

# **Mohanlal Sukhadia University, Udaipur**



## **College of Architecture**

**B.Arch**

**TEACHING SCHEME & SYLLABUS**  
**Effective from Academic Year 2021-2022**

**COURSE MATRIX**

| <b>YEAR I</b>      | <b>SEMESTER I</b>                          |              |          |           |                   |                   |              |           |
|--------------------|--------------------------------------------|--------------|----------|-----------|-------------------|-------------------|--------------|-----------|
|                    | <b>THEORY</b>                              | <b>Hours</b> |          |           | <b>Marks</b>      |                   |              | <b>Cr</b> |
| <b>Course Code</b> | <b>Course Name</b>                         | <b>L</b>     | <b>T</b> | <b>P</b>  | <b>IM<br/>20%</b> | <b>EM<br/>80%</b> | <b>Total</b> |           |
| B1AR01-CT01        | Architectural Structures-I                 | 2            | 0        | 0         | 20                | 80                | 100          | 2         |
| B1AR02-CT02        | Environmental Studies                      | 2            | 0        | 0         | 20                | 80                | 100          | 2         |
| B1AR03-CT03        | Human Settlement & Vernacular Architecture | 2            | 0        | 0         | 20                | 80                | 100          | 2         |
|                    |                                            |              |          |           |                   |                   |              |           |
|                    | <b>PRACTICAL/ STUDIO</b>                   |              |          |           |                   |                   |              |           |
| <b>Course Code</b> | <b>Course Name</b>                         | <b>L</b>     | <b>T</b> | <b>P</b>  | <b>IM<br/>60%</b> | <b>EM<br/>40%</b> | <b>Total</b> | <b>Cr</b> |
| B1AR04-CP01        | Architectural Drawing & Graphics           | 2            | 0        | 4         | 120               | 80                | 200          | 4         |
| B1AR05-CP02        | Visual Arts & Basic Design- I              | 1            | 0        | 4         | 90                | 60                | 150          | 3         |
| B1AR06-CP03        | Computer Applications- I                   | 0            | 0        | 2         | 30                | 20                | 50           | 1         |
| B1AR07-CP04        | Building Material & Construction- I        | 1            | 0        | 4         | 90                | 60                | 150          | 3         |
| B1AR08-CP05        | Model Making & Workshop                    | 1            | 0        | 2         | 60                | 40                | 100          | 2         |
| B1AR09-CP06        | Professional Communications                | 0            | 0        | 2         |                   | 50                | 50           | 1         |
|                    | <b>Total</b>                               | <b>11</b>    | <b>0</b> | <b>18</b> | <b>450</b>        | <b>550</b>        | <b>1000</b>  | <b>20</b> |
|                    | <b>Total Teaching Hours</b>                | <b>29</b>    |          |           |                   |                   |              |           |

**L- Lecture****T- Tutorial****P- Practical / Studio****IM- Internal Marks****EM- External Marks****Cr- Credits**

| YEAR I      | SEMESTER II                         |           |          |           |            |            |             |           |
|-------------|-------------------------------------|-----------|----------|-----------|------------|------------|-------------|-----------|
|             | THEORY                              | Hours     |          |           | Marks      |            |             | Cr        |
| Course Code | Course Name                         | L         | T        | P         | IM<br>20%  | EM<br>80%  | Total       |           |
| B2AR01-CT04 | Surveying & Leveling                | 2         | 0        | 0         | 20         | 80         | 100         | 2         |
| B2AR02-CT05 | Climatology                         | 2         | 0        | 0         | 20         | 80         | 100         | 2         |
| B2AR03-CT06 | Architectural Structures II         | 2         | 0        | 0         | 20         | 80         | 100         | 2         |
|             |                                     |           |          |           |            |            |             |           |
|             | PRACTICAL/ STUDIO                   |           |          |           |            |            |             |           |
| Course Code | Course Name                         | L         | T        | P         | IM<br>60%  | EM<br>40%  | Total       | Cr        |
| B2AR04-CP07 | Architectural Design- I             | 2         | 0        | 4         | 120        | 80         | 200         | 4         |
| B2AR05-CP08 | Visual Arts & Basic Design- II      | 1         | 0        | 4         | 90         | 60         | 150         | 3         |
| B2AR06-CP09 | Computer Applications- II           | 1         | 0        | 2         | 60         | 40         | 100         | 2         |
| B2AR07-CP10 | Building Material & Construction-II | 1         | 0        | 4         | 90         | 60         | 150         | 3         |
| B2AR08-CP11 | Surveying Lab                       | 0         | 0        | 2         | 30         | 20         | 50          | 1         |
| B2AR09-CP12 | Guided Study & Field Trip           | 0         | 0        | 2         | 30         | 20         | 50          | 1         |
|             | Total                               | <b>11</b> | <b>0</b> | <b>18</b> | <b>480</b> | <b>520</b> | <b>1000</b> | <b>20</b> |
|             | Total Teaching Hours                | <b>29</b> |          |           |            |            |             |           |

**L- Lecture**

**T- Tutorial**

**P- Practical / Studio**

**IM- Internal Marks**

**EM- External Marks**

**Cr- Credits**

| YEAR 1I     | SEMESTER III                         |           |          |           |            |            |            |           |
|-------------|--------------------------------------|-----------|----------|-----------|------------|------------|------------|-----------|
|             | THEORY                               |           | Hours    |           |            | Marks      |            | Cr        |
| Course Code | Course Name                          | L         | T        | P         | IM<br>20%  | EM<br>80%  | Total      |           |
| B3AR01-CT07 | Humanities                           | 2         | 0        | 0         | 20         | 80         | 100        | 2         |
| B3AR02-CT08 | History of Architecture-I            | 2         | 0        | 0         | 20         | 80         | 100        | 2         |
| B3AR03-CT09 | Architectural Structures III         | 2         | 0        | 0         | 20         | 80         | 100        | 2         |
|             |                                      |           |          |           |            |            |            |           |
|             | PRACTICAL/ STUDIO                    |           |          |           |            |            |            |           |
| Course Code | Course Name                          | L         | T        | P         | IM<br>60%  | EM<br>40%  | Total      | Cr        |
| B3AR04-CP13 | Architectural Design- II             | 1         | 0        | 6         | 120        | 80         | 200        | 4         |
| B3AR05-CP14 | Building Material & Construction-III | 1         | 0        | 4         | 90         | 60         | 150        | 3         |
| B3AR06-CP15 | Computer Applications- III           | 0         | 0        | 2         | 60         | 40         | 100        | 2         |
| B3AR07-CP16 | Structure Lab                        | 0         | 0        | 4         | 60         | 40         | 100        | 2         |
| B3AR08-CP17 | Guided Study & Field Trip            | 0         | 0        | 2         | 30         | 20         | 50         | 1         |
|             | Total                                | <b>8</b>  | <b>0</b> | <b>18</b> | <b>420</b> | <b>480</b> | <b>900</b> | <b>18</b> |
|             | Total Teaching Hours                 | <b>26</b> |          |           |            |            |            |           |

**L- Lecture**

**T- Tutorial**

**P- Practical / Studio**

**IM- Internal Marks**

**EM- External Marks**

**Cr- Credit**

| YEAR II     | SEMESTER IV                         |           |          |           |            |            |            |           |
|-------------|-------------------------------------|-----------|----------|-----------|------------|------------|------------|-----------|
|             | THEORY                              |           | Hours    |           |            | Marks      |            | Cr        |
| Course Code | Course Name                         | L         | T        | P         | IM<br>20%  | EM<br>80%  | Total      |           |
| B4AR01-CT10 | Specifications & Estimation         | 2         | 0        | 0         | 20         | 80         | 100        | 2         |
| B4AR02-CT11 | History of Architecture-II          | 2         | 0        | 0         | 20         | 80         | 100        | 2         |
| B4AR03-CT12 | Architectural Structures IV         | 2         | 0        | 0         | 20         | 80         | 100        | 2         |
|             |                                     |           |          |           |            |            |            |           |
|             | PRACTICAL/ STUDIO                   |           |          |           |            |            |            |           |
| Course Code | Course Name                         | L         | T        | P         | IM<br>60%  | EM<br>40%  | Total      | Cr        |
| B4AR04-CP18 | Architectural Design- III           | 1         | 0        | 6         | 120        | 80         | 200        | 4         |
| B4AR05-CP19 | Building Material & Construction-IV | 1         | 0        | 4         | 90         | 60         | 150        | 3         |
| B4AR06-CP20 | Measured Drawing & Documentation    | 1         | 0        | 2         | 60         | 40         | 100        | 2         |
| B4AR07-CP21 | Computer Applications- IV           | 1         | 0        | 2         | 60         | 40         | 100        | 2         |
| B4AR08-CP22 | Guided Study & Field Trip           | 0         | 0        | 2         | 30         | 20         | 50         | 1         |
|             | Total                               | <b>10</b> | <b>0</b> | <b>16</b> | <b>420</b> | <b>480</b> | <b>900</b> | <b>18</b> |
|             | Total Teaching Hours                | <b>26</b> |          |           |            |            |            |           |

**L- Lecture**

**T- Tutorial**

**P- Practical / Studio**

**IM- Internal Marks**

**EM- External Marks**

**Cr- Credit**

| YEAR III    | SEMESTER V                                                                  |           |          |           |            |            |            |           |
|-------------|-----------------------------------------------------------------------------|-----------|----------|-----------|------------|------------|------------|-----------|
|             | THEORY                                                                      |           | Hours    |           |            | Marks      |            | Cr        |
| Course Code | Course Name                                                                 | L         | T        | P         | IM<br>20%  | EM<br>80%  | Total      |           |
| B5AR01-CT13 | Building Plumbing Services                                                  | 2         | 0        | 0         | 20         | 80         | 100        | 2         |
| B5AR02-CT14 | History of Architecture-III                                                 | 2         | 0        | 0         | 20         | 80         | 100        | 2         |
| B5AR03-CT15 | Architectural Structures V                                                  | 2         | 0        | 0         | 20         | 80         | 100        | 2         |
|             |                                                                             |           |          |           |            |            |            |           |
|             | PRACTICAL/ STUDIO                                                           |           |          |           |            |            |            |           |
| Course Code | Course Name                                                                 | L         | T        | P         | IM<br>60%  | EM<br>40%  | Total      | Cr        |
| B5AR04-CP23 | Architectural Design- IV<br>(Including Educational Tour)                    | 1         | 0        | 6         | 120        | 80         | 200        | 4         |
| B5AR05-CP24 | Building Material & Construction-V                                          | 1         | 0        | 4         | 90         | 60         | 150        | 3         |
| B5AR06-CP25 | Interior Design                                                             | 1         | 0        | 2         | 60         | 40         | 100        | 2         |
| B5AR07-CP26 | Elective-I<br>1. Furniture Design<br>2. Product Design<br>3. Digital Design | 1         | 0        | 4         | 90         | 60         | 150        | 3         |
| B5AR08-CP27 | Guided Study & Field Trip                                                   | 0         | 0        | 2         | 30         | 20         | 50         | 1         |
|             | Total                                                                       | <b>10</b> | <b>0</b> | <b>18</b> | <b>450</b> | <b>500</b> | <b>950</b> | <b>19</b> |
|             | Total Teaching Hours                                                        | <b>28</b> |          |           |            |            |            |           |

**L- Lecture**

**T- Tutorial**

**P- Practical / Studio**

**IM- Internal Marks**

**EM- External Marks**

**Cr- Credit**

| YEAR III    | SEMESTER VI                                                                                                                        |           |          |           |            |            |            |           |
|-------------|------------------------------------------------------------------------------------------------------------------------------------|-----------|----------|-----------|------------|------------|------------|-----------|
|             | THEORY                                                                                                                             |           | Hours    |           |            | Marks      |            | Cr        |
| Course Code | Course Name                                                                                                                        | L         | T        | P         | IM<br>20%  | EM<br>80%  | Total      |           |
| B6AR01-CT16 | Building Electrical Services                                                                                                       | 2         | 0        | 0         | 20         | 80         | 100        | 2         |
| B6AR02-CT17 | History of Architecture-IV                                                                                                         | 2         | 0        | 0         | 20         | 80         | 100        | 2         |
| B6AR03-CT18 | Architectural Structures VI                                                                                                        | 2         | 0        | 0         | 20         | 80         | 100        | 2         |
|             |                                                                                                                                    |           |          |           |            |            |            |           |
|             | PRACTICAL/ STUDIO                                                                                                                  |           |          |           |            |            |            |           |
| Course Code | Course Name                                                                                                                        | L         | T        | P         | IM<br>60%  | EM<br>40%  | Total      | Cr        |
| B6AR04-CP28 | Architectural Design- V                                                                                                            | 1         | 0        | 6         | 120        | 80         | 200        | 4         |
| B6AR05-CP29 | Building Material & Construction-VI                                                                                                | 1         | 0        | 4         | 90         | 60         | 150        | 3         |
| B6AR06-CP30 | Landscape Design                                                                                                                   | 1         | 0        | 2         | 60         | 40         | 100        | 2         |
| B6AR07-CP31 | Elective-II<br>1. History of Architecture of Rajasthan<br>2. Vernacular Architecture of Rajasthan<br>3. Arts & Crafts of Rajasthan | 1         | 0        | 4         | 90         | 60         | 150        | 3         |
| B6AR08-CP32 | Guided Study & Field Trip                                                                                                          | 0         | 0        | 2         | 30         | 20         | 50         | 1         |
|             | Total                                                                                                                              | <b>10</b> | <b>0</b> | <b>18</b> | <b>450</b> | <b>500</b> | <b>950</b> | <b>19</b> |
|             | Total Teaching Hours                                                                                                               | <b>28</b> |          |           |            |            |            |           |

**L- Lecture**

**T- Tutorial**

**P- Practical / Studio**

**IM- Internal Marks**

**EM- External Marks**

**Cr- Credit**

| YEAR IV     | SEMESTER VII                                                                                  |           |          |           |            |            |            |           |
|-------------|-----------------------------------------------------------------------------------------------|-----------|----------|-----------|------------|------------|------------|-----------|
|             | THEORY                                                                                        | Hours     |          |           | Marks      |            |            | Cr        |
| Course Code | Course Name                                                                                   | L         | T        | P         | IM<br>20%  | EM<br>80%  | Total      |           |
| B7AR01-CT19 | Building Mechanical Services                                                                  | 2         | 0        | 0         | 20         | 80         | 100        | 2         |
| B7AR02-CT20 | Contract Documents & Byelaws                                                                  | 2         | 0        | 0         | 20         | 80         | 100        | 2         |
| B7AR03-CT21 | Acoustics & Illumination                                                                      | 2         | 0        | 0         | 20         | 80         | 100        | 2         |
|             |                                                                                               |           |          |           |            |            |            |           |
|             | PRACTICAL/ STUDIO                                                                             |           |          |           |            |            |            |           |
| Course Code | Course Name                                                                                   | L         | T        | P         | IM<br>60%  | EM<br>40%  | Total      | Cr        |
| B7AR04-CP33 | Architectural Design- VI                                                                      | 1         | 0        | 6         | 120        | 80         | 200        | 4         |
| B7AR05-CP34 | Working Drawing                                                                               | 1         | 0        | 4         | 90         | 60         | 150        | 3         |
| B7AR06-CP35 | Settlement Planning                                                                           | 1         | 0        | 2         | 60         | 40         | 100        | 2         |
| B7AR07-CP36 | Elective-III<br>1. Universal Design<br>2. Research Methodology<br>3. Architectural Journalism | 1         | 0        | 4         | 90         | 60         | 150        | 3         |
| B7AR08-CP37 | Guided Study & Field Trip                                                                     | 0         | 0        | 2         | 30         | 20         | 50         | 1         |
|             | <b>Total</b>                                                                                  | <b>10</b> | <b>0</b> | <b>18</b> | <b>450</b> | <b>500</b> | <b>950</b> | <b>19</b> |
|             | <b>Total Teaching Hours</b>                                                                   | <b>28</b> |          |           |            |            |            |           |

**L- Lecture**

**T- Tutorial**

**P- Practical / Studio**

**IM- Internal Marks**

**EM- External Marks**

**Cr- Credit**

| YEAR IV     | SEMESTER VIII                                                                                                                                                                          |          |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Course Code | Course Name                                                                                                                                                                            | Duration |
|             | Practical Training<br>1. Presentation & Approval Drawings<br>2. Site Visits & Studies<br>3. Critical appraisal of built projects<br>4. Working Drawing & Details<br>5. Training Report | 140 days |

| YEAR V            | SEMESTER IX                                                           | Hours     |          |           | Marks      |            |             | Cr        |
|-------------------|-----------------------------------------------------------------------|-----------|----------|-----------|------------|------------|-------------|-----------|
| THEORY            |                                                                       | L         | T        | P         | IM 20%     | EM 80%     | Total       |           |
| Course Code       | Course Name                                                           |           |          |           |            |            |             |           |
| B9AR01-CT22       | Professional Practice & Management                                    | 2         | 0        | 0         | 20         | 80         | 100         | 2         |
| B9AR02-CT23       | Sustainable Architecture                                              | 2         | 0        | 0         | 20         | 80         | 100         | 2         |
| B9AR03-CT24       | Disaster Resistant Architecture                                       | 2         | 0        | 0         | 20         | 80         | 100         | 2         |
|                   |                                                                       |           |          |           |            |            |             |           |
| PRACTICAL/ STUDIO |                                                                       | L         | T        | P         | IM 60%     | EM 40%     | Total       | Cr        |
| Course Code       | Course Name                                                           |           |          |           |            |            |             |           |
| B9AR04-CP38       | Architectural Design- VII                                             | 1         | 0        | 6         | 120        | 80         | 200         | 4         |
| B9AR05-CP39       | Dissertation (Including Thesis Seminar)                               | 1         | 0        | 4         | 90         | 60         | 150         | 3         |
| B9AR06-CP40       | Training Presentation                                                 | 0         | 0        | 4         | 90         | 60         | 150         | 2         |
| B9AR07-CP41       | Elective-IV<br>1. Housing<br>2. Urban Design<br>3. Urban Conservation | 1         | 0        | 4         | 90         | 60         | 150         | 3         |
| B9AR08-CP42       | Guided Study & Field Trip                                             | 0         | 0        | 2         | 30         | 20         | 50          | 1         |
|                   | <b>Total</b>                                                          | <b>9</b>  | <b>0</b> | <b>20</b> | <b>480</b> | <b>520</b> | <b>1000</b> | <b>19</b> |
|                   | <b>Total Teaching Hours</b>                                           | <b>29</b> |          |           |            |            |             |           |

**L- Lecture**

**T- Tutorial**

**P- Practical / Studio**

**IM- Internal Marks**

**EM- External Marks**

**Cr- Credit**

| YEAR V       | SEMESTER X                                                                                                                  | Hours     |          |           | Marks      |            |            | Cr        |
|--------------|-----------------------------------------------------------------------------------------------------------------------------|-----------|----------|-----------|------------|------------|------------|-----------|
|              |                                                                                                                             | L         | T        | P         | IM<br>60%  | EM<br>40%  | Total      |           |
| B10AR01-CP43 | Thesis Project                                                                                                              | 2         | 0        | 10        | 210        | 140        | 350        | 7         |
| B10AR02-CP44 | Elective- V:<br>Design Elective Related to Thesis<br>1. Interior Design<br>2. Landscape Design<br>3. Urban design           | 1         | 0        | 4         | 90         | 60         | 150        | 3         |
| B10AR03-CP45 | Elective VI:<br>Technology Elective Related to Thesis<br>1. Plumbing Design<br>2. Electrical Design<br>3. Mechanical Design | 1         | 0        | 4         | 90         | 60         | 150        | 3         |
| B10AR04-CP46 | Guided Study & Field Trip                                                                                                   | 0         | 0        | 2         | 30         | 20         | 50         | 1         |
|              | <b>Total</b>                                                                                                                | <b>4</b>  | <b>0</b> | <b>20</b> | <b>420</b> | <b>280</b> | <b>700</b> | <b>14</b> |
|              | <b>Total Teaching Hours</b>                                                                                                 | <b>24</b> |          |           |            |            |            |           |

**L- Lecture**

**T- Tutorial**

**P- Practical / Studio**

**IM- Internal Marks**

**EM- External Marks**

**Cr- Credit**

**ARCHITECTURAL STRUCTURES I****B.ARCH Semester: I****Code: B1AR01-CT01****Course Objectives:** Introducing simple structural concepts and behaviour of structural elements.**Anticipated Learning Outcomes:** Understanding of concepts taught in the semester through simple numerical calculations and models

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                      |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Forces:</b> Concept of Force, Graphical Presentation of Force, Coplanar and non Coplanar Forces, Concurrent and Non Concurrent Forces, Composition and Resolution of Coplanar Forces by Graphical and Analytical Methods.                                                                                                                 |
| 2    | <b>Centroids And Moment Of Inertia Of Plane Areas:</b> Built up Steel Sections, Centre of Gravity And Moments of Inertia, Parallel Axes Theorem, Product of Inertia, Radius of gyration, Perpendicular axis theorem.                                                                                                                         |
| 3    | <b>Lifting Machines:</b> Mechanical Advantage, Velocity Ratio and Efficiency, Law of Machine, Pulleys and Pulley Blocks.                                                                                                                                                                                                                     |
| 4    | <b>Simple Stresses and Strains:</b> Concept of stress and strain in three dimensions and generalized Hooke's law; Young's modulus; Tension test of mild steel and other materials: true and apparent stress, ultimate strength, yield stress and permissible stress; Stresses in prismatic & non prismatic members and in composite members. |
| 5    | <b>Types of Loads:</b> Requirements of good structures, safety, stability, economy, Dead, Live, Wind, Impact, Earthquake, Concentrated, Uniformly Distributed and Varying Loads, loads system, critical combination of loads, earthquake forces, and wind loads on tall building.                                                            |
|      | <b>TOTAL</b>                                                                                                                                                                                                                                                                                                                                 |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                     | YEAR OF PUBLICATION |
|------|----------------------------------------------------------------------------------------|---------------------|
| 1    | B.C.Punmia, "Strength of Materials", Laxmi Publications (P) Ltd., New Delhi            | 2006                |
| 2    | Ashok Jhunjhunwala, "Engineering Mechanics", Tata McGraw Hills                         | 2009                |
| 3    | Singer and Patel, "Strength of Material", Harper Collins Publishers                    | 2008                |
| 4    | Timoshenko & Gere, "Mechanics of Structures", CBS Publishers and Distributers.         | 2009                |
| 5    | S.B Junnarkar, "Mechanics of Structures Vol. I & II", Charotar Publishing House, Anand | 2009                |

**ENVIRONMENTAL STUDIES****B.ARCH Semester 1****Code: B1AR02-CT02**

**Course Objectives:** To bring about awareness of a variety of environmental concerns and to create a pro-environment attitude and behavioural pattern in society based on sustainable lifestyles.

**Anticipated Learning Outcomes:** Awareness of a wide range of environmental concerns and ability to act at their own level to protect the environment we all live in.

| UNIT | CONTENT                                                                                                                                                                                                                                                                                        |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Fundamentals of Ecology &amp; Environment</b> - Fundamental of Ecology, Environment, Resources, Sustainable habitats and ecological footprints of cities.                                                                                                                                   |
| 2    | <b>Fundamentals of Impact of human activities on Environment</b> - Impact of human activities on ecology and our environment leading to water pollution, air pollution, noise pollution etc., overall environmental degradation, reduced quality of life, climate change and natural disaster. |
| 3    | <b>Fundamentals of environmental Planning and Design</b> - Built Environment, new urbanism and sustainable architecture leading to energy efficient, environment friendly, low waste human settlements, climate friendly, energy efficient green buildings and art in our built environment.   |
| 4    | <b>Fundamentals of Environmental Legislations</b> - Introduction to salient provisions of environmental legislation in India and concerned departments / agencies for basic understanding.                                                                                                     |
| 5    | <b>Fundamentals of Environmental Impact Assessment</b> and Environmental clearance of projects pertaining to Built Environment for basic understanding.                                                                                                                                        |
|      | <b>TOTAL</b>                                                                                                                                                                                                                                                                                   |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                      | YEAR OF PUBLICATION |
|------|---------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Engene P. Odum and Garry W Barreit "Fundamentals of Ecology" Thomson – Brooks/ Cole                     | 2006                |
| 2    | A.K.Jain "Ecology and Nature Resource Management for Sustainable Development" Management Publishing Co. | 2001                |
| 3    | Goudi Andren "The human impact in Natural Environment", Basic Btackwell, Oxford                         | 1981                |
| 4    | McHarg Ian "Design with Nature" – Natural History Press, New York                                       | 1969                |
| 5    | James Steele, "Ecological Architecture", Thames & Hudson                                                | 2005                |

**HUMAN SETTLEMENT & VERNACULAR ARCHITECTURE**  
**Code: B1AR03-CT03**
**B.ARCH Semester I**

**Course Objectives:** Introduce traditions of building structures for habitation, made without the intervention of professional architects.

**Anticipated Learning Outcomes:** Familiarity with simple ways of building and settling a community that related to local customs, social systems, climate, available materials and construction methods.

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                 |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Vernacular architecture including primitive or aboriginal architecture; indigenous architecture; ancestral or traditional architecture; folk, popular, or rural architecture;                                                                                                                                                                           |
| 2    | Ethnic architecture or ethno-architecture; informal architecture; the so-called "anonymous architecture" or "architecture without architects;" and even "non-pedigree" architecture                                                                                                                                                                     |
| 3    | Early human settlements — Causal factors and pattern of development. Human settlements of River valleys civilisation (e.g. Indus-valley civilisation, Egyptian civilisation, etc. Early Vedic civilisation patterns, Canonical patterns as per various Indian contexts.                                                                                 |
| 4    | Vernacular architecture in Indian context<br>Definition(s) of vernacular architecture and related terminologies; Difference between vernacular architecture and traditional architecture; Relevance of vernacular architecture in present context; Typologies in different climatic regions of India.                                                   |
| 5    | Settlements and dwelling patterns Regional dwelling patterns like 'dhanis' (hamlets), villages and their overall adaptation in the said context; Settlements and their vicinity to water resource(s) as places of worship and social activity; water related architecture and typical water resources like kua, kohar, baoli/bavdi, jhalora, bera/beri. |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                            | YEAR OF PUBLICATION |
|------|-------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Brunskill, R. W. Illustrated Handbook of Vernacular Architecture. Castle Rock : Faber & Faber.                                | 1987                |
| 2    | Christian Schittich (Ed.) Vernacular Architecture Atlas for living throughout the world. Birkhauser                           | 2019                |
| 3    | Lindsay Asquith & Marcel Vellinga, Vernacular Architecture in the 21st Century, Theory Education & Practice, Taylor & Francis | 2020                |
| 4    | Kingston Wm.Heath, Vernacular Architecture & Regional Design, Routledge                                                       | 2020                |
| 5    | Cooper, I and Dawson, B. Traditional buildings of India. London : Thames & Hudson.                                            | 1998                |

**ARCHITECTURAL DRAWING & GRAPHICS****B.ARCH Semester: I****Code: B1AR04-CP01**

**Course Objectives:** Introducing basic principles of design, space articulation and architecture and the use of drawing as a communication tool for design information.

**Anticipated Learning Outcomes:** Ability to assemble simple spatial elements in articulated constructs and visually represent them through hand-made 2D drawings and models.

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Free hand &amp; Scale drawing</b> – Introduction to subject. Getting acquainted with necessary instruments of drawing. Learning to draw straight & curved lines with different qualities. Terminology & abbreviations used in architectural drawing. Learning good lettering to improve and maintain quality of presentation. Different types of lettering for titles and annotation of drawings. Introduction to various types of lines such as outline, construction line, centre line etc. Use of scale in drawings and their use in practice & construction of plain & diagonal scale. Reduction and enlarging of given drawings |
| 2    | <b>Orthographic projections</b> – Learning meaning of terms 'Plan and Elevations' and using them for drawing simple objects through orthographic projections. Orthographic projection of lines for any given condition determination of true length, traces and inclinations to the planes of projection of any given line. Traces of planes, plane figure inclined to one or both the reference planes. Simple solids like prisms, pyramids, tetrahedron cone, spheres in different position to the reference plane.                                                                                                                   |
| 3    | <b>Metric &amp; Complex Projections</b> – Different ways of presentation of solids in 3D projections like Axonometric, Isometric, oblique. Learning principles of solids, applying them to workout and drawing developed surfaces of simple geometric solids and using them to make models of some of them. Section planes in different angles, drawing of true section and introduction of slicing method. Interpenetration of solids.                                                                                                                                                                                                 |
| 4    | <b>Perspective Projections</b> – Understanding basic principles of perspective drawings. Introduction of basic elements such as station point, picture plane, eye level, centre of vision, cone of vision, vanishing points etc. Drawing one point and two point perspectives through plan and elevation method, plan and vanishing points method & measuring point method. Types of perspective projections such as one point, two point, three point, worm's eye view, bird's eye view, Normal view etc.                                                                                                                              |
| 5    | <b>Sciography</b> – Introduction to sciography, understanding shade & shadow, umbra & penumbra, Principles of conventional angle of light and its rays acting as a projectors to cast shadow of simple plane. Studying sciography and methods of representing it in 2D projections. Applying sciography to 3D geometrical projections especially Isometric projections.                                                                                                                                                                                                                                                                 |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                           | YEAR OF PUBLICATION |
|------|------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Philip Meggs, "A History of Graphic Design", John Wiley & Sons; 3 edition                                                    | 1998                |
| 2    | N.D.Bhatt, "Elementary Engineering", Charotar Publishing House, Anand                                                        | 1991                |
| 3    | Edward J.Muller, James G. Fausett, Philip A. Grau, "Architectural Drawing and Light Construction", Prentice hall New Jersey  | 1991                |
| 4    | Alexander W. White, "The elements of Graphic Design Space, Unity, Page, Architecture and Types", All worth press, 1 edition. | 2001                |
| 5    | Francis D.K.Ching with Steven P. Juroszek, "Design Drawing", John wiley & sons, NY.                                          | 1998                |

**VISUAL ARTS & BASIC DESIGN- I**  
**Code: B1AR05-CP02**
**B.ARCH Semester: I**

**Course Objectives:** Introducing free-hand drawing and Two-Dimensional graphic design as a way of understanding the place of art in architecture.

**Anticipated Learning Outcome:** Ability to draw in various media and materials, to develop the power of drawing as a means of coordinating eye and hand in studio and field observation, to judge proportion, scale, and spatial relationships, understand principles of visual composition and experiment with them.

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Elements of Visual Arts:</b> Brief historical review of Fine arts and interdependency of Visual arts, Architecture, painting & sculpture. Exposure to the life & works of famous artists & art forms. Theories related to visual perception –Proximity, repetition, simplest and largest figure, continuity & closure, Figure & ground relationship. Study of Line, Form, Colour, Texture, Space through Observation, Perception and Expression. Study of classification of colours with different hues , values and shades. Colour wheel and colour composition, Properties of colour. |
| 2    | <b>Principles of Art and Design:</b> Exploration of the basic principles of composition such as Balance, Proportion, Harmony, Contrast, Emphasis, character with building examples. Ordering principles such as Axis,Symmetry,Hierarchy,Datum,Rhythm & Repetition etc. and its role in architectural expression.                                                                                                                                                                                                                                                                           |
| 3    | <b>Two Dimensional Explorations:</b> Introduction to Principles of Organization/ Composition. Study of Visual properties of 2-Dimensional forms both Geometrical & Non-Geometrical surfaces and visual textures, optical illusions etc. Emphasizing on Elements and Principles of Art and Design by Composing Shapes and Forms in Various Mediums.                                                                                                                                                                                                                                         |
| 4    | <b>Indoor and Outdoor Sketching:</b> Learning to Draw by Seeing and Observing. Free hand line sketching and drawing of natural & manmade, Still and Moving Objects such as Human Figures, Vegetation, Automobiles, Historic or new built up structures etc.                                                                                                                                                                                                                                                                                                                                |
| 5    | <b>Rendering:</b> Shading Techniques using Materials such as Pencils, Pencil Colours, Water Colours, Poster Colours, Pen and Ink, charcoal & crayons for development of environmental and architectural ideas. Simple geometric objects, complex geometries and objects in nature & Architecture , shade and shading techniques.                                                                                                                                                                                                                                                           |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                   | YEAR OF PUBLICATION |
|------|----------------------------------------------------------------------|---------------------|
| 1    | Robert Gill, “Rendering with pen and ink”, Thames & Hudson           | 1990                |
| 2    | Gianni A. Sarcone, “Drawing & Illustration”, Arcturus Publication    | 2012                |
| 3    | Otto G. Ocvirk, “Art Fundamentals”, Mcgraw Hill                      | 2006                |
| 4    | Gianni A. Sarcone, “Drawing optical illusions”, Arcturus Publication | 2012                |
| 5    | Trudy Friend, “Landscape problem and solutions”, David & Charles     | 2005                |

**COMPUTER APPLICATIONS- I****B.ARCH Semester: I****Code: B1AR06-CP03**

**Course Objectives:** Introducing basic computer skills as relevant to the architectural profession and to bring all students from different backgrounds up to a common level of computer proficiency.

**Anticipated Learning Outcomes:**

Ability to do word and image processing to make short reports and seminar presentations and make 2D orthographic projections in CAD.

| UNIT | CONTENT                                                                                                                                                                                                                                                                                    |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Word processing:</b> Basic templates for creating text documents, editing, formatting, spelling/grammar check, dictionary and thesaurus, page layout, fonts, indentation, inserting tables and images, document review and annotation in software like MS Word.                         |
| 2    | <b>Numerical processing:</b> preparing and editing spreadsheets in software like MS Excel. Collating raw data into numbers for analytical use.                                                                                                                                             |
| 3    | Slide Presentations in software like MS PowerPoint, insertion of drawings, audio/video clips.                                                                                                                                                                                              |
| 4    | Introduction to Computer Applications in Architecture. Introduction to drafting and modeling software relevant to architecture viz. AutoCAD, Proge CAD, ZWCAD, Draft sight, Google Sketchup, 3ds Max etc.                                                                                  |
| 5    | Simple exercises in to 2D CAD software (AutoCAD/Revit) specifically for proficiency of, drawing/editing objects, text, dimensioning, making and inserting blocks, etc. and an understanding of units settings, scale, limits, line type, line weight, layers, colours, and print commands. |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                   | YEAR OF PUBLICATION |
|------|--------------------------------------------------------------------------------------|---------------------|
| 1    | Cadfolks, "Autocad 2014 for Beginners", Create Space Independent Publishing Platform | 2014                |
| 2    | Bill Fane, "AutoCAD 2014 For Dummies", John Wiley & Sons                             | 2013                |
| 3    | Randy H. Shih, "Exploring DraftSight" Schroff Development Corp                       | 2009                |
| 4    | Chris Grover, "Google Sketch Up", Shroff/O'Reilly                                    | 2009                |
| 5    | Kelly L. Murdock, "Google SketchUp and SketchUp Pro 7 Bible"                         | 2009                |

**BUILDING MATERIAL & CONSTRUCTION-I****B.ARCH Semester: I****Code: B1AR07-CP04****Course Objectives:** To introduce students to primary building materials and simple construction techniques as applicable to a low-rise building- three to four storied contemporary building.

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Building Stones</b> —Classification of rocks, Quarrying of building stones, Properties of building stones, Common building stones and their uses, Qualities of good building stones, Defects in stones and their remedial measures, Physical tests on stones such as absorption test, hardness test, crushing test etc., Artificial stones, Dressing and various finishes on stones. B.I.S. specification for stones. Various building elements such as foundation, wall, roof/floor and openings using stones in load bearing construction. Classification of arches. Construction of staircase, ramp, retaining wall, columns and piers in stone. Use of stone in various building components such as door window frame, lintel, sill, etc. |
| 2    | <b>Earth, Soil and Laterite</b> —Types and Properties of Earth, Soil and Laterite. Construction systems such as adobe, rammed earth, wattle and daub, CSEB etc., Problems of Earth, Soil and Laterite construction and their remedial measures. Soil stabilizers, Physical tests on earth, soil & laterite, BIS specification. Various building elements such as foundation, wall, openings using earth, soil and laterite in load bearing construction. Construction of staircase, ramp, retaining wall, Column and Piers in earth, soil and Laterite. Adobe, rammed earth, wattle & daub construction in mud.                                                                                                                                  |
| 3    | <b>Bricks</b> - Composition of good brick earth, Manufacturing of bricks, Properties of bricks, Qualities of good bricks, Classification of bricks, Market forms of bricks such as hollow brick, bullnose brick, perforated, etc. Uses of bricks in building, storage of bricks, Physical tests for bricks, Brick substitutes, BIS specifications. Various building elements such as foundation, wall, roof, floor and openings using bricks in load bearing construction. Special bonds in brick such as rat trap bond, herring bone bond, etc. Details at junctions and quoins. Construction of staircase, ramp and retaining wall in Brick.                                                                                                   |
| 4    | <b>Clay Products &amp; Pozzolanas</b> – Types of Tiles, Characteristics of a good tile, Manufacture of tiles, Earthenware, Stoneware, Porcelain, Clay blocks. Natural & Artificial Pozzolanic materials, Advantages of addition of pozzolanas, Storing of pozzolanas, Chemical & physical characteristics of fly ash. BIS specifications. Various building elements such as roof and floor using clay products such as roof and floor tiles. Use of clay products in various building components.                                                                                                                                                                                                                                                |
| 5    | <b>Protective finishes, Machines &amp; Equipments</b> – Protective finishes on building stones, earth laterite bricks and clay products. Protective finishes such as Damp proofing and water proofing in case of construction in stones, earth, laterite and bricks. Study of Machines & Equipments for manufacturing, transportation, preparation and laying of building stone, earth, brick and clay products. Drawings of machines and equipments used for manufacturing, transportation, preparation and lying of building stone, earth, brick and clay products.                                                                                                                                                                            |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                         | YEAR OF PUBLICATION |
|------|--------------------------------------------------------------------------------------------|---------------------|
| 1    | S.C.Rangwala, “Engineering Materials”, Charota Publishing Housing Pvt. Ltd. Anand (Gujrat) | 1997                |
| 2    | Sushil Kumar, “Building Construction”, M/s. Standard Publishers & Distributors, Delhi      | 2003                |
| 3    | Robin Barry, “The construction of buildings (Vol. I-V)”, Blackwell publishing              | 2000                |
| 4    | Francis D.K.Ching, “Building Construction Illustrated”, John Wiley                         | 1975                |
| 5    | Handbook on Building Construction Practices, BIS, New Delhi                                | 1997                |

**MODEL MAKING AND WORKSHOP****B.ARCH Semester 1****Code: B1AR08-CP05****Course Objectives:** Introduce different techniques of model making in various materials and basic processes for fabrication and assembly of simple building components**Anticipated Learning Outcomes:** Ability to make true scale models of architectural designs, manually and mechanically and familiarity with carpentry, joinery, smithy and moulding with different materials and techniques.

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                 |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Model Making:</b><br>(a) Surface Modelling: Basic geometry like cube, cuboid, cylinder, cone, pyramids by single surface development through cutting and pasting.<br>(b) Form Modelling: basic geometry by using thermocol & various solid materials to understand the characteristics of materials. |
| 2    | <b>Model Making (Advance):</b> Study of complex figures to achieve complexity in model making, with addition & subtraction in basic geometry by using paper, mount sheet, mount boards etc.                                                                                                             |
| 3    | <b>Photography:</b> About the Types of Camera, accessories, lenses, films their usages, setting of camera, aperture, & Shutter speed settings, compositions with respect to view finder, E.V. value colour, white balance, I.S.O. & Exposure.                                                           |
| 4    | <b>Carpentry &amp; Metal Workshop:</b> Types of joint in wood such as butt, dovetails, rebate, tongue and groove etc. how to cut and weld the metal, molding, bolting, usages of fabrication in architecture.                                                                                           |
| 5    | <b>Modeling &amp; Casting Techniques:</b> volumetric study using clay and Plaster of Paris, Clay Modeling, Types of Clay, Casting in Plaster of Paris and other materials                                                                                                                               |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                  | YEAR OF PUBLICATION |
|------|-----------------------------------------------------------------------------------------------------|---------------------|
| 1    | Donald Stoltenberg, "The Artist & Built Environment", Davis Publication                             | 1980                |
| 2    | Keith Critchlow, "Order in Space", Thames & Hudson                                                  | 2000                |
| 3    | R.C.Gupta, "Basic Shop Theory carpentry", Dhanpat Rai publications                                  |                     |
| 4    | Edward Luce Smith, Paul J Karlstroam, "Fletcher Benton", Harry N Abrams publications, First Edition | 1990                |
| 5    | Robert J. Lang, "Origami animals", Crescent Books Publishers                                        | 1992                |

**PROFESSIONAL COMMUNICATIONS****B.Arch Semester: I****Code:BIAR09-CP06**

**Course Objectives:** Introduce basis language skills for oral professional communication that enables effective conversation in the classroom and participation in conferences and seminars.

**Anticipated Learning Outcomes :** Students should be able to speak and understand spoken English to carry out a meaningful conversation on topics related to Architecture, particularly in the Studio.

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                    |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Importance of conversation, definition, process and feedback in communication, cultural influences as barriers to effective communication, features of effective communication                                                                                                                                                                                             |
| 2    | Types of professional communication, Letters, Email, short messages, reports, listening and responding, Live, Tele – and Video-conferencing as a media of modern communication, ethics related to various forms of communications.                                                                                                                                         |
| 3    | Planning, composing, and writing, Guide to effective writing: Planning and conducting conversations, interviews, preparation and rehearsal of oral statements for presentations, body language, effective listening, telephonic communication.                                                                                                                             |
| 4    | Dimensions of communication (Formal and Informal, upward, downward etc.)                                                                                                                                                                                                                                                                                                   |
| 5    | Writing a short Research Paper. This exercise is to be followed up continually in all courses throughout the program wherein students are assigned to write a paper on a particular topic related to the course as decided by the subject teacher concerned. This may include reportage of readings, site visits, field trips, conversations with experts and public, etc. |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                 | YEAR OF PUBLICATION |
|------|------------------------------------------------------------------------------------|---------------------|
| 1    | Raman, M. & Sharma, S., Technical Communication : Principles and Practice, 2nd Ed. |                     |
| 2    | Market, Mike, Technical Communication                                              | 2012                |
| 3    | Rizvi, M. Ashraf, Effective Technical Communication,                               |                     |
| 4    | Anderson, Paul V., Technical Communication : A Reader- Centred Approach, 6 Ed.     |                     |

**SURVEYING & LEVELING**  
**Code: B2AR01-CT04**
**B.ARCH Semester: II**

**Course Objectives:** Introduce principles of topographical survey and their application.

**Anticipated Learning Outcomes:** Working knowledge of manual and digital surveying techniques, ability of demarcating features and setting out a simple building on site.

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                            |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Introduction:</b> Principles and classification of survey, Basic measurements in surveying, Basic methods of surveying, Different types of transverse.                                                                                                                                                                                                                                                          |
| 2    | <b>Horizontal Survey:</b> Chain survey - Introduction, Instruments, Types of chains and tapes, their uses and construction details. Compass survey - Introduction, Different type of compass, Meridians, Bearings, Dip, Declination, Local attraction, Adjustment of angles, Loose needle and fast needle method, Compass transverse. Plane Table survey - Elements of plane table survey, Plane table transverse. |
| 3    | <b>Vertical survey:</b> Levelling - Basic definitions, Types of levelling, Instruments like Theodolite, Dumpy level etc., sources of errors, Computations & Permanent adjustment of levels. Theodolite survey - Introduction, Basic definitions, Construction details, Temporary adjustment, Measurement of vertical and horizontal angle, Area computations by planimeter.                                        |
| 4    | <b>Contouring:</b> Contour – Definition, contour signature of various land forms, Contouring and Earth work calculation.                                                                                                                                                                                                                                                                                           |
| 5    | <b>Setting out work for buildings:</b> Introduction, Controls for setting out, horizontal control, vertical control, setting out in vertical direction, Positioning of structure, Setting out of foundation trenches.                                                                                                                                                                                              |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                | YEAR OF PUBLICATION |
|------|-----------------------------------------------------------------------------------|---------------------|
| 1    | Arora, “Surveying”, Raj Sons Publications Pvt. Ltd.                               | 1996                |
| 2    | S.C.Rangwala, “Surveying & Levelling”, Charotar Publishing House, Anand (Gujarat) | 2005                |
| 3    | Dr. B.C.Punmia, “Surveying”, Laxmi Publication (P) Ltd., New Delhi                | 2002                |
| 4    | William Irvine, “Surveying for Construction”, McGraw Hill Book Co., New Delhi     | 1995                |
| 5    | John Clancy, “Site Surveying & Levelling”, Arnold London                          | 1991                |

**CLIMATOLOGY**  
**Code: B2AR02-CT05**
**B.ARCH Semester: II**

**Course Objectives:** Understanding the elements of climate and how architecture responds to them architecture in order to develop bioclimatic design in buildings. **Anticipated Learning Outcomes:** Ability to interpret climatic data for design, understanding sun path diagrams, shadow angles, daylight factors, read wind charts and assess volume of natural ventilation

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Introduction to Climatology:</b> Importance of climate in Architecture, Weather & Climate, tilt of earth axis, solar radiation quantities & earth's thermal balance. Macro and Micro climate, elements of climate such as temperature, humidity, solar radiation, wind etc. Solar geometry, sun path diagram, types and design of shading devices.                                                                                  |
| 2    | <b>Analysis of Climate:</b> Different types of climatic zones and their characteristics. Climatological site analysis and its application in site planning and design evolution.                                                                                                                                                                                                                                                       |
| 3    | <b>Thermal Comfort:</b> Thermal comfort factors, Methods of heat transfer, Thermal comfort Indices, Application of ET, CET, Psychometric chart and Bioclimatic chart. Thermal Behaviour of Building Elements & Materials: Thermal quantities, Time lag & decrement factor, Thermal conductivity, Thermal transmittance, Thermal Resistance, Thermal bridging, Thermal behaviour of different materials, Effect of multilayered bodies. |
| 4    | <b>Day light, Ventilation &amp; Air Movement:</b> Natural light sources, daylight factors, day light contours & calculations. Air movement & ventilation, functions of ventilations, types of ventilation, Air movement standards, Effect of opening on ventilation.                                                                                                                                                                   |
| 5    | <b>Passive means of thermal control:</b> Simple passive techniques such as orientation, form, building envelope, opening etc. Advance solar passive techniques for cooling & heating such as wind tower, solar chimney, roof ponding, Earth air tunnel, trombe wall, solarium, etc. Study of passive environmental control mechanism in traditional or modern built environment.                                                       |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                             | YEAR OF PUBLICATION |
|------|--------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Milli Majumdar, "Energy Efficient Buildings in India", Teri & MNES                                                             | 2001                |
| 2    | Arvind Krishnan, "Climate Responsive Architecture – A design handbook for energy efficient buildings", Tata McGraw Hill, Delhi | 2001                |
| 3    | Koenigsberger, "Manual on tropical housing & building", Orient Longman                                                         | 1975                |
| 4    | Ishwarchand, P.K.Bhargava, "The Climatic Data Handbook", CBRI Roorkee & Tata McGraw Hills Delhi.                               | 1999                |
| 5    | Randall McMillan, "Environmental Science in Building", Palgrave                                                                | 1983                |

**ARCHITECTURAL STRUCTURES-II**  
**Code: B2AR03-CT06**
**B.ARCH Semester: II**
**Course Objectives:** To understand simple structural concepts and behaviour

**Anticipated Learning Outcomes:** To demonstrate and understanding of concepts taught during the semester through simple calculations and models.

| UNIT | CONTENT                                                                                                                                                                                                                        |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Shear Force And Bending Moment:</b> Shear Force and Bending Moment Diagrams in case of simply supported Beams, Cantilevers and beams with overhangs due to Concentrated Loads and Distributed Loads.                        |
| 2    | <b>Bending Stresses in Beams:</b> Theory of Simple Bending, $M/I=F/Y=E/R$ Equation and Its Derivation, Section Modulus, Distribution of Normal Stress due to Bending.                                                          |
| 3    | <b>Determinacy:</b> Definition of determinate and indeterminate structures, redundant frames, Frames and Trusses: Pre jointed Plane Frames, Determination of Forces in the members by Method of Joints and Method of Sections. |
| 4    | <b>Shearing Stresses in Beams:</b> Composite Beams, Shear Stress Distribution In Rectangular, Circular, T And I Sections                                                                                                       |
|      | <b>Torsion:</b> Elementary concepts of torsion, shear stress in solid and hollow circular shafts, angle of twist, power transmitted by a shaft, combined bending and torsion;                                                  |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                         | YEAR OF PUBLICATION |
|------|--------------------------------------------------------------------------------------------|---------------------|
| 1    | B.C.Punmia, "Strength of Materials", Laxmi Publications (P) Ltd., New Delhi                | 2006                |
| 2    | R. K. Bansal, "Engineering Mechanics & Strength of Materials", Laxmi Publications (P) Ltd. | 2008                |
| 3    | V.S.Prasad, "Structural Mechanics & Analysis"                                              | 2005                |
| 4    | Singer and Patel, "Strength of Material", Harper Collins Publishers.                       | 2009                |
| 5    | Timoshenko & Gere, "Mechanics of Structures", CBS Publishers and Distributors              | 2006                |

**ARCHITECTURAL DESIGN -I**  
**Code: B2AR04-CP07**
**B.ARCH Semester: II**

**Course Objectives:** Introducing Architectural Design as the ideation of a functional space crafted by robust elements in an aesthetic manner and exploiting 3D drawings as a medium of near-realistic representation of architectural intent.

**Anticipated Learning Outcomes:** Ability to assimilate learning from Basic Design and Visual Arts, Building Construction and Structures and apply to an Architectural Design by weighing design choices, to draw insights from personal experience of surrounding environment, extract programmatic requirements therefrom and translate into a Design Concept to be expressed through hand-made 3D drawings and models.

| UNIT | CONTENT                                                                                                                                                                                                                                                 |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Space, Form &amp; Structure</b> – Interdependence of form, structure, function and space. Study of simple structural systems and behaviour under load, working model of structures like post and Lintel, Cantilever, arched, corbelled, trussed etc. |
| 2    | <b>Architectural Concept</b> – Various sources of inspiration for design. Types of concepts. Concept as a response to site and context. Design determinants.                                                                                            |
| 3    | <b>Circulation &amp; Space</b> – Types of circulation such as internal, external. Elements of circulation. Types of space such as public, semi public, private, served & servant spaces, etc.                                                           |
| 4    | <b>Form composition</b> – Relationship of plan, Elevation and section, organization of form, composition of built form.                                                                                                                                 |
| 5    | <b>Design</b> – Application of anthropometry in design of simple living and working spaces through study of furniture placement and clearances in space.                                                                                                |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                             | YEAR OF PUBLICATION |
|------|--------------------------------------------------------------------------------|---------------------|
| 1    | Francis D.K.Ching, “Visual Dictionary of Architecture”, Van Nostrand Reinhold  | 1995                |
| 2    | Ernst and Peter Neufert, “Architect Data”, Blackwell Science Ltd.              | 2000                |
| 3    | V.S.Pramar, “Design Fundamentals in Architecture”, Somya Publication Pvt. Ltd. | 1973                |
| 4    | Lorraine Farrelly, “The fundamentals of Architecture”, Ava Publications        | 2007                |
| 5    | Fil Hearn “Ideas that shaped buildings”, The MIT Press Cambridge.              | 2003                |

**VISUAL ARTS & BASIC DESIGN -II**  
**Code: B2AR06-CP08**
**B.ARCH Semester: II**

**Course Objectives:** Introducing design elements in three-dimensional forms and space leading to classical methods of architectural form development, theory and application of colours,

**Anticipated Learning Outcomes:** Ability to identify and analyse the elements, principles and vocabulary of three-dimensional design; Identify and apply colour properties and concepts

| UNIT | CONTENT                                                                                                                                                                                                                                                                                               |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Form</b> – Form and nature, Visual and emotional effects of geometric forms and their derivatives – sphere, cube, pyramid, cylinder, cone etc. Properties of forms. Transformation of forms such as dimensional, subtractive, additive forms. Articulation of forms.                               |
| 2    | <b>Space</b> – Space defining elements – horizontal and vertical elements, Openings in space defining elements, spatial relationship, spatial organization.                                                                                                                                           |
| 3    | <b>Anthropometry</b> –Space and human activity. Average measurements of human body in different postures, its proportion and graphic presentation. Basic human functions and their implications for space requirement. Minimum and optimum areas for various functions.                               |
| 4    | <b>Proportion and Scale</b> – Visual and Human scale, Theories of proportions – Modular theory, golden section, Ken, etc. Application of these theories in Nature, Art & Architecture.                                                                                                                |
| 5    | <b>3D Explorations</b> - Study of 3D Forms using principles of Design like repetition, symmetry, rotation, rhythm etc. for making murals, sculptures, installations using different materials like clay, plaster of Paris, wood, paper, metal etc. Abstraction used as basis of development of ideas. |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                    | YEAR OF PUBLICATION |
|------|-------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Francis D.K. Ching, “Architecture Form, Space & Order”, John Wiley & Sons, Incorporated               | 2007                |
| 2    | Simon Unwin, “Analysing Architecture”, Routledge                                                      | 2003                |
| 3    | Debkumar Chakrabarti, “Indian Anthropometric Dimensions”, NID                                         | 1997                |
| 4    | Alvin R. Tilly, “The measures of man & woman human factors in design”, Whitney library of design, NY. | 1993                |
| 5    | K.W.Smithies, “Principles of Design in Architecture”, Van Nostrand Reinhold company.                  | 1981                |

**COMPUTER APPLICATION -II**  
**Code: B2AR07-CP09**
**B.ARCH Semester: II**

**Course Objectives:** Empowering students to use computers as 2D drafting and 3D modelling tool and to familiarise realistic rendering and architectural presentation techniques using computers

| UNIT | CONTENT                                                                                                                                                            |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Introduction to Advanced CAD commands</b> – Creating and insertion of blocks, External reference, raster image ,Attributes etc.                                 |
| 2    | <b>Layout and print setting</b> – Create layouts by using Layout Wizard, view ports. paper size, plot scale, style table, paper space and model space etc.         |
| 3    | <b>Introduction to BIM</b> –Introduction and its advantage over CAD.<br>User Interface, Intro to real building elements i.e. walls, door, window, floor, slab etc. |
| 4    | <b>Customization</b> – changing element properties, applying material.<br>Insertion of components from library. Using BIM to create the simple building form.      |
| 5    | <b>Site</b> – Creating site, contours, applying material, etc.                                                                                                     |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                                                                                                   | YEAR OF PUBLICATION |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Cadfolks, “Autocad 2014 for Beginners”, Create Space Independent Publishing Platform                                                                                                                 | 2014                |
| 2    | Bill Fane, “AutoCAD 2014 For Dummies”, John Wiley & Sons                                                                                                                                             | 2013                |
| 3    | George Omura , Brian C. Benton, “Mastering AutoCAD 2014 and AutoCAD LT 2014”, John Wiley & Sons                                                                                                      | 2013                |
| 4    | Chuck Eastman, Paul Teicholz , Rafael Sacks, Kathleen Liston, “BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors”, John Wiley & Sons | 2008                |
| 5    | Scott MacKenzie, “Learning ArchiCAD 17”, Packt Publishing                                                                                                                                            | 2014                |

**BUILDING MATERIAL & CONSTRUCTION -II****B.ARCH Semester: II****Code: B2AR05-CP10****Course Objectives:** To introduce students to design elements, materials and methods of construction for simple buildings.**Anticipated Learning Outcomes:** Understanding construction materials and techniques for simple building elements.

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Lime and Sand:</b> Sources of lime, Classification of lime & their characteristics, Manufacturing of lime, uses of lime in building elements and components, Building limes according to BIS. Natural sources of sand, classification of sand, properties of sand, classification of Mortars, proportion of lime mortar.<br>Various building elements such as foundation, wall, openings using lime products. Construction of staircase, ramp and retaining wall in lime products.                                                                                                                                                                                                                                                                                                               |
| 2    | <b>Cement:</b> Introduction to Indian cement industry, Composition and properties of cement, Setting action of cement, Manufacturing of Cement, Tests and storage of cement, Varieties of cement and its application in various building elements and components. BIS Specifications.<br>Various building elements such as foundation, wall, openings using cement products. Construction of staircase, ramp and retaining wall in cement products such as hollow and perforated cement blocks.                                                                                                                                                                                                                                                                                                     |
| 3    | <b>Timber:</b> Classification of tree, Structure of tree, Defects in timber, Qualities of good timber, Preservation of timber, Seasoning of timber, Market forms of timber, Uses of timber, Indian timber trees. BIS Specifications.<br>Details of carpentry joints in timber, wall construction in timber. Study of timber fasteners. Columns & Piers in timber. Roofs in timber. Terms used for sloped timber roofs, wooden roof truss and its types, covering of sloped roof in timber with various roof covering materials.<br>Timber flooring like woodblock and parquet floor. Doors in timber such as braced and battened, paneled, glazed and sliding. Windows in timber such as paneled, battened, glazed, top hung, pivoted, gable window, dormer window, bay window, French window, etc. |
| 4    | <b>Industrial Timber:</b> Properties of veneers, ply woods, Block board, fibre boards, Impreg timber, Compreg timber etc. Application of Industrial timber. BIS Specifications.<br>Various building elements such as walls, roof, floor and openings in industrial timber. Wall paneling and flooring construction using industrial timber. Door, windows in industrial timber.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 5    | <b>Protective finishes, Machines &amp; Equipments:</b> Protective finishes on lime, cement, timber and timber products. Study of machines & equipments for manufacturing, transportation, preparation and lying of lime, cement and timber & industrial timber.<br>Drawings of machines and equipments used for manufacturing, transportation, preparation and laying of building timber and timber products. Stairs and ramps in timber.                                                                                                                                                                                                                                                                                                                                                           |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                          | YEAR OF PUBLICATION |
|------|---------------------------------------------------------------------------------------------|---------------------|
| 1    | S.C.Rangwala, "Engineering Materials", Charotar Publishing Housing Pvt. Ltd. Anand (Gujrat) | 1997                |
| 2    | Sushil Kumar, "Building Construction", M/s. Standard Publishers & Distributors, Delhi       | 2003                |
| 3    | Robin Barry, "The construction of buildings (Vol. I-V)", Blackwell publishing               | 2000                |
| 4    | Francis D.K.Ching, "Building Construction Illustrated", John Wiley                          | 1975                |
| 5    | Handbook on Building Construction Practices, BIS, New Delhi                                 | 1997                |

**SURVEYING LAB**  
**Code: B2AR08-CP11****B.ARCH Semester: II**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                             |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Chain Surveying:<br>a. Ranging and Fixing of Survey Station.<br>b. Plotting Building Block by offset with the help of cross staff                                                                                                                                                                   |
| 2    | Compass: To determine the magnetic bearing of a line<br>a. Using surveyor's compass<br>b. Using prismatic compass                                                                                                                                                                                   |
| 3    | Dumpy leveling : To determine the reduce levels in closed circuit using Dumpy Level.<br>Plane Table Survey: To determine the horizontal levels                                                                                                                                                      |
| 4    | Theodolite: To carryout temporary adjustment of Theodolite & Measurement of horizontal angle.<br>a. By method of repetition.<br>b. By method of Reiteration                                                                                                                                         |
| 5    | Trigonometric Leveling: To determine the Height of an object by trigonometric leveling<br>a. Instruments in same vertical plane<br>b. Instruments in different vertical planes<br>c. Survey Camp (including exercise on triangulation, Theodolite and dumpy level) with minimum duration of 3 days. |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                | YEAR OF PUBLICATION |
|------|-----------------------------------------------------------------------------------|---------------------|
| 1    | Arora, "Surveying", Rajsons Publications Pvt. Ltd.                                | 1996                |
| 2    | S.C.Rangwala, "Surveying & Levelling", Charotar Publishing House, Anand (Gujarat) | 2005                |
| 3    | Dr. B.C.Punmia, "Surveying", Laxmi Publication (P) Ltd., New Delhi                | 2002                |
| 4    | William Irvine, "Surveying for Construction", McGraw Hills Book Co., New Delhi    | 1995                |
| 5    | John Clancy, "Site Surveying & Levelling", Arnold London                          | 1991                |

**HUMANITIES**  
Code: B3AR01-CT07

**B.ARCH Semester: III**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Introduction to Sociology:</b> Relationship between Sociology and Architecture and its relevance: Society and its types, Family as the basic Unit of 'Society'. Man, Environment and Society, Sociological aspects in the history of the evolution of housing/ shelter forms. Human as resource. Maslow theory of hierarchy                                                                                                                                                                                                                                                |
| 2    | <b>Power Structure in Society:</b> Social stratification – Concept and Theories (Davis and Moore and Marx). Institutions of Local self government in the Rural and Urban Areas – Gram Panchayat and Municipality.                                                                                                                                                                                                                                                                                                                                                             |
| 3    | <b>Social Problems:</b> Urbanisation, Overcrowding, Slums, Issues in Housing, Developmental programmes related to urban and rural society. Problems of interaction, Isolation, privacy, accessibility, conflict, and alienation related to the planning and design of different buildings with the references to the people of different age group/Population groups.<br><b>Socio-Spatial Problems:</b> Migrants, slums high density, high-rise living.                                                                                                                       |
| 4    | <b>General Economics Concepts:</b> Demand and Supply, Elasticity of Demand, , Market and its types, competition, price determination, cardinal and Ordinal utility, Factors of production<br><b>Elementary Idea of Economic Planning:</b> Broad features of the ongoing five year plan with special references to social and economic factors effecting location, construction and financing of the building industry and housing in particular.<br><b>Agencies/Institution/Organisations:</b> Directly or indirectly influencing economic aspects of architectural projects. |
| 5    | <b>Land Economics:</b> Land as limited resource, demand for land acquisition.<br><b>Economics of regional Development:</b> Economic development in relation to the regional planning, regional economics theories, problems and prospects of balanced regional development.<br><b>Building Economics:</b> sources of finance (public or private), interests, rents, taxes, insurance, recurring costs, disposable income and expenditure patterns.                                                                                                                            |

#### REFERENCE BOOKS

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                     | YEAR OF PUBLICATION |
|------|------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Wallis, Wilson D and Willey M.M, "Text book of Sociology", 1st edition, Khel sahitya Kendra, New Delhi.                | 2001                |
| 2    | Schaefer, Richard T. "Sociology: A brief introduction", 4th edition McGraw hill, Boston.                               | 2002                |
| 3    | Stone P.A. "Building Economy: Design production and organisation a synoptic view", 2nd edition, Pergamon Press, Oxford | 1976                |
| 4    | Giddens Anthony, "Sociology", Polity Press, Cambridge (UK)                                                             | 2006                |
| 5    | Porteous, John Douglas; "Environment Behaviour: Planning and Everyday Urban Life", Addison, Wesley                     | 1977                |

**HISTORY OF ARCHITECTURE**  
**Code: B3AR02-CT08**
**B.ARCH Semester: III**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p><b>Indus Valley Civilization, the Vedic Period &amp; Buddhist architecture</b><br/> <b>INDUS VALLEY CIVILIZATION:</b><br/>           Introduction to the origins and spread of the Indus Valley Civilization. Nature of growth and salient features of the socio-economic, political, cultural and religious facets that influenced the emergence of an architectural style. Focus on the Town Planning, i.e zoning, road networks, drainage system, clusters and individual residences, the Great Bath and granaries.<br/> <b>Examples:</b> The major cities of Harappa and Mohenjo-Daro.</p> <p><b>VEDIC PERIOD:</b><br/>           Origins of new settlers, area where they settled, individual residences, clusters and village layouts, forms and materials. Socio-political, economic, cultural and religious aspects of the society, evolution of towns and city planning.<br/> <b>Examples:</b> A typical Vedic village, including individual residences, clusters, fencing &amp; gate</p> <p><b>BUDDHIST ARCHITECTURE:</b><br/>           Factors leading to the formation of the religion. Salient features of the religion, its philosophy and methods of worship. Evolution of religious structures like the stupa and the stambha covering their religious symbolism. Evolution of the Chaitya and rock-cut architecture.<br/> <b>Examples:</b> Great Stupa at Sanchi in detail with the Ashok stambha, Chaitya at Karla, near Lonavla</p> |
| 2    | <p><b>North-Indian (Nagara) &amp; Jain temple architecture</b><br/> <b>NAGARA STYLE ARCHITECTURE:</b><br/>           Factors that led to the need for a temple as a built-form. Salient features of the religion, its philosophy and methods of worship. Evolution and growth of North-Indian or Nagara style temple architecture.<br/> <b>Examples:</b> Udaigiri, near Sanchi, Gupta temple at Tigawa, , Lingaraj temple at Bhubhaneshwar, Sun temple at Modhera, Sun temple at Konark, Kandheriya Mahadev temple at Khajuraho, Chenna Keshava temple at Belur &amp; Somnathpur, Chaumukh temple at Ranakpur, Dilwara temple at Mount Abu</p> <p><b>JAIN TEMPLE ARCHITECTURE:</b><br/>           Evolution of Jain temple architecture and its distinct architectural language and growth with reference to socio-economic, political and religious factors.<br/> <b>Examples:</b> Chaumukh temple at Ranakpur, Dilwara temple at Mount Abu</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 3    | <p><b>South Indian (Dravida) temple architecture</b><br/>           Evolution and growth of the South Indian or Dravida architectural language, its religious, socio-economic, cultural, political influences. Evolution of the gopuram and growth of temple cities. Fusion of Nagara and Dravida styles and the reasons for the evolution of Star-shaped temples. Focus on construction materials and techniques, symbolic and religious association of forms in the architectural style.<br/> <b>Examples:</b> Ladkhan temple &amp; Durga temple at Aihole, The rathas and shore temple at Mahabalipuram, Kailasa temple at Ellora, Temple cities of Srirangam &amp; Meenakshipuram, Chenna Keshava temple at Belur &amp; Somnathpur</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 4    | <p><b>Islamic Architecture in India – Pre Mughal period</b><br/> <b>DELHI REGION</b><br/>           Salient features of the religion, its philosophy and methods of worship.<br/>           Evolution of Islamic architecture in India and its development, covering mosques, tombs, forts &amp; other structures. Focus on new construction techniques like arch, dome, squinch, surface decorations, etc<br/> <b>Examples:</b> Qutb Complex, including Quwwat-ul-Islam, Qutb Minar, Extensions by the Khaljis, Alai Darwaza, Alai Minar, Tughlaqabad, Tomb of Ghiyas-ud-din Tughlaq, Khirki Masjid, Ferozshah Kotla &amp; Hauz Khas</p> <p><b>REGIONAL SULTANATES</b><br/>           Growth and development of Indo-Islamic architecture in areas outside Delhi. Focus on Gujarat, Gulbarga &amp; Bijapur. To study the influences of local traditional architecture and fusion with Islamic architecture, both religious and non-religious.<br/> <b>Examples:</b> Jami Masjid, Ahmedabad, Dada Hari's way, Jami Masjid, Gulbarga, Sayyad Usman's Rauza, Ahmedabad, Ibrahim Rouza &amp; Gol Gumbaz, Bijapur</p>                                                                                                                                                                                                                                                                                                                                          |

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5    | <p><b>Islamic Architecture in India –Mughal period</b><br/>           Growth and development of Indo Islamic architecture during the Mughal period. Focus on newer construction technology, material and architectural influences in tomb and palace architecture<br/> <b>Examples:</b> Tombs of Mubarak Shah, Sikandar Lodi, Shershah Suri, Humayun, Itmad-ud-Daula, Akbar &amp; Taj Mahal. Palace complex at Fatehpur Sikri</p> |

#### REFERENCE BOOKS

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                     | YEAR OF PUBLICATION |
|------|----------------------------------------------------------------------------------------|---------------------|
| 1    | Indian Architecture (Hindu and Buddhist), Percy Brown – D.B.Taraporvala Sons & Co.,    |                     |
| 2    | Indian Architecture (Islamic Period), Percy Brown - D.B.Taraporvala Sons & Co., Mumbai | 1997                |
| 3    | Buddhist and Hindu Architecture, Satish Grover – Taschen London 1998                   |                     |
| 4    | Islamic Architecture in India, Satish Grover – CBS Publisers & Distributors New Delhi  | 2002-03             |

**ARCHITECTURAL STRUCTURES-III****B.ARCH Semester: III****Code: B3AR03-CT09**

| UNIT | CONTENT                                                                                                                                                                                                                                                                              |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Slope and Deflection:</b> Relations between load, shear force & bending moment, slopes and deflections of indeterminate beams using double integration method, moment area method and Macaulay's method                                                                           |
| 2    | <b>The long and short columns or struts;</b> buckling load, Euler's theory, limitations, various end- conditions, equivalent length of a strut, Rankine's theory, Slenderness ratio, strut with eccentric load.                                                                      |
| 3    | <b>Arches and Folded plates:</b> analysis of three hinged, two hinged and fixed type parabolic arches with supports at the same level and at different levels, Introduction to folded plates<br><b>Shells and Domes:</b> Introduction to Shells and domes                            |
| 4    | <b>Beams:</b> Slope-deflection method and Kani's method for analysis of continuous beams.                                                                                                                                                                                            |
| 5    | <b>Design concepts:</b> Design concept of factor of safety and limit state; failure modes of a structure, Elastic theory of R.C.C. Design, permissible stresses and permissible deflections for R.C.C. and Steel structures. Introduction and use of Design codes. IS456 and IS 800. |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                            | YEAR OF PUBLICATION |
|------|-----------------------------------------------------------------------------------------------|---------------------|
| 1    | B.C.Punmia, Strength of Materials of Structure, Laxmi Publications © Ltd., New Delhi          | 2006                |
| 2    | R.K. Bansal, Strength of materials                                                            | 2008                |
| 3    | Timoshenko & Gere, Mechanics of Structures, CBS Publishers and Distributors                   | 2006                |
| 4    | K.R. Arora, Soil Mech. & Foundation Engineering, Standard Publishers and Distributors, Delhi. | 2007                |
| 5    | Terzaghi & Peck, Soil Mechanics in Engineering Practices, John Wiley & Co                     | 2010                |

**ARCHITECTURAL DESIGN-II**  
**Code: B3AR04-CP13**
**B.ARCH Semester: III**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                       |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Theme:</b> Understanding the nature of built environment as a resultant of the determinants of Built Form, such as climate. Introduction of determinants of built form.                                                                                                                                                                                                                                    |
| 2    | <b>Parameter:</b> Form & Space: Understanding user and its surroundings and devising requirements with the help of space & materials standards.<br>Form & Function: Exposure to building elements & components and their effects on Air circulation, Day lighting, Thermal Comfort etc. Study of the human considerations like comfort, privacy, security etc.                                                |
| 3    | <b>Expected Skills:</b> To develop the ability to translate abstract principles of design into architectural solutions for small problem. 3D visualization and presentation through models. Theoretical inputs from History & Sociology. To enhance & develop skills with respect to site analysis and application.                                                                                           |
| 4    | <b>Design Outlines:</b> Application of climate in design of simple function and simple program. Building scale project on a site area of approx. 100-200 sq. mt. Location of site can be in Urban or Rural setting and in any climatic zones and can be an annexure building of any existing setup. At least two major exercises and one time problem should be given.                                        |
| 5    | <b>Projects:</b> List of suggested topics to be covered as design problem keeping in mind the following categories: the Educational institutes - Kindergarten, Balwadi, etc. Public facilities – Post office, police station, etc., Health Facilities – Dispensary, clinic, etc. Commercial facilities – General store, Boutique etc. Hospitality – Café, canteen etc. Residential – Farm house, Cottage etc. |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                           | YEAR OF PUBLICATION |
|------|----------------------------------------------------------------------------------------------|---------------------|
| 1    | Koenigsberger O., “Manual of Tropical housing and building”, Orient Longman, New Delhi       | 2003                |
| 2    | Rasmussen, Steen, Eiler, “Experiencing Architecture”, MIT Press, Cambridge, Massachusetts    | 1977                |
| 3    | Chiara Joseph de and others, “Time, Savers & Standards of building types”, McGraw Hills      | 1980                |
| 4    | Pevsner, Nikolaus, “A History of Building Types”, Thames & Hudson, London                    | 1976                |
| 5    | V.S.Parmar, “Design Fundamentals in Architecture”, Somaiya Publications Pvt. Ltd., New Delhi | 1997                |

**BUILDING MATERIAL & CONSTRUCTION-III**  
**Code: B3AR05-CP14**
**B.ARCH Semester: III**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p>Cement Concrete:</p> <p>MATERIAL: Brief history of development of concrete, ingredients of concrete, properties of concrete like strength, durability, workability etc. BIS specification for concrete, Methods of proportioning concrete mixes, Factors effecting strength of concrete, Important operations in concreting like mixing ,transporting, placing, compacting, curing &amp; removal of form work.</p> <p>Tests on fresh concrete like slump test, flow test etc &amp; on hardened concrete like compression test, tension test etc. Strength &amp; failure of concrete, Chemicals used in concrete construction ex. Admixtures, mould releasing agents, Concrete curing compounds etc. Concreting under special condition, Guniting and Shotcrete work for repair of concrete.</p> <p>CONSTRUCTION: Application of cement concrete in foundation, Cement concrete flooring on ground level, cement concrete floor tiles, Paver Blocks in flooring ; Cement Concrete Blocks Such as hollow, solid and cellular in wall construction along with steel bars at the junction. Application of cement concrete products</p> |
| 2    | <p>Special Structural Concrete:</p> <p>MATERIAL: Basic introduction to special concrete used for structural work ex reinforced concrete, Fiber reinforced concrete, Light weight concrete, fly ash concrete, High strength-high performance concrete, No-fines concrete, ready mix concrete. Introduction to theory of reinforcing concrete, Properties and advantage of reinforced concrete, types &amp; grades of steel bars as per BIS specification, Bending and placing of reinforcement in RCC Work.</p> <p>CONSTRUCTION: Application of RCC in various building elements such as shallow foundation for isolated column, RCC wall, DPC / Plinth &amp; floor / roof beam. One way &amp; two way slab in RCC. Arches &amp; Lintels in RCC. Door, window, frames in RCC. Construction of different types of RCC stairs.</p>                                                                                                                                                                                                                                                                                                       |
| 3    | <p>Plastics &amp; Polymer:</p> <p>MATERIAL: Brief history of plastics, polymerisation of plastics, Classification &amp; Properties of plastics, fabrication of plastic articles, Application of plastics in building services &amp; building construction Geo-synthetics and its classification, Properties &amp; uses of geo-textiles. Natural &amp; synthetic rubber, Uses of rubber in building construction, Vulcanisation of rubber.</p> <p>CONSTRUCTION: Application of PVC &amp; Rubber in various building elements &amp; components, Vinyl, Linoleum &amp; rubber flooring, plastic doors &amp; windows, PVC roofing, Glass fibre reinforced plastic sheets for roofing.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 4    | <p>Asbestos, Asphalt, Bitumin &amp; Tar</p> <p>MATERIAL: Introduction and history of Asbestos, Asphalt, Bitumen &amp; Tar. Asbestos &amp; its forms, properties, uses and harmful effects of asbestos. Asphalt &amp; its types such as natural asphalt &amp; residual asphalt. Bitumen &amp; its forms in the market, Modified Bitumen, tar and its types. Uses of these materials in building construction.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 5    | <p>Protective Finishes, Machines &amp; Equipments</p> <p>MATERIAL: Brief introduction of adhesives, Sealants &amp; joint fillers and protective finishes for cements concrete, RCC, Plastic, Asbestos, Asphalt, bitumen &amp; tar. Study of machines &amp; equipments for manufacturing, transportation, preparation, laying/Casting, Compaction, repairing of these materials.</p> <p>CONSTRUCTION: Drawing of machines &amp; Equipments used.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                                       | YEAR OF PUBLICATION |
|------|------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | S.P.Arora, S.P. Bindra, "Building Construction Including Engineering Material". Dhanpat Rai Publications (P) Ltd., New Delhi             | 2010                |
| 2    | Handbook on Concrete Reinforcement and Detailing, SP 34:1987, BIS New Delhi                                                              | 2002                |
| 3    | CPWD specifications (Vol.1), Director General of Works, New Delhi                                                                        | 2009                |
| 4    | P. Kumar Mehta "Concrete Technology for Sustainable Development in the twenty-first century", Cement Manufactures Association, New Delhi | 1999                |
| 5    | Hegger,Auch-schwelk,Fuchs,Rosenkranz:"Construction material manual";Birkhauser,Munich.                                                   | 2006                |

**COMPUTER APPLICATION-III**  
**Code: B3AR06-CP15**
**B.ARCH Semester: III**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Advance BIM commands:</b> Complex modeling: Creating complex building forms by using massing i.e. blend mass, mass by extrusion, creating voids in them. Roofs: Creating various type of roofs i.e. flat roof, sloped roof designing roof in elevation views, defining slope and creating openings in roof slab, insertion of layers in roof slab.<br>Staircase: Creation of various types of staircase and ramp i.e. straight, deg legged, spiral etc.<br>Designing and customization of staircase as per requirement.<br>Exercise: Designing of a complex building form using massing and insert walls, doors, windows, slab, staircase. |
| 2    | <b>Scheduling:</b> Creating various schedule for documentation purpose. Type of schedule i.e. door, window, wall etc. Insertion of various fields in schedule i.e. type, width, cost etc. Formatting and calculating totals. Extracting information to external utilities like MS Excel.<br>Exercise: Creation of door window schedule which includes total number of doors, windows, total cost and export it to excel format.                                                                                                                                                                                                               |
| 3    | <b>Light and Energy Analysis:</b> Using BIM for simple lighting and energy analysis. Insertion of various interior and exterior lights and its customization. Creating sun path and animation of solar study of a whole day.                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4    | <b>Import and Export Options</b> - import and export the file into other file formats i.e. JPEG, PDF, CAD etc. for printing, rendering and documentation purpose. Advance print options for setting paper size, orientation.                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 5    | <b>Rendering</b> –Applying various materials, scale, render quality, setting backgrounds etc. Creating moving animations and saving it in various formats.<br>Exercise: Hard copy submission of rendered views .                                                                                                                                                                                                                                                                                                                                                                                                                              |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                                                                                                   | YEAR OF PUBLICATION |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Chuck Eastman, Paul Teicholz , Rafael Sacks, Kathleen Liston, “BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors”, John Wiley & Sons | 2008                |
| 2    | Scott MacKenzie, “Learning ArchiCAD 17”, Packt Publishing                                                                                                                                            | 2014                |
| 3    | Ryan Duell, Tobias Hathorn, Tessa Reist Hathorn,“Autodesk revit Architecture 2014 Essentials”, John Wiley & Sons                                                                                     | 2013                |
| 4    | Tatjana Dzambazova , Eddy Krygiel , Greg Demchak; “Introducing Revit® Architecture 2010: BIM for Beginners”; John Wiley & Sons                                                                       | 2009                |
| 5    | Ken Good’, “Discover Smart Bim : An Interactive Guide to Archicad”; Author house                                                                                                                     | 2009                |

**STRUCTURE LAB**  
**Code: B3AR07-CP16**
**B.ARCH Semester: III**

| UNIT | CONTENT                                                                                                  |
|------|----------------------------------------------------------------------------------------------------------|
| 1    | <b>Physical Test of Construction Materials:</b> Cement, Bricks, Aggregates                               |
| 2    | <b>Laboratory Tests of Cement:</b> Normal Consistency Test, Initial & Final Setting Time, Soundness Test |
| 3    | <b>Laboratory Tests of Aggregates:</b> Sieve Analysis Test, Fineness Modulus, Water Absorption Test      |
| 4    | <b>Compressive Strength Tests of Concrete:</b> Cube Test, Cylindrical Test                               |
| 5    | <b>Workability Tests of Concrete :</b> Slump Test, Compaction Factor Test                                |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                       | YEAR OF PUBLICATION |
|------|----------------------------------------------------------------------------------------------------------|---------------------|
| 1    | M.S.Shetty, "Concrete Technology", S. Chand & Co.                                                        | 2005                |
| 2    | M.L.Ghambir, "Building Materials: Products, Properties and Systems", Tata Mc Graw Hill, Delhi            | 2011                |
| 3    | S.C.Rangwala, "Engineering Materials, Material Science", Charter Publishing House, Anand                 | 2007                |
| 4    | Gurucharan Singh, "Buidling Construction and Material", M/s. Standard Publications & Distribution, Delhi | 2007                |
| 5    | S.C. & K.S.Rangwala, "Engineering Materials", Charter Publishing House, Anand                            | 2007                |

**SPECIFICATION & ESTIMATION**  
**Code: B4AR01-CT10**
**B.ARCH Semester: IV**

| UNIT | CONTENT                                                                                                                                                                                                                                                            |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Specification:</b> Introduction, Main items of work, Importance of specification, Types of specifications - General and detailed specifications - Method of preparation of specifications                                                                       |
| 2    | <b>Estimate:</b> Introduction, Types of Estimate, Detailed Estimate - Units of Measurements, Details of measurement and calculation of quantities of various items of work, Methods of Building Estimate - separate or individual wall method, Centre line method. |
| 3    | <b>Rate Analysis:</b> Analysis of rates for main items of work in buildings, considering current market rates for building materials, labor wages, plants and tools, transportation, handling, storage and contractor's profit.                                    |
| 4    | <b>Detailed Estimation:</b> Preparation of Detailed estimate (Details of Measurements and Calculation of quantities & Abstract of - Estimated cost) for different types of buildings including R.C.C. framed buildings.                                            |
| 5    | <b>Cost &amp; Valuation:</b> Cost price and value. Factors controlling the cost of Urban real properties, Valuation, Depreciation, Rent and its implications                                                                                                       |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                               | YEAR OF PUBLICATION |
|------|------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Carol A. Sampson, "Techniques for Estimating Materials Cost", Watson Guptil Publication New York                 | 2001                |
| 2    | S.C.Rangwala, "Estimating, Costing & Valuation", Charotar Book Stall, Anand                                      | 2006                |
| 3    | B.N.Dutta, "Estimating & Costing in Civil Engineering", UBS Publication, New Delhi                               | 2005                |
| 4    | M. Chakroborty, Bhakti Vedanta, "Estimating Costing Specification & Valuation in Civil Engg.", Book Trust, Delhi | 2010                |
| 5    | Central Public Department, "CPWD Specification, Vol.I & 2", Nirman Bhawan, Delhi.                                | 2004                |

**HISTORY OF ARCHITECTURE-II**  
**Code: B4AR02-CT11**
**B.ARCH Semester: IV**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p><b>Egyptian &amp; West Asiatic</b><br/>Socio-economic, political, cultural and religious character of the ancient civilizations. The evolution of architectural form and character from the these factors, available materials and construction technology.</p> <p><b>EGYPTIAN:</b><br/>Examples: Mastaba at Beit Khallaf, Pyramid of Zoser at Sakkara, Great Pyramid of Cheops at Gizeh, Temple of Khons at Karnak</p> <p><b>WEST ASIATIC:</b><br/>Examples: Ziggurats: White temple at Warka, Urnamu at Ur. Palaces: Palace of Sargon at Khorsabad</p>                                                                                                                                                                                                                                         |
| 2    | <p><b>Greek:</b><br/>To study the development and formation of the classical orders in chronological sequence, namely the Doric, Ionic &amp; Corinthian orders, The use of optical correction, illusions, proportions, scale and other designing techniques in evolution of a distinct architectural language architecture</p> <p>Examples: Temples and temple complexes: Acropolis, which includes the Parthenon &amp; Erichtheon. Urban architecture: The Agora at Athens</p>                                                                                                                                                                                                                                                                                                                     |
| 3    | <p><b>Roman:</b><br/>To study the development in architectural style with new construction technology; such as arches, domes, vaults, etc. To study the influence of socioeconomic prosperity in architecture, with public &amp; private, religious and nonreligious examples.</p> <p>Examples: Residential: House of Pansa at Pompeii. Temple: Pantheon at Rome. Forum: Forum of Trajan with Basilica and Column. Recreational: Thermae of Caracalla. Sports: Coliseum &amp; Circus Maximus.</p>                                                                                                                                                                                                                                                                                                   |
| 4    | <p><b>Early Christian, Byzantine &amp; Romanesque</b><br/><b>EARLY CHRISTIAN &amp; BYZANTINE</b><br/>To study all aspects of the evolution of a new religion; Christianity, and its influence on the Architectural style. Evolution of church architecture through functions and construction technology</p> <p>Examples: St Peter's Basilica (old), Santa Sophia (Hagia Sophia) at Istanbul</p> <p><b>ROMANESQUE:</b><br/>To study the influence of the growing power of religion and inter-religious conflicts on architecture. To study the influence of improvements in construction techniques like rib-and-panel vaulting, etc.</p> <p>Examples: Italy: Pisa complex including Cathedral, Campanile (Leaning tower) and Baptistry. Central Europe: Worm's Cathedral &amp; S.Michel, Pavia</p> |
| 5    | <p><b>Gothic</b><br/>To study significant improvements in construction technology like flying buttresses and its effect on the architectural character. To compare the varied development of architectural forms in France &amp; England in religious and nonreligious structures.</p> <p>Examples: Cathedrals: Reims cathedral, Salisbury cathedral. Parish churches: St Andrews, Heckington. Manor houses: Penshurst place, Kent, Oxburgh Hall, Norfolk, Compton Wynyates, Warwickshire</p>                                                                                                                                                                                                                                                                                                       |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                | YEAR OF PUBLICATION |
|------|-----------------------------------------------------------------------------------|---------------------|
| 1    | Traditions in Architecture, Dora Crouch – Oxford University Press, N. York        | 2001                |
| 2    | History of Architecture, Bamister Fletcher – SBS Publishers & Distributors, Delhi | 1997                |
| 3    | History of Architecture, Spiro Kostof – Oxford University Press, N. York          | 1995                |
| 4    | History of western architecture, David Watkin – Lawrance King Publishing London   | 2005                |
| 5    | High Gothic, Guthor Binding – Taschen London                                      | 1999                |

**ARCHITECTURAL STRUCTURES-IV**  
**Code: B4AR03-CT12**
**B.ARCH Semester: IV**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                  |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Soil and soil mass constituents;</b> water content, specific gravity, voids ratio, porosity, degree of saturation, air voids and air content; unit weights, density index etc., inter-relationships of the above                                                                                                                                                      |
| 2    | <b>Plasticity Characteristics of Soils:</b> Determination of water content, specific gravity; particle size distribution sieve and sedimentation analysis; consistency limits; voids ratio and density index<br>Soil Classification: classification of soil for general engineering purposes; particle size textural, H.R.B and Unified and I.S. classification systems. |
| 3    | <b>Earth Pressure:</b> Active, passive and earth pressure at rest. Rankine's theories of earth Pressure, Earth pressure on cantilever sheet piles Stability analysis of retaining walls                                                                                                                                                                                  |
| 4    | <b>Bearing capacity of soils;</b> shallow foundation; Terzaghi's and Meyerhoff's formula for bearing capacity; plate loading test, standard penetration test.                                                                                                                                                                                                            |
| 5    | <b>Foundation:</b> Basic concept of Pile and Raft foundation.                                                                                                                                                                                                                                                                                                            |
|      | <b>TOTAL</b>                                                                                                                                                                                                                                                                                                                                                             |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                      | YEAR OF PUBLICATION |
|------|---------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Dr. B.C. Punmia, "Strength of Materials & Mechanics of Structures": Vol. I, Laxmi Publications (P) Ltd. | 2006                |
| 2    | Reinforced Concrete : Limit State Design by Nemi Chand and Brothers, Roorkee                            | 2009                |
| 3    | Singer and Patel, "Strength of Material", Harper Collins Publishers                                     | 2008                |
| 4    | Wang & Salmon; "Reinforced Concrete Design", Harper & Row.                                              | 2009                |
| 5    | S.B Junarkar, "Mechanics of Structures Vol. I & II", Charotar Publishing House, Anand                   | 2009                |

**ARCHITECTURAL DESIGN-III**  
**Code: B4AR04-CP18**
**B.ARCH Semester: IV**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Theme:</b> Understanding the Design of built spaces as a resultant of sociocultural influences of the place.                                                                                                                                                                                                                                                                                                                         |
| 2    | <b>Parameter:</b> Organization of functional activities in relation to user requirements and the site, considering materials and structure in relation to the design proposal. Influence of humanities and culture in a design project. Response to socio-economic factors such as income level, privacy, territoriality, interaction etc.                                                                                              |
| 3    | <b>Expected Skills:</b> To develop the ability to understand the cultural frame work of meaning and symbolism in architecture and incorporation of climate strategies and constructional systems appropriate to social and economical context.                                                                                                                                                                                          |
| 4    | <b>Design Outlines:</b> Application of vernacular style in design of simple function and simple programme. Site scale project on a site area of approx. 250-500 sq.mt. Location of site can be in Urban or Rural setting and in any climatic zones. At least two major exercises and one time problem should be given.                                                                                                                  |
| 5    | <b>Projects:</b> List of suggested topics to be covered as design problem keeping in mind the following categories:<br>Educational Institutes – Primary Schools etc., Public facilities – Neighborhood Library, Bank Local Branch etc., Health Facilities – Primary health centre etc., Commercial facilities – Neighborhood shopping centre etc., Recreation & Hospitality – Restaurant, etc., Residential – Row house, bungalow, etc. |
|      | TOTAL                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                        | YEAR OF PUBLICATION |
|------|---------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Kingston Wm. Heath, “Vernacular Architecture and Regional Design; Cultural Process and Environmental Design”, Elsevier UK | 2009                |
| 2    | Jonathan A. Hale, “Building Ideas an introduction to architectural theory”, Johnwiley and sons ltd. New York              | 2000                |
| 3    | Yatin Pandya, “Concepts of space in traditional Indian architecture”, Mapin Publishing                                    | 2013                |
| 4    | A. Peter Fawcett, “Architecture : Design Notebook”, Architectural Press, London                                           | 2003                |
| 5    | Kulbhushan & Minakshi Jain, “Architecture of the Indian Desert”, Aadi Centre Ahmedabad                                    | 2000                |

**BUILDING MATERIALS & CONSTRUCTION-IV**  
**Code: B4AR05-CP19**
**B.ARCH Semester: IV**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Iron &amp; Steel:</b><br>MATERIAL: Brief history of Iron, Study of Iron ores its varieties, Manufacturing of Pig-Iron and wrought iron, Properties of iron, composition and Types of cast iron & wrought iron, Properties & uses of cast & wrought iron, types of casting techniques. Brief history of steel, manufacturing of steel, Properties of Steel, market forms of steel, Mechanical treatment of steel such as hot working & cold working of steel, Heat Treatment of steel. CONSTRUCTION: Application of iron and steel in various building elements such as steel grillage foundation, pad foundation, Steel column & beams, Trusses in steel, North light truss, Monitor Roof, Structural Floor/roof industrial flooring, Door/Window openings in iron & steel, Metal stair case, Methods of connecting steel work. |
| 2    | <b>Aluminium &amp; their alloys:</b><br>MATERIAL: Brief history of Aluminium, Manufacturing & properties of Aluminium, market forms of aluminium, Uses of Aluminium and Its alloys in building industries. CONSTRUCTION: Application of aluminium in various building elements such as aluminium door & window, Structural glazing, curtain wall.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 3    | <b>Other metals &amp; their alloys:</b><br>MATERIAL: Introduction to copper and its alloys such as Brass, bronze, Zinc & its alloys. Study of other Metals such as Cobalt, Lead, nickel, Titanium, magnesium, tin and their alloys. Properties and uses of these metals. CONSTRUCTION: Application of metals in various building elements & Components such as metal roofing system, wall system.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4    | <b>Glass &amp; Glass products:</b><br>MATERIAL: Brief introduction of history of glass, composition of glass, manufacturing & classification of glass, Properties of glass, Types of glasses & their performances, Treatments of glass, Glass industry, Glass as a green building material. Uses of glass in building industry. CONSTRUCTION: Application of glass in various building elements and components. Glass Floor, wall & partitions systems, Skylight, Glass staircase.                                                                                                                                                                                                                                                                                                                                                 |
| 5    | <b>Protective Finishes, Machines &amp; Equipment</b><br>Brief introduction of adhesives, sealants, joint filler & protective finishes for ferrous, non ferrous materials & Glass. Machines & equipment for applications of these materials. CONSTRUCTION: Drawings of tools, machines & equipments for fabrication, erecting & maintenance.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                         | YEAR OF PUBLICATION |
|------|----------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | CPWD specifications (Vol.1 & 2), Director general of works New Delhi                                                       | 2009                |
| 2    | S.P.Arora, S.P. Bindra, "Building construction including engineering material".Dhanpat Rai publications (P) ltd. New Delhi | 2010                |
| 3    | Schittich, Staib, Balkow, Schuler, Sobek, Glass Construction Manual, 2nd revised and expanded addition, Birkhauser         | 2007                |
| 4    | Robin Barry, "The construction of buildings (Vol. I-V)", Blackwell publishing                                              | 2000                |
| 5    | Handbook on Building Construction Practices, SP62:1997, BIS New Delhi                                                      | 1997                |

**MEASURED DRAWING & DOCUMENTATION**  
**Code: B4AR06-CP20**
**B.ARCH Semester: IV**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Introduction:</b> Reading and interpreting documented work to understand the constituents of Measured Drawing. To understand its importance. Difference between measured and working drawing.<br>Application of conventional, Modern and Digital Techniques of measurement used at settlement, Building, Building Element & Component level exercise such as measuring height of building from ground, Height of Dome, etc. |
| 2    | <b>Exercises for learning:</b> Colloquial techniques of measurement such as furlong, Footsteps, open hand, etc. And application of Sketching and photography as a tool for documentation.                                                                                                                                                                                                                                      |
| 3    | <b>Study, Measure and Document:</b> Elements of style / period such as wall, Roof, Door, window, furniture, etc. building elements and components of renaissance, Gothic, Colonial, Art Deco, Modern, style/ Period. Study, Measure and Document: Individual architect's style of designing wall, Roof, Door, Window, etc. such as works of Le-Corbusier, Louis I Khan, Lauri Baker, Charles Correa, Raj Rewal etc.            |
| 4    | <b>Study, Measure and Document:</b> Historical precincts / Building of Art, Culture and heritage Value. Preparation of Graphical Documentation consisting of site plan, building plan, sections, elevations and details on Suitable architectural scale.                                                                                                                                                                       |
| 5    | <b>Documentation techniques:</b> Graphical and Descriptive. Documenting art, architecture, social, economic, cultural, or structural data in soft as well as hard format.                                                                                                                                                                                                                                                      |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                    | YEAR OF PUBLICATION |
|------|-------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Feildon B. M., "An introduction to conservation", UNESCO Press                                        | 1982                |
| 2    | Anuradha V. Kumar, "Conservation of Building Stones", INTACH Publication, New Delhi                   |                     |
| 3    | ARCHIFUNDA, "Heritage Conservation & Cultural Continuity", Archifunda                                 | 2002                |
| 4    | Colonel S.S.Jacob, "Jeypore Portfolio of Architecture Details", Idological Book House, Varanasi India | 1977                |
| 5    | P.K Mishra, "Researches in Archeology and Conservation"                                               | 1999                |

**COMPUTER APPLICATION-IV**  
**Code: B4AR07-CP21**
**B.ARCH Semester: IV**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p><b>Rendering-</b> To introduce 2D and 3D rendering and visualization softwares. Basic setup including page size, resolution, colour scheme i.e. CMYK/RGB, units etc. Introduction to basic rendering tools: Selection tools i.e. lasso tool, marquee tool, magic wand tool, brush and its customization using option bar, paint bucket tool, gradient tool, text tool. Layers: Creation of new layers, arranging/merging layers applying effects using layers i.e. colour, shadow, gradient, patterns, emboss, opacity etc. Importing/ Creating patterns for hatching.</p> <p><b>Exercise:</b> To prepare portfolio cover page by using above tools.</p> |
| 2    | <p><b>Layers:</b> Creation of new layers, arranging / merging layers applying effects using layers i.e. color, shadow, gradient, patterns, emboss, opacity etc. Importing / Creating patterns for hatching.</p> <p><b>Exercise:</b> To prepare portfolio cover page by using above tools.</p>                                                                                                                                                                                                                                                                                                                                                               |
| 3    | <p><b>Import and Export options:</b> Importing and exporting 2D and 3D models to and from various softwares in jpeg, eps, pdf etc. Packaging and Saving high resolution images and videos.</p> <p><b>Exercise:</b> import plan, section, elevation in supported format i.e. EPS, JPEG and render it</p>                                                                                                                                                                                                                                                                                                                                                     |
| 4    | <p><b>Creating rendered images</b> – Exporting files into JPEG, pdf and other format.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 5    | <p><b>Print Options</b> – Page setup, Page Layout, image resolution, etc.</p> <p>Exercise: Hard copy submission of rendered views.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|      | <b>TOTAL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                             | YEAR OF PUBLICATION |
|------|----------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Lisa Danae Dayley, Brad Dayley, “The Essential Photoshop Book” Adobe Photoshop CS5 Bible, Wiley India Pvt. Ltd | 2010                |
| 2    | Eileen Mullin, “The Essential Photoshop Book”, Prima Publishing US                                             | 1998                |
| 3    | Olivier Lecarme , Karine Delvare, “The Book of GIMP - A Complete Guide to Nearly Everything”, No Starch Press  | 2013                |
| 4    | Kogent, “Photoshop CS6 in Simple Steps”, Dreamtech Press                                                       | 2012                |
| 5    | Davinder Singh Minhas, “Photoshop” New Dawn Press                                                              | 2005                |

**BUILDING PLUMBING SERVICES**  
**Code: B5AR01-CT13**
**B.ARCH Semester: V**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p><b>Water Supply: sources, demand, treatment and distribution of water.</b><br/>           Sources of water supply, Plumbing system types for various buildings. Quality of potable water. Calculation of water requirements for various building types based on Indian standards (BIS). Water treatment methods– Screening, Aeration, Sedimentation, Filtration, Disinfection, Softening. Storage and distribution of water. Choice of pipe materials, types of fixtures and fittings.</p>                                                                                                                                                                       |
| 2    | <p><b>Sanitation: Sanitary pipes, fittings and fixtures- Layout and design</b><br/>           Principles of sanitation, Study of Indian standards and plumbing by-laws (NBC). Introduction to various sanitary pipes, joints, fittings and fixtures, their function, placement and constructional details.<br/>           Study of internal &amp; external drainage system of various buildings including small residences, apartments, public buildings etc. Single stack system, one pipe and two pipe systems, testing of house drains, Gradients used in laying drains and sewers, Self-cleaning and non-scoring velocities for drain pipes,</p>                |
| 3    | <p><b>Sanitation: Waste water treatment and disposal methods</b><br/>           Study of Traps, Inspection chambers, Manholes, Septic tanks, Soak pits, and Public sewage line. Study of Disposal systems for domestic effluent from fitting to sewer line. Study of low cost sanitary systems (sulabh complexes) and other CBRI details. Waste water – Sewage disposal, primary treatment, secondary treatment and tertiary treatment. Modern types of Sewage Treatment Plants.</p>                                                                                                                                                                                |
| 4    | <p><b>Storm water drainage &amp; Rain water harvesting</b><br/>           Principles of storm water drainage. Types of drain pipes. Storm water gutter / Storage sumps. Study of storm water disposal at site and settlement level. Rain water harvesting system. Recycling of water.<br/> <b>Solid waste, collections, treatments and disposal</b><br/>           Prevalent SWM practices and deficiencies: Storage of waste at source, collection, segregation, transportation of waste. Disposal of solid wastes: Sanitary land filling, Composting, Incineration, Pyrolysis – advantages and limitations. Biogas system and Modern renewable energy system.</p> |
| 5    | <p><b>Application: Layout design and construction</b><br/>           Layout design and details of water supply distribution system in a Campus. Layout design and details of sewage and drainage system for different building types. Storm water drainage and rain water harvesting system design for a building project. Course may be integrated with concurrent architectural design.</p>                                                                                                                                                                                                                                                                       |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                            | YEAR OF PUBLICATION |
|------|-----------------------------------------------------------------------------------------------|---------------------|
| 1    | B.C. Punmia, "Waste Water Engineering", Laxmi Publications.                                   | 2009                |
| 2    | S.J. Arceivala, "Waste Water Treatment for Pollution Control", Tata McGraw Hills Publication. | 2008                |
| 3    | K.N. Duggal, "Elements of Environmental Engineering", Chand & Co.                             | 2010                |
| 4    | "Uniform Illustrated Plumbing Code – India (UIPC-I)", Indian Plumbing Association             | 2014                |
| 5    | Charanjeet S. Shah; Water Supply and Sanitation; Galgotia Publication                         | 2015                |
| 6    | H.S. Bhatia; Environmental Services (Plumbing); Galgotia Publication                          |                     |

**HISTORY OF ARCHITECTURE-III**  
**Code: B5AR02-CT14**
**B.ARCH Semester: V**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p><b>RENAISSANCE &amp; BAROQUE ARCHITECTURE</b></p> <p><b>Renaissance Architecture:</b> Characteristic features of the Renaissance Architecture. Famous designers and Works of the period Brunelleschi : Florence Cathedral, S. Maria Novella, S. Andrea Alberti: Palazzo Rucellai, S. Maria Novella; Bernanate: Tempietto, Plan of St. Peter's; Michelangelo: Laurentian Library, Campidoglio, St. Peter's Palladio: Villa Barbaro, Villa Americo Capra, S. Giorgio Maggiore</p> <p><b>Baroque Architecture:</b> Characteristic features of the Baroque Architecture. Famous Designers and works of the period Bernini: St. Peter's- Plaza, S. Andrea.; Borromini: S. Carlo alle Quattro Fontane, S. Ivo Della Sapienza; Christopher Wren: St. Stephen, Walbrook ; St. Paul's Cathedral</p>                                                                                                                                                                                                    |
| 2    | <p><b>NEOCLASSICAL &amp; INDUSTRIAL ARCHITECTURE</b></p> <p><b>Neoclassical Architecture:</b> Characteristic features of Neoclassical Architecture. Famous Designers and works of the period. Robert Adam: Kedleston Hall, Syon House; William Chambers: Somerset House; Louis Boullee: Cenotaph for Sir Issac Newton, Library of the King Claude Nicolas Ledoux: Salt works of Arc and Senans</p> <p>Karl Friedrich Schinkel: Royal Guard House, Altes Museum Sir John Soane: Bank of England; Thomas Jefferson: Monticello House, Virginia State Capitol.</p> <p><b>Industrial Architecture:</b> Characteristic features of Industrial Architecture. Famous Designers and works of the period. Joseph Paxton: Crystal Palace; Henri Labrouste: Bibliotheque Ste.-Genevieve, Bibliotheque Nationale; Gustave Eiffel: Eiffel Tower, Statue of Liberty Emanuele Rocco: Galleria Umberto; George Gilbert Scott: St Pancras Station Charles Garnier: Paris Opera House</p>                          |
| 3    | <p><b>LATE 19TH CENTURY MOVEMENTS</b></p> <p>Characteristic features of Art and Architectural movements of late 19thCentury. People and places associated with the movements. Famous Designers and works of the period.</p> <p><b>Art &amp; Crafts Movement:</b><br/>John Ruskin &amp; William Morris; Philip Webb: Red House; Richard Norman Shaw: New Zealand Chambers; Greene &amp; Greene: Gamble House</p> <p><b>Art Nouveau:</b> Victor Horta: Tussel House, Hotel Van Etevelde; Hector Guimard: Paris Metro Entrances; Antonio Gaudi: Casa Mila, Casa Batllo and Church of Sagrada Familia; Charles Rennie Mackintosh: Glasgow School of Art, Hill House</p> <p><b>Viennese Secession:</b> Otto Wegner: Postal Savings Bank; Josef Maria Olbrich: Secession Building; Adolf Loos: The essay "Architecture and Ornament", Steiner House, Moller House and Goldman &amp; Salatsch Store.</p>                                                                                                |
| 4    | <p><b>EARLY 20TH CENTURY MOVEMENTS</b></p> <p>Characteristic features of Art and Architectural movements of early 20thCentury. Famous Designers and works of the period. People and places associated with the movements.</p> <p><b>Deutscher Werkbund:</b> 1st and 3d Exhibition<br/>Peter Behrens: AEG Turbine Factory; Bruno Taut: Glass house</p> <p><b>Futurism:</b> Filippo Marinetti: Futuristic Manifesto; Antonio Sant' Elia: La Cita Nuova</p> <p><b>Constructivism:</b> Vladimir Tatlin: Monument to the Third International; Konstantin Melnikov: Soviet Pavilion, Rusakov Workers' Club</p> <p><b>Expressionism:</b> Erich Mendelsohn: Einstein Tower; Rudolph Steiner: Goetheanum</p> <p><b>De Stijl:</b> Theo Van Doesburg&amp; Piet Mondrian; Gerrit Rietveld: Schroeder House; J.J.P. Oud: Seaside Houses, Café de Unie.</p> <p><b>Art Deco:</b> William Van Alen: Chrysler Building; Shreve, Lamb &amp; Harmon: Empire State Building; B. Marcus Priteca: Pantages Theatre</p> |
| 5    | <p><b>British Colonial India</b></p> <p>In search of appropriate style; development of hybrid styles; Indo Sarcenic, Indo Gothic and Indo Deco styles. Famous Designers and works in the major cities namely Madras, Calcutta, Bombay and Delhi.</p> <p><b>Madras</b><br/>Caldwell &amp; Havilland: St Andrews Church; Robert F. Chisholm: Senate House and National Art Gallery; Henry Irwin: Madras high court, Chennai Central Railway Terminus</p> <p><b>Calcutta</b><br/>Thomas Lyon: Writer's Building; Charles Wyatt: Government Building; William Emerson: Victoria Memorial</p> <p><b>Bombay</b><br/>George Gilbert Scott: Rajbai Tower-Bombay University Library; Fredrick William Stevens: Victoria Terminus, Municipal Hall; George Wittet: Gateway Of India and Prince of Wales Museum</p> <p><b>Delhi</b><br/>Sir Edwin Lutyens: India Gate. Viceroy's House; Herbert Baker: Parliament House, Secretariat Buildings</p>                                                           |

**REFERENCE BOOKS**

| <b>S.NO</b> | <b>NAME OF AUTHORS / BOOKS/ PUBLISHER</b>                                                                             | <b>YEAR OF PUBLICATION</b> |
|-------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------|
| 1           | Marian Moffett, Michael Fazio, Lawrence Wodehouse; Buildings Across Time; McGraw Hill                                 | 2004                       |
| 2           | Francis D. K. Ching, Mark M. Jarzombek, Vikramaditya Prakash; A Global History of Architecture, John Wiley & Sons     | 2007                       |
| 3           | William J. R. Curtis, Modern Architecture since 1900, Phaidon Press ltd.                                              | 1996                       |
| 4           | Vikram Bhatt & Peter Scriver; Contemporary Indian Architecture, After the Masters;Mapin Publishing Pvt. Ltd.          | 1990                       |
| 5           | Kenneth Frampton; World Architecture 1900-2000: A critical Mosaic, Volume 8 South Asia; Springer-Verlag Wien New York | 2000                       |

**ARCHITECTURAL STRUCTURES-V**  
**Code: B5AR03-CT15**
**B.ARCH Semester: V**

| UNIT | CONTENT                                                                                                                                                                                                     |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>RCC Beams Design:</b> Introduction to different types of beams, Design of rectangular beams; design of singly reinforced beams, design of doubly reinforced beam, design of T-beam, design of L-beam     |
| 2    | <b>RCC Columns Design:</b> Introduction to RCC column, Design of square column, Design of rectangular column, Design of circular column                                                                     |
| 3    | <b>RCC Slabs Design:</b> Introduction to RCC slab, Difference between one way slab and two way slab, Design of one way slab, Design of two way slab, Design of cantilever slab                              |
| 4    | <b>RCC Footing Design:</b> Introduction, Pressure distribution beneath footing, Design of Rectangular footing, Design of square footing, Design of circular footing, Design of combined rectangular footing |
| 5    | <b>Retaining Wall Design:</b> Introduction, Types of retaining walls, Design of T-shaped retaining wall                                                                                                     |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                | YEAR OF PUBLICATION |
|------|-------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | S Unnikrishnapillai & Devdasmenon, Reinforced concrete design; Third Edition, "Mcgraw hill publication education" | 2002                |
| 2    | B C Punmia, Design of R.C.C. Structures; "Laxmi Publication"                                                      | 2006                |
| 3    | P.C. Varghese, Limit state design of Reinforced concrete; Second Edition, "PHI learning private limited"          | 2011                |
| 4    | Ramanutham, Design of reinforced concrete design; "Dhanpat Rai Publication"                                       | 2011                |
| 5    | Kenneth M.leet & Dionisiobernal, Reinforced concrete design; "The McGraw Hills Companies"                         | 2000                |

**ARCHITECTURAL DESIGN-IV**  
**Code: B5AR04-CP23**
**B.ARCH Semester: V**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Theme:</b> Understanding the integration of structure and construction systems in design of Built Spaces.                                                                                                                                                                                                                                                                                                                                               |
| 2    | <b>Parameters:</b> Structure and construction as disciplines that evolve making of a space. Structural systems as choices based on program, space and form character. Structure as a space maker and structure as order.                                                                                                                                                                                                                                   |
| 3    | <b>Expected Skills:</b> To develop ability to study and analyze natural and man-made structural systems, co-relation between function, structure, space and form. Different structural models in building systems. Models as analytical tools of decision making. Understanding of Gravity loads transfer, structural grid and Framing systems. Co-relation between Structural Grid, Design Grid and Parking Grid.                                         |
| 4    | <b>Design Outline:</b> Integration of structure and construction in the design of a Multi-functional simple programmatic Building Project at Neighborhood level in Urban or Rural context, ideally on a Building Site for a built-up area of 501-1000 sq. m. The Course may be integrated with Structures, Building materials & construction and Interior Design.                                                                                          |
| 5    | <b>Projects:</b> A minimum of two Design Projects to be given in the semester from the list of suggested topics in various categories of Building types: Residential: Apartments, Students Hostel etc.; Educational: Primary, Secondary school, etc.; Commercial: Neighborhood shopping Centre, bank etc.; Recreational: Health clubs, Gymkhana etc.; Public: Neighborhood Centre, Marriage halls, etc.; Religious: Temple, Mosque, Gurudwara, Church etc. |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                            | YEAR OF PUBLICATION |
|------|---------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Richard Weston; Materials Form and Architecture; Laurence king Publishing, Singapore                          | 2003                |
| 2    | Gunter Pfeifer, Antje M. Liebers, Per Brauneck; Exposed Concrete Technology & Design; BirkHauser, Switzerland | 2005                |
| 3    | Catherine Croft; Concrete Architecture; McGraw Hill, New Delhi                                                | 2004                |
| 4    | Donald Watson & Michael J. Crosbie; Time Saver Standards for Architectural Design, McGraw Hill                | 2004                |
| 5    | Francis D.K. Ching, Building Construction Illustrated, John Wiley & Sons 2001                                 | 2001                |

**BUILDING MATERIALS & CONSTRUCTION-V**  
**Code: B5AR05-CP24**
**B.ARCH Semester: V**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p><b>Damp Proofing</b><br/>           MATERIALS: Causes and effect of dampness, techniques and methods of damp prevention, materials used for damp proofing– flexible, semi-rigid and rigid materials. Damp proofing treatments in buildings.<br/>           CONSTRUCTION: General preparatory work for damp proofing. Treatment of foundations, dampness from adjacent ground, treatment of foundation on poor soil, treatment above ground level. External and internal tanking, in-situ damp proofing treatment, cavity wall construction.</p>                                                                                                                                                                                                                                                                                                                                                                                                           |
| 2    | <p><b>Water Proofing</b><br/>           MATERIALS: Difference in water proofing and damp proofing, various systems of water proofing, materials for water proofing such as bitumen felt and paints, epoxy formulations, lime concrete, slurry coats, polyethylene film, glass fiber tissue reinforced bitumen, etc.<br/>           CONSTRUCTION: Preparatory work for water proofing. Water proofing for different roof types such as concrete and masonry flat or sloping roofs, timber sloping roof, shell roofs etc. Parapet and coping details, water proofing of underground reservoirs &amp; swimming pools. Covering of expansion joints, water proofing techniques for roof gardens, etc.</p>                                                                                                                                                                                                                                                        |
| 3    | <p><b>Fire &amp; Pest Resistance</b><br/>           MATERIALS: Important considerations in fire protection, Non-combustible and combustible materials. Properties of some common materials such as timber, stone, bricks, terracotta, steel, wrought iron, cast iron, Aluminium, glass, asbestos, cement, mortar etc. Classification of pests, effects of pests in buildings, pest control methods such as Biological, Environmental, Mechanical &amp; Chemical. Laws &amp; Regulations for pest control.<br/>           CONSTRUCTION: General measures of fire safety in buildings such as smoke detectors, alarm systems, etc. Fire extinguishing arrangements, escape routes, etc.<br/>           Pest control measures by design and constructional means for new and existing buildings. Design criteria internal &amp; external anti-termite measures at foundation level &amp; masonry level.</p>                                                     |
| 4    | <p><b>Thermal Insulation</b><br/>           MATERIALS: Effects of heat transfer and thermal insulation behavior of the material and building components, General principles of thermal insulation, materials of heat insulation such as slab or block insulations, blanket insulations, loose fills, insulating boards, reflective sheet materials etc.<br/>           CONSTRUCTION: Methods of heat insulation of roofs, exposed walls and exposed windows, doors and ventilators.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 5    | <p><b>Protective &amp; Decorative finishes and Machines &amp; Equipment:</b><br/>           MATERIALS: Objectives of building finishes, characteristics and ingredients of a good paint. Paints: classification and types. Covering capacity of paints, preparation of paints. Varnishes &amp; Varnishing; Objectives and characteristics of a good varnish, ingredients of varnish, types of varnishes, process of varnishing. Polishes &amp; polishing. Distempers &amp; distempering, properties of distempers. Miscellaneous finishes such as wall filling, papering, whitening, coal tarring, wax polishing, wood oiling, glazing etc.<br/>           CONSTRUCTION: Application of paints on different surfaces such as wood, metal, plastered concrete surfaces etc. in detail. Application of varnishes, distempers in various building elements, components &amp; furniture. Tools and equipment for various protective and decorative finishes.</p> |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                       | YEAR OF PUBLICATION |
|------|------------------------------------------------------------------------------------------|---------------------|
| 1    | Handbook on Building Construction Practices, BIS, New Delhi                              | 1997                |
| 2    | S.P. Arora, S.P. Bindra, Building Construction, Dhanpat Rai Publications.                | 2012                |
| 3    | Hegger, Auch-Schwelt, Fuchs, Rosenkranz, Construction Materials Manual; Brkhauser Boston | 2006                |
| 4    | Francis D.K. Ching; Building Construction Illustrated, John Wiley & Sons 2001            | 2001                |
| 5    | Barry R; Construction of Building, Vol.2; Affiliated East West Press Pvt. Ltd.           | 1999                |

**INTERIOR DESIGN**  
**Code: B5AR06-CP25**
**B.ARCH Semester: V**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | The profession of Interior Design; Role of an Interior designer– past & present.<br>Interior Space: Space as raw material; quantitative and qualitative study such as types of spaces; size of a space; organization of spaces, etc. Light as an animator of space, direct & indirect lighting. Interior Elements: Floor; Floor finishes, their functional and aesthetical criteria; floor coverings, etc.<br>Wall; Wall finishes and their functional and aesthetical criteria; wall coverings,<br>Ceiling; types; finishes and their functional & aesthetical criteria. Openings; such as Doors and Windows; their types and treatments. Inclined elements such as stairs; ramps; their types and finishes |
| 2    | Perception of Interiors: Surface & Visual characteristics of Interior elements and their effect on the perception of space. Principal of Visual composition, Principle on where and how to perceive shapes & forms, the primary six principles such as figure-ground, closure, symmetry, proximity, similarity and continuance. Study of proxemics, behavioural settings.                                                                                                                                                                                                                                                                                                                                    |
| 3    | Furniture & Accessories: An overview of historical perspective of furniture and styles. Interior styles such as Italian, English, French, Japanese, etc. Modern trends and contemporary attitudes to Interior Design i.e. Modular furniture.<br>Utilitarian, Incidental and Decorative accessories in public and private interiors.                                                                                                                                                                                                                                                                                                                                                                          |
| 4    | Interior Environmental System: Understanding thermal, visual, auditory and sanitary condition necessary for comfort and convenience of occupants. Coordination of heating and air conditioning system, water supply, sanitary drainage system, electrical & lighting system and acoustics with a building's structural system.                                                                                                                                                                                                                                                                                                                                                                               |
| 5    | Design: Interior Design process, Interior design concepts, Interior space planning & human dimensions. Two interior schemes of different functional types; Residential/ Commercial/ Institutional etc. at different scales will form the major design assignments. The course may be integrated with the concurrent architecture design.                                                                                                                                                                                                                                                                                                                                                                     |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                        | YEAR OF PUBLICATION |
|------|---------------------------------------------------------------------------|---------------------|
| 1    | Elizabeth Wilhide, The Interior Design Directory, Quadrille London        | 2009                |
| 2    | Francis D.K. Ching, Interior Design Illustrated, NY Van Nastrand Reinhold | 1987                |
| 3    | Time Saver Standards for Interior Design & Space Planning, McGraw Hill    | 1992                |
| 4    | The Fundamentals of Interior Design, AVA Academic, Switzerland            | 2009                |
| 5    | Karla J. Nielson, David A. Taylor, Interiors an introduction, McGraw Hill | 2002                |

**ELECTIVE I (FURNITURE DESIGN)**  
**Code: B5AR07-CP26**
**B.ARCH Semester: V**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Introduction: Furniture design and its types based on; function (sit, surface, storage etc.), state (movable, built-in, modular, stack etc.) and forms. Role of furniture design in interiors.                                                                                                                                                                                                                         |
| 2    | Historical & Cultural Context of Furniture Design: Industrial Revolution, Great Reform Movements: 1850-1914, Modernism to Pre-World War: 1900-1945, Post World War: 1945-1970s, Post Modernism: 1970-2000, Emerging design trends: 21st century.                                                                                                                                                                       |
| 3    | Materials: types of materials, market forms, construction or assembly techniques such as bending, molding, casting etc. Joinery details, fabrication, tools and machinery involved.                                                                                                                                                                                                                                    |
| 4    | Design & Production: Concept generation methods and design, Developing design and drawing techniques, skills (analog and digital), Technical drawings (design and details) and Model on scale.                                                                                                                                                                                                                         |
| 5    | Design:<br>The subject may be integrated with the concurrent course of Interior Design. At the term of the course, the students will formulate, develop and resolve design solutions for furniture and present it in a form of a portfolio made in appropriate scale. The portfolio must present all drawings and details with respect to ergonomics, aesthetics, materials and construction, on an appropriate scale. |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                             | YEAR OF PUBLICATION |
|------|----------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Juli Capella & Quim Larrea, Designed by Architects in the 1980's, Mitchell London                              | 1988                |
| 2    | Karla J. Nielson, David A. Taylor, Interiors an Introduction 3d Edition, McGraw Hill New York                  | 2002                |
| 3    | Joint & Connection: Ideas in Furniture Design and their background, Birkhauser Verlag Basel.Boston.Berlin      | 1992                |
| 4    | Charles D. Gandy & Susan Z. Stidham, Contemporary Classics, furniture of the masters, McGraw Hill Book Company | 1981                |
| 5    | Francis D.K. Ching, Interior Design Illustrated, NY Van Nastrand Reinhold                                      | 1987                |

**ELECTIVE I (FURNITURE DESIGN)**  
**Code: B5AR07-CP26**
**B.ARCH Semester: V**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Introduction: Furniture design and its types based on; function (sit, surface, storage etc.), state (movable, built-in, modular, stack etc.) and forms. Role of furniture design in interiors.                                                                                                                                                                                                                            |
| 2    | Historical & Cultural Context of Furniture Design: Industrial Revolution, Great Reform Movements: 1850-1914, Modernism to Pre-World War: 1900-1945, Post World War: 1945-1970s, Post Modernism: 1970-2000, Emerging design trends: 21st century.                                                                                                                                                                          |
| 3    | Materials: types of materials, market forms, construction or assembly techniques such as bending, molding, casting etc. Joinery details, fabrication, tools and machinery involved.                                                                                                                                                                                                                                       |
| 4    | Design & Production: Concept generation methods and design, Developing design and drawing techniques, skills (analog and digital), Technical drawings (design and details) and Model on scale.                                                                                                                                                                                                                            |
| 5    | Design:<br>The subject may be integrated with the concurrent course of Interior Design. At the term of the course, the students will formulate, develop and resolve design solutions for furniture and present it in a form of a portfolio made in appropriate scale.<br>The portfolio must present all drawings and details with respect to ergonomics, aesthetics, materials and construction, on an appropriate scale. |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                             | YEAR OF PUBLICATION |
|------|----------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Juli Capella & Quim Larrea, Designed by Architects in the 1980's, Mitchell London                              | 1988                |
| 2    | Karla J. Nielson, David A. Taylor, Interiors an Introduction 3d Edition, McGraw Hill New York                  | 2002                |
| 3    | Joint & Connection: Ideas in Furniture Design and their background, Birkhauser Verlag Basel.Boston.Berlin      | 1992                |
| 4    | Charles D. Gandy & Susan Z. Stidham, Contemporary Classics, furniture of the masters, McGraw Hill Book Company | 1981                |
| 5    | Francis D.K. Ching, Interior Design Illustrated, NY Van Nastrand Reinhold                                      | 1987                |

**ELECTIVE I (PRODUCT DESIGN)**  
**Code: B5AR07-CP26**
**B.ARCH Semester: V**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                  |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Introduction: Product design and its types and need. Role of a product designer, product design process- research, development, production and marketing. Difference between Industrial and Product Design.                                                                              |
| 2    | Historical & Cultural Context of Product Design: Industrial Revolution, Great Reform Movements: 1850-1914, Modernism to Pre-World War: 1900-1945, Post World War: 1945-1970s, Post Modernism: 1970-2000, Emerging design trends of 21st century.                                         |
| 3    | Common Materials and their application. Hard Materials: Stone, Wood & Metals.                                                                                                                                                                                                            |
| 4    | Design and production: Concept generation methods and design, Developing design via sketching, on scale drawing techniques, skills (analog and digital), Technical drawings (design and detail) and Model on scale. Emphasis on ergonomics, material and aesthetics and user experience. |
| 5    | Design:<br>The subject may be integrated with the concurrent course of Interior Design.<br>A portfolio comprising of design for a product, presented in an appropriate scale. The design must fulfil the requirements such as ergonomics, aesthetics and construction technique.         |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                      | YEAR OF PUBLICATION |
|------|---------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Juli Capella & Quim Larrea, Designed by Architects in the 1980's, Mitchell London                       | 1988                |
| 2    | Roland Knauer, Transformation: Basic Principles & Methodology of Design, Birkhauser Basel.Boston.Berlin | 2008                |
| 3    | European Masters/ 3 vol. 10 Industrial Design, EDICIONES ATRIUM S.A.                                    | 1991                |
| 4    | Drawing for 3-Dimensional Design, Concept. Illustration. Presentation, Thames & Hudson.                 | 1990                |
| 5    | Robert W. Gill; Rendering with pen & ink; Thames & Hudson                                               | 2003                |

**ELECTIVE I (DIGITAL DESIGN)**  
**Code: B5AR07-CP26****B.ARCH Semester: V**

| UNIT | CONTENT                                                                                                                                                                                                                                                                             |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Introduction: Digital design and its practices. Digital or computational Designs such as Parametric, Isomorphic, Metamorphic etc. and their techniques. Inter-relationships of geometric and architectural parameters.                                                              |
| 2    | History & Evolution of Digital Architecture: Works of Gehry Partners, Zaha Hadid, Morphosis, SOM, KPF, Foster & Partners, Greg Lynn, etc. with respect to computational designs and contemporary practices.                                                                         |
| 3    | Computational Design Thinking & Fundamentals of Software:<br>Basic concept formulation, computational thinking and lexicon, visualization. Rhino+ Grasshopper (exploring new NURB systems, using generative algorithms and 3D modeling tools and required plug-ins).                |
| 4    | Digital fabrication & Scaled Models :<br>Creation of shop drawings (drawing issued for fabrication or production)<br>Coordination of Autodesk software with Rhino, Grasshopper and similar files formats.<br>Introduction to 3D printing, laser cutting and fabrication techniques. |
| 5    | Design Portfolio: At the end of the term, a portfolio will be made containing process documentation (sketches, diagrams both 2D and 3D)by setting up a layout or a scheme (composition of information on paper), using Adobe Illustration & In-design.                              |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                                              | YEAR OF PUBLICATION |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Jane Burry+ Mark Burry; The New Mathematics of Architecture, Thames & Hudson                                                                    | 2010                |
| 2    | Helmut Pottman, Andrea Asperl, Michael Hofer & Axel Kilian; Architectural Geometry, 1st Edition, Bentley Institute Press, Eton Pennsylvania USA | 2007                |
| 3    | Roland Knauer,Transformation: Basic Principles & Methodology of Design, Birkhauser Basel.Boston.Berlin                                          | 2008                |

**BUILDING ELECTRICAL SERVICES****B.ARCH Semester: VI****Code: B6AR01-CT16**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p><b>Building Energy</b><br/>Significance, Scope, Building Energy Sources-Conventional – Hydro, Fossil Fuels, Nuclear, etc. &amp; Non-Conventional - Bio-Gas, Photo Voltaic, Wind, Wave Energy, etc.<br/>Building Energy Scenario - Trends in Consumption, Impact of user behaviour and Energy Conservation. Terminology used – Electric Charge, Current, Voltage, Power, Resistance, AC &amp; DC etc. Basics of electrical circuit- Ohm's Law &amp; Kirchoff's Law- Series and Parallel Circuits.</p>     |
| 2    | <p><b>Electrical Transmission &amp; Distribution</b><br/>Transmission of electricity - Transmission Voltages, Power Factor and Power Losses.<br/>Electrical Distribution Systems- Demand, Tariff Legislation and Code of practice.<br/>Rules- National Electrical Code. Single Phase and Three Phase Supply Electrical Sub-Station – Transformer, Metering &amp; Monitoring, HT &amp; LT Panels, Switch Gears, Power Backup &amp; Emergency Supply.</p>                                                     |
| 3    | <p><b>Electrical Wiring and Installations</b><br/>Types of wiring systems, Methods of Wiring, Joint and Loop-In.<br/>Types of electrical Wires and their choice in planning electrical wiring in Building Switch boards, Distribution boards, Sockets, junction boxes, control equipment, and other fittings and fixtures. Protection against overload, short circuit, earth faults, lightning Conductors and other safety measures. Special systems- Bus Way, Bus Bar Trunk, Race Way, lighting Tracks</p> |
| 4    | <p><b>Building Automation and Control Systems</b><br/>Building Automations, Significance and Scope.<br/>Electronic and Communication Systems- Telecom, Intercom, Computer Systems and Data Networking- Wired &amp; Wireless. Electronic Security System- Security and Surveillance Systems. Automatic Control Systems- Elementary Local Loop and complete control systems</p>                                                                                                                               |
| 5    | <p><b>Electrical Layout Design</b><br/>Single Line Diagram &amp; Electrical layouts.<br/>Calculation of load for small project like Shop, Showroom, Office, Residence etc. Designing Basic Electrical layout to be integrated with concurrent Design Studio.</p>                                                                                                                                                                                                                                            |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                     | YEAR OF PUBLICATION |
|------|------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | S.L. Uppal- G.C. Garg; Electrical Wiring Estimation and Costing; Khanna Publication                                    | 2010 – 6th Edition  |
| 2    | Fred Hall & Rager Greeno; Building Services Handbook; Butterworth-Heinmann                                             | 2011 – 6th Edition  |
| 3    | Raina K.B. & Bhattacharya S.K.; Electrical Design, Estimation and Costing; New Age International Publishers, New Delhi | 2007                |
| 4    | Steve Doty & Wayne C. Turner; Energy Management Handbook; The Fourmount Press, USA                                     | 2009 – 7th Edition  |
| 5    | B. Mazumdaar; Textbook of Energy Technology; APH Publishing Corporation                                                | 2005                |

**HISTORY OF ARCHITECTURE-IV**  
**Code: B6AR02-CT17**
**B.ARCH Semester: VI**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p><b>MODERN ARCHITECTURE: The Great Masters</b><br/>           Factors contributing to the development of the style. The life, Philosophy and contribution of the Great Masters to Architecture<br/>           Luis Sullivan: The Chicago School Of Architects, Auditorium Building, Wainwright and Guaranty Building, Carson Pirie Scott Store.<br/>           Frank Llyod Wright: Prarie School Houses such as Winslow, Ward Willits and Robie House. Early Public buildings such as Larkin &amp; Unity Temple. Usonian Homes such as Hanna House. The culmination of the idea of the Organic Architecture- Falling Waters.<br/>           Later Public buildings such as Johnson Wax and Guggenheim Museum.<br/>           Walter Gropius: Fagus Shoe factory &amp; Bauhaus School.<br/>           Mies Van der Rohe: Weissenhoff Housing Estate, German Pavilion at Barcelona, Farnsworth House, Illinois; Lake Shore Drive Apartments, Chicago; Crown Hall and Seagram Building, New York.<br/>           Le Corbusier: Towards a new Architecture- the Five Points. Villa Savoye, Swiss Pavilion, Unite d'Habitation, Notre Dame du Haut. City Planning and Design of buildings of Capitol Complex at Chandigarh. Sanskar Kendra, Mill Owner's Association, Shodhan and Sarabhai houses at Ahmedabad.</p> |
| 2    | <p><b>MODERN ARCHITECTURE: After The Masters</b><br/>           Life, Philosophy and Contribution of Modern Period Architects after the great masters.<br/>           Alvar Aalto: Paimio Sanatorium, Viipuri Library, Villa Mairea, Saynatsalo Town Hall<br/>           Louis Isadore Kahn: Salk Institute, California; Kimbell Art Museum, Texas; IIM Ahmedabad; Bangladesh National Assembly, Dhaka<br/>           Eero Saarinen: TWA Terminal J.F. Kennedy Airport, New York; Dulles International Airport ; Kresge Auditorium and Chapel at MIT<br/>           Kenzo Tange: Hiroshima Peace Memorial, Yoyogi Olympic Gymnasiums, Tokyo; Tokyo City Hall.<br/>           John Utzon: Sydney Opera House, Kuwait National Assembly, Bagsverd Church, Denmark</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3    | <p><b>POST MODERN ARCHITECTURE: Classicism &amp; High-Tech</b><br/>           Post Modern architecture as a counter proposal to Modern architecture. Different Trends and Meanings of Post Modern Architecture. The Life, Philosophy and Contribution of Post Modern Architects.<br/>           Robert Venturi: Vanna Venturi House and Guild House, Philadelphia and Sainsbury Wing National Gallery London.<br/>           Philip Johnson: The Glass House, Connecticut; AT&amp;T Building, Manhattan; National Centre for Performing Arts, Mumbai.<br/>           Micheal Graves: Public Service and Humana Corporation Buildings, Walt Disney World Swan &amp; Dolphin Resort<br/>           Richard Rogers: Georges Centre Pompidou, Llyods Building, Millennium Dome.<br/>           Renzo Piano: Tjibaou Cultural Centre, California Academy of Sciences.<br/>           Norman Foster: HSBC Hong Kong, Sainsbury Centre for Visual Arts, Swiss Re Tower, Santiago Calatrava: Lyon Airport Railway Station, The Turning Torso.</p>                                                                                                                                                                                                                                                                        |
| 4    | <p><b>POST MODERN ARCHITECTURE: Deconstructivism &amp; Regionalism</b><br/>           The other flavors of Post Modern Architecture in the Developed and Developing World.<br/>           Peter Eisenman: House VI, Wexner Centre for Visual Art, Bio Centrum<br/>           Frank Owen Gehry: Walt Disney Concert Hall, Nationale Nederlander, Prague; Guggenheim Museum, Bilbao.<br/>           Daniel Libeskind: Jewish Museum, Berlin; Imperial War Museum, Manchester ; Denver Art Museum Extension &amp; Residences, Colorado.<br/>           Zaha Hadid: Vitra Fire Station, Weil Am Rhein Germany; Phaeno Science Centre, Wolfsburg ; London Aquatics Centre.<br/>           Hassan Fathy: Mosque, New Gournu; Ministerli House, Cairo; Hassan Rashad House, Ibiar Tanta, Egypt.<br/>           Geoffrey Bawa: Parliamentary Complex, Sri Jayawardenapura; University of Ruhunu, Matara ; Kandalama Hotel, Dambulla; Sri Lanka.<br/>           Laurie Baker: Loyola Graduate Women's Hostel, Centre for Development Studies, Indian Coffee House, Trivandrum.</p>                                                                                                                                                                                                                                        |

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5    | <p><b>INDIAN ARCHITECTURE – Post Independence</b><br/>           Post Independence Indian Architects after Le Corbusier and Louis Kahn.<br/>           Achyut P. Kanvinde: Campus Architecture, IIT Kanpur ; Dudhsagar dairy Complex, Mehsana ; National Insurance Academy, Pune; Nehru Science Centre, Mumbai.<br/>           Joseph A. Stein: India International Centre ; Triveni Kala Sangam and India Habitat Centre, Delhi<br/>           B. V. Doshi : Gandhi Labour Institute, CEPT, Institute of Indology, Ahmedabad ; Aranya Township, Indore; Vidyadhar Nagar, Jaipur; IIM Bangalore.<br/>           Anant D. Raje : Indian Statistical Institute, Delhi ; Indian Institute of Forest Management, Bhopal; Farmers Training Institute, Palampur.<br/>           Charles Correa: Gandhi Samarak Sangrahalaya, Ahmedabad; Kala Academy, Panjim; Jawahar Kala Kendra, Jaipur; British Council Headquarters, Delhi; Artist's Village, Belapur ; Chamapulimaud Centre for Unknown, Lisbon.<br/>           Raj Rewal : Asiad Games Village, National Institute of Immunology and Scope Office Building, Delhi.<br/>           Uttam C. Jain : Jodhpur University Campus Extension ; Indira Gandhi Institute of Development Research, Mumbai ; Nagar Nigam, Jaipur.</p> |

#### REFERENCE BOOKS

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                    | YEAR OF PUBLICATION |
|------|-----------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Marian Moffett, Michael Fazio, Lawrence Wodehouse; Buildings Across Time; McGraw Hill                                 | 2004                |
| 2    | Francis D. K. Ching, Mark M. Jarzombek, Vikramaditya Prakash; A Global History of Architecture, John Wiley & Sons     | 2007                |
| 3    | William J. R. Curtis, Modern Architecture since 1900, Phaidon Press Ltd.                                              | 1996                |
| 4    | Vikram Bhatt & Peter Scriver; Contemporary Indian Architecture, After the Masters;Mapin Publishing Pvt. Ltd.          | 1990                |
| 5    | Kenneth Frampton; World Architecture 1900-2000: A critical Mosaic, Volume 8 South Asia; Springer-Verlag Wien New York | 2000                |

**ARCHITECTURAL STRUCTURE -VI**  
**Code: B6AR03-CT18**
**B.ARCH Semester: VI**

| UNIT | CONTENT                                                                                                                                                                          |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Introduction<br>Introduction to steel members, Uses of steel over RCC, Introduction to Rivet connections, Introduction to bolted connections, Introduction to welded connections |
| 2    | Design of Tension members<br>Introduction to tension plates, Introduction to tie members in trusses, Designing of tension plates, Designing of tie members                       |
| 3    | Design of Compression members<br>Introduction to steel columns and struts, Designing of steel columns, Designing of steel struts and uses of steel columns                       |
| 4    | Design of Beams<br>Introduction to steel beams, Designing of laterally supported beams, Designing of laterally unsupported beams, Uses of built up sections and steel beams.     |
| 5    | Design of Foundations<br>Introduction of grillage foundation, Theory of column bases, Designing of grillage foundation and Designing of column bases                             |
|      | <b>TOTAL</b>                                                                                                                                                                     |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                       | YEAR OF PUBLICATION |
|------|------------------------------------------------------------------------------------------|---------------------|
| 1    | Prof. R. Chandra, Design of Steel Structure (Vol.I); “Standard Publisher & Distributors” | 2005                |
| 2    | Negi, Design of Steel Structure; “Tata McGraw Hills Publishing Co. Ltd.”                 | 2004                |
| 3    | S. Subramaniam, Design of Steel Structure; “Oxford university press”                     | 2008                |
| 4    | B.C.Punmia& A K Jain, Design of Steel Structure; “Laxmi publication”                     | 2006                |
| 5    | S.K.Duggal, Design of Steel Structure; “Tata McGraw Hills Publishing Co. Ltd.”           | 2004                |

**ARCHITECTURAL DESIGN -V**  
**Code: B6AR04-CP28**
**B.ARCH Semester: VI**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Theme:</b> Understanding the integration of Building services in the design of built spaces. Introduction to various Building services as functional enhancer of space.                                                                                                                                                                                                                                                                                                                     |
| 2    | <b>Parameters:</b> Environmental concerns in design such as light, ventilation, water, waste and Energy. Integration of structural, constructional and spatial systems with Building Services systems.                                                                                                                                                                                                                                                                                         |
| 3    | <b>Expected Skills:</b> To develop ability to study and analyze natural and man-made, ancient and Modern Building services systems. Co-relation between structural, constructional, spatial and Building plumbing and Electrical systems. Requirement of services as per Building codes, Basic layout and Design of Plumbing and Electrical services in Buildings.                                                                                                                             |
| 4    | <b>Design Outline:</b> Integration of services with structure, construction and function in the design of Multifunctional Simple Programmatic Building Project at community level in Urban or Rural context ideally on a Building site for a built-up area of 1001- 2500 sq.m. Course to be integrated with Plumbing and Electrical services and landscape Design courses.                                                                                                                     |
| 5    | <b>Projects:</b> A minimum of two Design Projects to be given in the semester from the list of suggested projects in various categories of Building types: Residential: Community Hostel, Youth, Hostel, etc.<br>Educational: Higher Secondary School, Special school, etc.<br>Health: Community Health Centre, Hospital, etc. Hospitality: Hostels, Motels, Resorts, etc.<br>Commercial: Community shopping centre, commercial complex, offices, etc. Industrial: Industry, Laboratories etc. |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                         | YEAR OF PUBLICATION |
|------|--------------------------------------------------------------------------------------------|---------------------|
| 1    | Smith Lee; Plumbing Technology- Design & Installation; Delman Publishers Inc.              | 2007                |
| 2    | Fred Hall & Rager Greeno; Building Services Handbook; Butterworth-Heinmann                 | 2011- Sixth Edition |
| 3    | Ralph Hammann, “ Creative Engineering, Architecture, and Technology; DOM publishers        | 2010                |
| 4    | Pierre Loze, “Art & Build” Images Publishing                                               | 2009                |
| 5    | Joseph De Chiara, Micheal J. Crosbie; Time Saver Standards for Building Types; McGraw Hill | 2001-Fourth Edition |

**BUILDING MATERIAL & CONSTRUCTION -VI**  
**Code: B6AR05-CP29****B.ARCH Semester: VI**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p><b>Pre-cast, Prefabricated &amp; Pre-stressed Construction:</b><br/> <b>MATERIALS:</b> Pre-stressing, prefabrication and precast and their present scenario in country. Standardization &amp; modular coordination, jointing, tolerances, mass production storage and handling of materials. Types of pre-stressing techniques such as pre-tensioning &amp; post tensioning. Advantage &amp; disadvantages of Pre-stressing, Post-tensioning systems such as Freyssinet system, Gifford-Udall-cct system etc.<br/> <b>CONSTRUCTION:</b> Prefabrication technology – column &amp; beam system, panel system, box system, Prefabrication techniques and various building components, Comparison between RCC and Pre-stressed concrete.</p>                                                                                                                                                                      |
| 2    | <p><b>Long span structures:</b><br/> <b>MATERIALS:</b> Structural, Design &amp; constructional issues of long span structures, long span structure system such as one way systems: Beams in timber, steel &amp; concrete; Trusses in timber &amp; Steel; Arches in timber, steel and concrete; Cable Structures in Steel. Plate structures in timber &amp; concrete; shell structures in wood &amp; concrete. Two way systems: Plate structures in steel &amp; concrete; shell structures in steel &amp; concrete. Principles of pneumatic structures. Machines and equipments for long span structures.<br/> <b>CONSTRUCTION:</b> Constructional details of various structures in steel, concrete – portal frames, folded plate, domes, space frame, tensile structure etc.. Foundations for long span structures.</p>                                                                                          |
| 3    | <p><b>High Rise Structures:</b><br/> <b>MATERIALS:</b> Different types of forces on high rise structures, Types of High Rise structures – Exterior structures such as Braced Frames, tube structures, tube in tube structure, Diagrid structures, trussed tubes, bundled tubes, space truss etc. Interior structures such as Rigid frame structures, Braced frame cores, shear wall cores etc. Machines &amp; equipments for high rise construction.<br/> <b>CONSTRUCTION:</b> Deep foundations such as piles, caissons, diaphragm walls. Foundations under special conditions etc.</p>                                                                                                                                                                                                                                                                                                                          |
| 4    | <p><b>Appropriate Construction Technology:</b><br/> <b>MATERIALS:</b> Appropriate construction technologies used as an alternative for conventional practices. Selection Criteria and objectives for using such technologies.<br/> Application of Building Materials processed from Agricultural and Industrial waste. Introduction about agencies involved in promotion of such materials and technologies like BMTPC, CBRI, etc.<br/> Appropriate construction techniques, spanning systems, building components and Building Materials. Ferrocement its constituents &amp; characteristics, comparison with RCC, various applications of Ferrocement.<br/> <b>CONSTRUCTION:</b> Appropriate construction techniques such as precast channel unit, RCC plant &amp; joist, waffle unit, concrete L panel, Doubly curved shell, Ferrocement roofing channels, spanning systems such as corbelling, arch etc.</p> |
| 5    | <p><b>Advance Materials &amp; Construction Technologies:</b><br/> <b>MATERIALS:</b> Introduction and brief history of smart materials, classification such as smart, Intelligent, Repurposed, Transformational, nano etc. Innovation in materials such as Translucent concrete, LED tiles, ECO glass, Electroluminescent fabric, Reaction glass etc. Processing and conversion of materials. New technologies of construction.<br/> <b>CONSTRUCTION:</b> Lift slab construction, slip form construction.</p>                                                                                                                                                                                                                                                                                                                                                                                                     |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                                 | YEAR OF PUBLICATION |
|------|------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Francis D.k. Ching, Barry S. Onoye, Douglas Zuberbuhler; Building Structures Illustrated; John Wiley & Sons                        | 2009                |
| 2    | Michael Barnes, Michae Dickson, Thomas Telford; Widespan Roof Structures                                                           | 2000                |
| 3    | Johann Eisele, Ellen Kloft, High Rise Manual; Birkhauser Boston                                                                    | 2003                |
| 4    | M.J. Tomlison; Foundation, Design & Construction; Longman Group Ltd.                                                               | 1995                |
| 5    | Barry R.; Construction of Buildings, Volume 1, Foundation and on-site Concrete Walls, Floors and Roofs; Affiliated East West Press | 1996                |

**LANDSCAPE DESIGN -V**  
**Code: B6AR06-CP30**
**B.ARCH Semester: VI**

| UNIT | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Introduction to Landscape Architecture</b><br>Definitions, Hierarchy and Scope in Architecture. Landscape Design in History – Persian, Spanish, Italian, French, Mughal, English and Japanese Gardens. Contemporary concepts and concerns in Landscape such as living green roof, terrace, wall, etc. and Modifying micro climate w.r.t. Temperature, humidity, precipitation and percolation.                                                                                                                                                                                                                                                                                         |
| 2    | <b>Elements of Landscape Architectural Design</b><br>Landform: Significance, Expression, types and uses of Landform.<br>Plant material: Significance, Types Characteristics and uses of plant material. Planting Design process and Principles. Plant Material in local context. Botanical & Common names, Characteristics and uses. Selection of Plants.<br>Water: Characteristics and uses of water in Landscape, Materials & Design of water features such as fountains and pools. Pavement: Types, Characteristics &. Uses of pavements in Landscape. Basic Pavement, Materials and Design.<br>Site Structures: Steps, Ramps, walls, fences, seating, etc., their materials & design. |
| 3    | <b>Site Studies, Planning &amp; Development</b><br>Site survey to study site characteristics such as Access, Topography, Vegetation, Hydrology, Views and Context. Site planning issues. Such as siting individual buildings and relating Buildings to a site. Building clusters and Types of spaces, Site circulation and zoning of Activities & spaces on site.                                                                                                                                                                                                                                                                                                                         |
| 4    | <b>Landscape Architectural Design Process &amp; Services:</b><br>Basic Design Process: Research, Analysis, Design & Construction Drawings such as Master Plan, Grading Plan, Section and Planting Plan. Drainage & Irrigation System Layout plan, Outdoor Lighting System layout plan.                                                                                                                                                                                                                                                                                                                                                                                                    |
| 5    | <b>Landscape Architectural Design Project</b><br>Design and Presentation of landscape scheme for Building Projects from the previous or concurrent, Architectural Design Studio, Small exercise to test application through design of parks, play grounds, road layouts, parking etc.                                                                                                                                                                                                                                                                                                                                                                                                     |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                | YEAR OF PUBLICATION |
|------|-----------------------------------------------------------------------------------|---------------------|
| 1    | Michael Laurie; An Introduction to Landscape Architecture; Elevation Publications | 1986                |
| 2    | Sylvia Crowe; Garden Design                                                       | 1994                |
| 3    | Geoffrey & Susan Jellicoe, Landscape of Man                                       | 1975                |
| 4    | Kevin Lynch, Site Planning                                                        | 1984                |
| 5    | PradeepKrishan, Trees Of Delhi, Penguin India                                     | 2006                |

**ELECTIVE-II - HISTORY OF ARCHITECTURE OF RAJASTHAN****B.ARCH Semester: VI****Code: B6AR07-CP31**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Background &amp; Historical context</b><br>Context and Physical Characteristics; Forces responsible for architectural development of Rajasthan like social, political and economic factors, culture and building resources, building techniques & processes characteristic to Rajasthan.                                                                                                                              |
| 2    | <b>Development and Evolution of architecture</b><br>Earliest archeological evidences – Mauryan & Post Mauryan period, Gupta & Post Gupta period, Pratihara period, Rajput period, Rajput-Mughal period, Rajput-British period; Buildings for the expression of power like Hill Forts & Citadels - Amber, Mehrangarh, Kumbhalgarh, Jaisalmer and Chittorgarh and palaces like City Palace Jaipur and City Palace Udaipur. |
| 3    | <b>The organic and the planned cities</b><br>Settlement patterns- Common planning principles & articulation of built form and the factors influencing their spatial organization; cultural values that shaped the overall architectural language; Brief understanding of planning of early cities with an organic character like Jaisalmer, Shekhawati towns and of planned cities like Jaipur.                          |
| 4    | <b>History of building craft</b><br>Traditional treatise - Rajvallabh, Devtamurtiprakaran, Prasadmandana, Rupavatra, Rupamandana, Vastushastra; Visual records - Manuscripts, miniature paintings, Mughal paintings; Local traditions of artisanship – artisans, temple builders, sculptors, stone carvers, inlayers, etc.                                                                                               |
| 5    | <b>Building types and their uses</b><br>Havelis and houses, temples and other religious buildings, bazaars and public buildings, buildings for water and gardens - examples from cities like Jaipur, Jodhpur, Udaipur, Jaisalmer, etc.                                                                                                                                                                                   |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                              | YEAR OF PUBLICATION |
|------|-----------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Bannister Fletcher, History of Architecture, Twentieth Edition, CBS Publishers, Delhi                           | 1999                |
| 2    | Shikha Jain, Havelis: a living tradition of Rajasthan, Shubhi Publications                                      | 2004                |
| 3    | The Stone Crafts of Rajasthan, CDOS, Jaipur                                                                     | 2011                |
| 4    | G.H.R. Tillotson, The Rajput Palaces: the development of architectural style, Oxford University Press, New York | 1999                |
| 5    | G.H.R.Tillotson, Paradigms of Indian Architecture, Routledge                                                    | 1997                |
| 6    | Rima Hooja, History of Rajasthan, Rupa Co., New Delhi                                                           | 2006                |

**ELECTIVE-II -VERNACULAR ARCHITECTURE OF RAJASTHAN****B.ARCH Semester: VI****Code: B6AR07-CP31**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                           |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Vernacular architecture in Indian context</b><br>Definition(s) of vernacular architecture and related terminologies; Difference between vernacular architecture and traditional architecture; Relevance of vernacular architecture in present context; Typologies in different climatic regions of India.                                                      |
| 2    | <b>Regional context and corresponding built form in Rajasthan:</b><br>Factors influencing the development of vernacular architecture like climate, topography, availability of building materials, resources, building skills and techniques. Conception of space and evolution of a generic form.                                                                |
| 3    | <b>Settlements and dwelling patterns</b><br>Regional dwelling patterns like 'dhanis' (hamlets), villages and their overall adaptation in the said context; Settlements and their vicinity to water resource(s) as places of worship and social activity; water related architecture and typical water resources like kua, kohar, baoli/bavdi, jhalora, bera/beri. |
| 4    | <b>Typical built typologies</b><br>Study of relative built typologies for residential, religious and public use of cities like Jaisalmer, Jaipur, Jodhpur, Bikaner and Udaipur in terms of context, physical characteristics and culture.                                                                                                                         |
| 5    | <b>Characteristic spaces and thematic elements</b><br>Spaces like courtyards, platforms, jharokhas (balconies) etc.; Embellishments & Architectural expressions– Symbolism and Ornamentation, compound walls, patterns on doors and windows, mirror work and motifs, flooring patterns, etc.                                                                      |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                                                | YEAR OF PUBLICATION |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Amos Rapoport; House Form & Culture; Prentice Hall                                                                                                |                     |
| 2    | Dora P. Crouch & June G. Johnson, Traditions in Architecture – Africa, America, Asia and Oceania, Oxford University Press, Inc., USA, 1st edition | 2001                |
| 3    | J. Tod, Annals and Antiquities of Rajasthan; Volume-II, KMN Publishers, New Delhi                                                                 | 1983                |
| 4    | Minakshi Jain & Kulbhushan Jain; Architecture of the Indian Desert; AADI Centre, Ahmedabad, India                                                 | 2000                |
| 5    | Minakshi Jain & Kulbhushan Jain; Indian City in the Arid West; AADI Centre, Paldi, Ahmedabad, India                                               |                     |

**ELECTIVE-II - ARTS & CRAFTS OF RAJASTHAN****B.ARCH Semester: VI****Code: B6AR07-CP31**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                 |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Background &amp; Regional formation of Rajasthan.</b><br>Traditional geographical, political and cultural divisions; Pre-and proto history of Rajasthan focusing on various prehistoric cultures; Inter-religious interactions- Aspects of arts and crafts, literature and cultural relations with neighboring states during respective historical eras.                             |
| 2    | <b>Classification of Arts &amp; Crafts based on nature and material used</b><br>The Chhatiskarkhana of Jaipur; Crafts - Jewelry, metal, wood, lac-based crafts, textiles, paper crafts, miscellaneous arts – Miniature painting, frescoes, etc.; Tribal crafts; Influence of arts and crafts on built form.                                                                             |
| 3    | <b>Building stone craft tradition in Rajasthan</b><br>Rock formations in Rajasthan and stone types; Shaping the stone – quarrying, selection, dressing, finishing, carving and patterning; Stone craft clusters in Rajasthan; Stone Masonry (walls; dry and with lime mortar / cladding and finishes).                                                                                  |
| 4    | <b>Building elements in stone</b><br>Structural elements in stone (foundations, columns, beams, brackets and roofs – flat and domed); Architectural elements in stone (jharokhas, copings, railings, jaalis); Landscape elements in stone (fountains, water bodies, benches, signage, lamps); Interior elements/ sculptures/artifacts of various sorts; Maintenance of Stone Buildings. |
| 5    | <b>Reinterpretation of stone craftsmanship</b><br>The new generation artisan; Innovations and adaptations to new tools and applications in stone; contemporary use of stone while studying works of Raj Rewal, Charles Correa, Ashok B Lall and Nimish Patel,                                                                                                                           |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                                            | YEAR OF PUBLICATION |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Rima Hooja, History of Rajasthan, Rupa Co., New Delhi                                                                                         | 2006                |
| 2    | The Stone Crafts of Rajasthan- A Manual, CDOS, Jaipur                                                                                         | 2011                |
| 3    | V.S. Bhatnagar, Life and times of Sawai Jai Singh, Impex India, New Delhi                                                                     | 1979                |
| 4    | Rajasthan Sate Gazetteers, Volume – 2, History and culture, Directorate District Gazetteers, GoR& Volume-3, Economic Structure and Activities |                     |
| 5    | Jadunath Sarkar, History of Rajasthan                                                                                                         |                     |

**BUILDING MECHANICAL SERVICES****B.ARCH Semester: VII****Code: B7AR01-CT19**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p><b>Principles of Refrigeration and HVAC</b><br/> Basics of Thermodynamics: Heat, Transfer of heat, Change of state, Temperature, Specific Heat, Latent Heat, Saturation Temperature, Evaporation, Condensation, Enthalpy, Entropy, Pressure-Temperature Relationship for liquids, Refrigerants, Refrigeration Cycle.<br/> Human Comfort: Humidity, Absolute Humidity, Relative Humidity, Specific Humidity, Temperature Range, Air Quality Parameters, Air Movement, Need of HVAC.<br/> Principles of Air-Conditioning: Psychometric Process, Air Cycle, Summer and Winter air conditioning, evaporative cooling, Constituents of Heat Load Estimation- Material, Orientation, Heat, Light, Occupancy, Building Use (Mathematical calculations are excluded).<br/> Air Conditioning Zoning: Purpose &amp; advantages, Air distribution systems- Non Duct &amp; Duct Systems, Air outlets, Compressors, Evaporators, Condensers, etc.</p> |
| 2    | <p><b>HVAC System Components and Equipment</b><br/> Window &amp; Split units; Variable air-volume, water volume, vapor absorption system (Variable refrigerant Flow).<br/> Central Air conditioning systems: AC Plant Room, Direct Expansion and chilled water system, Types of compressors (air cooled and water cooled), Cooling Towers, Air handling units, Fan Coil Unit, Fresh air-sick building syndrome.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3    | <p><b>Fire Prevention, Protection &amp; Life Safety</b><br/> Causes of building fire: Triangle of fire<br/> Prevention: Materials for different building components and their fire rating,<br/> Considerations for: Building Heights, F.A.R. &amp; Open Space, service ducts and shafts, refuse chutes, electrical installations &amp; emergency power supply, lightening protection, escape lighting and escape signage, fire and smoke dampers, opening and glazing (façade fire prevention)<br/> Life Safety: Fire exits- numbers and arrangement, fire escape staircase and its pressurization, ramps, Compartmentation, Fire detection and alarm systems, safety drills.<br/> Fire Protection: Fire extinguishing and fire fighting installations- types of extinguishers, dry and wet riser system, automatic sprinkler system, fire tank and pump house.</p>                                                                         |
| 4    | <p><b>Elevators and Escalators</b><br/> Types of Elevator and escalator mechanism, Design considerations: location in a building, serving floor, grouping, lift size, lift car dimensions, door arrangements, waiting time analysis, sky lobby.<br/> Types &amp; installation provisions of elevators &amp; escalators: passenger lift, hospital (stretcher lift), goods lift, car lifts, dumbwaiters, travelators, step type escalator, belt type escalators, cleat type escalator, levytator etc.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 5    | <p><b>Mechanical Layout Design</b><br/> Application of air conditioning system in hotels hospital and commercial building.<br/> Ventilation System design for basement, car park, toilet and kitchen ventilation (air washer and scrubbers), air cooling systems.<br/> Schematic layout for fire protection in building showing exits, escape routes, fire extinguishers (sprinkler systems), tanks and pump room.<br/> All designs to be integrated with concurrent Design Studio.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                 | YEAR OF PUBLICATION |
|------|--------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | John W. Mitchell, James E. Braun; Heating, Ventilation, and Air Conditioning in Buildings ; John Wiley & Sons Inc. | 2012                |
| 2    | William K.Y. Tao , Richards R. Janis; Mechanical and electrical Systems in Buildings; Pearson Education Inc.       | 2014                |
| 3    | M.Y.H. Bangash, T. Bangash; Lifts, Elevators, Escalators and Moving Walkways; Travelators/Taylor & Francis/Balkema | 2007                |
| 4    | Bureau of Indian Standards; National building code of India-2016; Bureau of Indian Standards                       | 2016                |
| 5    | William H. Severns and Julian R Fellows; Air conditioning and Refrigeration; John Wiley & sons, London             | 1987                |

**CONTRACT DOCUMENTS & BYELAWS****B.ARCH Semester: VII****Code: B7AR02-CT20**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p><b>Building Contracts</b><br/>Type of contracts and contract documents, detailed knowledge about various conditions of contract as published by the Indian Institute of Architects, interim certificates defect, liability period, retention amount and virtual completion.</p> <p>Articles of agreement, execution of work payment and Arbitration, arbitrators, umpire and nature of arbitration, Appointment, conduct, powers and duties of arbitrators and umpires, Procedure for arbitration, preparation and publication of awards and impeachment.</p> |
| 2    | <p><b>Tenders</b><br/>Types of tender documents, tender draft notices and invitation of tenders. Procedure for opening and selection of tenders &amp; award of contract. Analysis and report to owner. Work order.</p>                                                                                                                                                                                                                                                                                                                                           |
| 3    | <p><b>Building Byelaws:</b><br/>Brief history of Town planning Act 1954 with reference to Building Projects. Various factors for formalization of Bye Laws &amp; its implications. Comprehensive study of Jaipur Building Bye-laws relating to Ground coverage, FSI Calculation, Building Height &amp; Building use regulation. Study of special provisions in bye-laws in respect of Special category of Buildings Role of Approving authorities, special rules governing hill area development &amp; coastal area management.</p>                              |
| 4    | <p><b>Approval &amp; Clearance:</b><br/>Preparation and procedure of approval drawings. Methods of enforcement &amp; monitoring. Fire clearance, Structure safety approval, Environment clearance, consent to establishment, Occupancy &amp; completion certificate, Indemnity Bond, other special clearances.</p>                                                                                                                                                                                                                                               |
| 5    | <p><b>Other Laws:</b><br/>An overview of laws related to the profession of Architecture and Physical Development. Introduction to Labour Act, Building construction worker act &amp; Real estate Bill 2017.</p>                                                                                                                                                                                                                                                                                                                                                  |
|      | <b>TOTAL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                       | YEAR OF PUBLICATION |
|------|----------------------------------------------------------|---------------------|
| 1    | V.S.Apte; Architectural Practice & Procedure             | 2008                |
| 2    | Roshal Namavati; Professional Practice                   | 2008                |
| 3    | Dr. K.G.Krishnamurthy; Construction Management           | 2005                |
| 4    | Ministry of Urban Development; Model Building Byelaws    | 2016                |
| 5    | Bureau of Indian Standards; National Building Code (NBC) | 2016                |

**ACOUSTICS & ILLUMINATION**  
**Code: B7AR03-CT21**
**B.ARCH Semester: VII**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Fundamentals &amp; Behavior of sound:</b> Acoustics-need & scope, pioneers and their works, Acoustics examples from past .Basic Theory: Generation, Propagation, Transmission, Reception of sound, Human ear and hearing, loudness perception, subjective effects. Basic terminology - Frequency, pitch, tone, timbre, sound pressure, sound intensity, loudness, threshold of audibility & pain, wavelength and velocity of sound. Properties & Characteristics of Sound. Reflection and absorption of sound. Inverse Square law, Decibel scale & decibel addition. Behavior of sound in an enclosed space. Ray Diagrams, Sound paths, Effect of geometry and shapes. Sound Absorption coefficient, Reverberation, Calculation of reverberation time-Sabine formula. Acoustical defects in an enclosed space and their remedial measures. |
| 2    | <b>Noise Control:</b> Physiological and psychological effects of noise. Types of noises- Structure borne & Air borne noise, flanking of sound. Noise classification Outdoor and indoor noises. Transmission of noise & Transmission loss, Noise control and sound insulation & absorption. Sound leaks through openings. Acceptable noise levels for building types and indoor noise levels. Noise criteria curve & noise reduction coefficient. Noise reduction through landscaping and design techniques. Land use planning for Noise control. Noise reduction from mechanical equipment their mounting details and insulation.                                                                                                                                                                                                             |
| 3    | <b>Design &amp; construction for sound:</b> Introduction to sound amplification and Distribution system. Selection of Acoustic materials like porous materials, membrane absorbers, cavity resonators, space absorbers, variable absorbers and their construction details and fixing. Environmental aspects of acoustical materials. Construction details of walls, partitions, floors, ceiling doors & windows for Noise reduction. Acoustic design process in different types of buildings like Auditoriums, concert halls, lecture halls. Site selection, noise survey, room zoning and shape. Acoustical privacy in open plan offices. Halls for speech & music .Raking of seats, stage forms etc.                                                                                                                                        |
| 4    | <b>Illumination:</b> Introduction to illumination and Terms- lux, candle power , lumen, luminance, illuminance, luminous flux, luminous intensity ,glare etc. Evolution of lighting technologies. Light and vision . Photometry and measurement .Laws of Illumination such as inverse square law, cosine law, lamberts cosine law. Methods of lighting-ambient, task and accent. Classification of lighting systems-direct, diffused, indirect. Key technical terms such as CRI, CCT etc. Artificial light sources, types-incandescent, fluorescent, HID & LID, LED and their application, advantages & limitations.                                                                                                                                                                                                                          |
| 5    | <b>Lighting Design:</b> Functional & aesthetic uses of lighting. Characteristics of good lighting. Architectural lighting methods. Use of Artificial lighting as an element in Architectural scheme for Exhibitions, Museum, office, Residences, Outdoor Lighting road, façade & landscape . Lighting techniques -Spot, Flood, Light beams etc. Lighting Design: Lumen method, Point by Point Method, Graphical representation of general Lighting scheme. Energy efficient lighting Design strategies.                                                                                                                                                                                                                                                                                                                                       |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                     | YEAR OF PUBLICATION |
|------|--------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Egan David; Architectural Acoustics; Mcgraw-Hills Book Co. New York                                    | 1988                |
| 2    | Leslie I. Doelle; Environmental Acoustics; MC graw-Hill book company, New York                         |                     |
| 3    | Norbert Lachner; Heating, Cooling, Lighting - Design methods for Architects; Johnwiley & Sons New York | 2001                |
| 4    | BIS; Handbook on Functional requirement of Buildings, (Part 1-4) ; BIS                                 |                     |
| 5    | Christina Augustesen; Lighting Design Principles, implementation case studies; Birkhauser, Boston      | 2006                |

**ARCHITECTURE DESIGN -VI**  
**B7AR04-CP33**
**B.ARCH Semester: VII**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Theme:</b> Understanding the co-relation between the sight and the building / buildings through the integration of various site and landscape elements.                                                                                                                                                                                                                                                                                                                                                                                 |
| 2    | <b>Expected Sills:</b> To develop ability to locate a building / buildings on site as per local building regulations, climate and site conditions in order to achieve mutually beneficial relation between built and open spaces using various available natural & man made elements such as land form, plant material, water bodies, pavements, buildings and site structures. To develop ability to plan and design access, circulation and parking at site level                                                                        |
| 3    | <b>Building Byelaws:</b><br>Brief history of Town planning Act 1954 with reference to Building Projects. Various factors for formalization of Bye Laws & its implications. Comprehensive study of Jaipur Building Bye-laws relating to Ground coverage, FSI Calculation, Building Height & Building use regulation. Study of special provisions in bye-laws in respect of Special category of Buildings Role of Approving authorities, special rules governing hill area development & coastal area management.                            |
| 4    | <b>Design Outline:</b> Integration of built & open spaces in the design of multi-functional complex programmatic building project at District level in Urban or Rural context ideally on a building site required for a built up area of 2500 – 5000 Sqm. Course to be integrated with building mechanical services, acoustics & illumination, settlement planning & universal design.                                                                                                                                                     |
| 5    | <b>Projects:</b> A minimum of two design projects to be given in the semester from the list of suggested projects in various categories of building types :<br>Residential: Group, Spatial Housing, etc.<br>Educational: Diploma, Degree, Professional colleges, Science centre, etc.<br>Public: Law courts, Art & Cultural Centre, etc.<br>Health: Naturopathy & Yoga Centre, Hospice, Drug De-addiction centre, etc.<br>Hospitality: Holiday, Beach, Hill, Dessert Resort, etc.<br>Entertainment: Sports / Social Club, Water Park, etc. |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                 | YEAR OF PUBLICATION |
|------|--------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | John Ormsbee Simonds,; “Landscape Architecture”; McGraw Hill                                                       | 2008                |
| 2    | Charles W. Harris, Nicholas T. Dines; “Time-Saver Standards for Landscape Architecture”; McGraw Hill               | 2008                |
| 3    | Joseph De Chiara, Micheal J. Crosbie; Time-Saver Standards for Building Types; McGraw Hill                         | 2005                |
| 4    | Ernest & Peter Neufert; “Architect’s Data Part-I & II”; Black Well Science                                         | 2016                |
| 5    | Achyut P. Kanvinde & H. James Miller; “Campus Design in India”; United States Agency for International Development | 2016                |

**WORKING DRAWING**  
**Code: B7AR05-CP34**
**B.ARCH Semester: VII**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p><b>Introduction:</b><br/>           Understating of working drawing, their co-relation in various technical projections like plans, elevations, sections, detailing etc. Estimation &amp; Specifications, Standards, guidelines for execution of works, Units of measurements, various graphic, numeric, text components and their precise function in a set of working drawing. Method of representing various contents &amp; specific information in working drawings.<br/>           Study of a set of working Drawings and its understanding</p>                                                                                                                                                                                              |
| 2    | <p><b>Building Plans:</b><br/>           Demarcation of building envelop using diagonal and coordinate method; Locating vertical structural member; Detailing of sub Structure-Excavations and layouts; External and partition wall and scheduling of fenestration.<br/>           Building Location Plan, Centre line Plan, Column location plan, Excavation drawing, Foundation Layout, Plinth Beam Layout, Site Plan, Brick work of all floor plan, Roof plan with parapet and Mumty brick work, Stair room plan, Door Window Detail with schedule, Suspended floor and roof framing.</p>                                                                                                                                                         |
| 3    | <p><b>Building Sections and Elevations</b><br/>           Sectional representation of different material in different building components; Wall Sections; Detailing of building façade; vertical circulation-planning and detailing.<br/>           Building Sections: Whole and part, Building elevations, External Finishing schedule, Staircase and ramp Details.</p>                                                                                                                                                                                                                                                                                                                                                                             |
| 4    | <p><b>Building Services</b><br/>           Building plumbing network – Water supply lines &amp; sewer lines, their gradation, drains &amp; traps, Details for rain water harvesting &amp; septic tanks. Building electrical network – Space allocation for various components (panels, vertical stacks, etc.) and provisions for their connections.<br/>           Plumbing Drawings: Site Level - Water supply, Sewer, Storm water Layouts and Invert Level schedules. Building Level - Kitchen and toilet Detail-Water supply, Sewer, Rain water; Roof Drain plan.<br/>           Electrical Drawings: Site Level – Electrical layout, Building Level - Reflected ceiling Plan, Power layout, Low voltage layout, lighting and circuit layout.</p> |
| 5    | <p><b>Building Component Detail</b><br/>           Building internal finishing schedule – color schemes, flooring patterns, wall elevations, dado, fixtures &amp; fittings. Sectional details for various building components as per standard specification &amp; site conditions.<br/>           Toilet and kitchen wall elevations, Flooring detail, under floor treatment, Terracing detail, water proofing detail, Lintel Detail, Coping &amp; Parapet Detail etc.</p>                                                                                                                                                                                                                                                                           |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                        | YEAR OF PUBLICATION |
|------|---------------------------------------------------------------------------|---------------------|
| 1    | Ralph W. Liebing, Mimi Ford, Raul; Architectural Working Drawings; Wiley  | 1990                |
| 2    | Director General of Works; CPWD Specifications; CPWD Nirman Bhawan, Delhi | 2014                |
| 3    | M.G.Shah, CM Kale, S.Y. Paoul; Building Drawing; Tata McGraw Hills        | 2011                |
| 4    | Director General of works; Delhi Schedule of Rates; CPWD, Delhi           | 2016                |
| 5    | Barry R; Construction of Building; Affiliated East West Press Pvt. Ltd.   | 1999                |

**SETTLEMENT PLANNING****B.ARCH Semester: VII****Code:B7AR06-CP35**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p><b>Introduction and History of Human Settlement</b><br/>           Definition and vocabulary of urban and regional planning. Definitions of town planning. Early human settlements — Causal factors and pattern of development.<br/>           Human settlements of River valleys civilization (e.g. Indus-valley civilization, Egyptian civilization, etc. Early Vedic civilization patterns, Canonical patterns as per various Indian contexts.<br/>           Human settlements during ancient Greek period, ancient Roman period, Medieval period (Western and Indian), Renaissance period, India during Islamic period, India during colonial period.<br/>           Effects of Industrial Revolution on planning of cities (history and present scenario). Ancient System of Town Planning In India -Extracts from Chanakya's Arthashastra, Manasara's Vastushastra, planning thought behind Fatehpur Sikri, Shahjahanabad, Jaipur and Delhi. Basic Skill Development exercise: Introduction to graphic representation reading of drawing.</p>                                       |
| 2    | <p><b>Forms of Human Settlements</b><br/>           Structure and form of Human settlements: Linear, non-linear and circular, Combinations. Reasons for development, advantages and disadvantages, case studies, factors influencing the growth and decay of human settlements. Documentation of case study/ Literature reference study of suitable scale for understanding of the urban context.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3    | <p><b>Planning Theories and Techniques:</b><br/>           Planning concepts related to garden city, geddesian triad, neighbourhood planning, radburn layout, ekistics, satellite towns and ribbon development. Various theories of planning like landuse theory, exploratory theories, speculative theories etc. Principles of Planning, Zoning, zoning regulations, Site planning. Types of plans-development plans, action plans, structure plans. Planning process of Master plan/Development plan preparation and its components, Approaches to physical and social planning, stake holders in planning process. Planning laws, legislation and amendments i.e. ULCAR, LAA, 73rd and 74th constitutional amendments, etc. Special Economic Zones (SEZs), UDRPFI recommendations.<br/>           Levels of planning and steps for preparation of a town plan, survey techniques in planning, concepts, functions, components and preparation of a development plan. Defining characteristics of identified area. Planning project implementation techniques i.e. BOOT, BOT, BOLT, etc</p> |
| 4    | <p><b>Urban Planning and Urban Renewal</b><br/>           Post-independence Planned cities in India i.e. Chandigarh, Gandhinagar, Vidhyadhar Nagar, etc. Globalization and its impact on cities, Urbanisation, emergence of new forms of developments, self-sustained communities, SEZ, transit oriented development, integrated townships, case studies. Urban Renewal: Meaning, Redevelopment, Rehabilitation and Conservation. Urban renewal schemes i.e. JNNURM, etc. Case study and literature review of planning concepts and norms for selected area.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 5    | <p><b>Transport Planning</b><br/>           Introduction to transport planning: Network characteristics, Analysis and interpretations Intersections, Hierarchy and their design of roads, survey methods i.e. Trip generation, trip distribution, Modal Split Origin Destination survey, etc. Traffic signs. Level of services. Transport modes, technology and selection Planning Studio: Selection of site, data collection, data analysis and presentation.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                 | YEAR OF PUBLICATION |
|------|----------------------------------------------------------------------------------------------------|---------------------|
| 1    | C.A.Doxiadis, Ekistics; "An Introduction to the Science of Human Settlements"; Hutchinson, London. | 1968                |
| 2    | Arthur B. Gallion & Simon Eisner; "Urban Pattern"; D. Van Nostrand Co., New York                   | 1963                |
| 3    | Ministry of Urban Development; "Urban Development Plans: Formulation & Implementation Guidelines"  | 1996                |
| 4    | A.K.Jain; "Urban Transport Planning and Management"; APH New Delhi                                 | 2009                |
| 5    | Sandhu. R. S.; "Sustainable Human Settlements"; Asian Experience, Rawat publications.              | 2001                |

**ELECTIVE-III UNIVERSAL DESIGN****B.ARCH Semester: VII****Code: B7AR07-CP36**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p><b>Introduction:</b> Universal design and its significance, need and role in various design fields in current context for people with different abilities. Universal Design awareness and education at national and international level.</p> <p>Seven International principles: Equitable Use, Flexibility in Use, Simple &amp; Intuitive Use, Perceptible Information, Tolerance for Error, Low Physical Effort, and Size &amp; Space for Approach &amp; Use.</p> <p>Five Indian Principles of Universal Design: Equitable, Usable, Cultural, Economic and Aesthetic.</p>                                                                                                                                                                                                                                                               |
| 2    | <p><b>Understanding Disability:</b> Types of disabilities based on mental, physical, function, age and extreme physical proportions. Study of groups comprising of people with disabilities and the necessary design requirements with respect to aspects of anthropometrics i.e. visibility, access and usage.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3    | <p><b>Universal Design: Guidelines &amp; Legal Provisions:</b> United Nations Convention on the Rights of Persons with Disabilities; UNCPRD, 2008. Acts, Bills, Policies, and Building guidelines in India: Disability Act 1995, Rights of Persons with Disabilities Bill 2012, CPWD Guidelines for Barrier Free Built Environment for Disabled and Elderly and Standard Emergency Evacuation Guidelines for Disabled by National Building Code.</p>                                                                                                                                                                                                                                                                                                                                                                                        |
| 4    | <p><b>Universal Design:</b> Building Level: Design Standards for accessibility and usage in various building typologies both constructed as well as existing buildings: Residential, Institutional, Commercial, Hospitals &amp; Health facilities, Public Transit Buildings, Recreational Buildings and Hospitality Buildings. Design and Construction Strategies with respect to all kinds of disability at Building Interior: floor, walls, doors, windows, counters, railings, sanitary fixtures and signage. Building Exterior: pathways, parking, signage, levels and grooves, main entrance/exit and approach to plinth. Building Circulation: vertical and horizontal elements such as corridors, staircases, lifts, elevators, ramps.</p> <p>Materials and surface finishes available, their types and construction techniques.</p> |
| 5    | <p><b>Universal Design:</b> Urban Level; For Streets, Pathways, Pedestrian Crossings, Foot over Bridges, Curb Ramps, Parking, Public Toilets, Parks, Bus Stops, Street Furniture, Signage. Materials available and their types and construction techniques.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                       | YEAR OF PUBLICATION |
|------|----------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Preiser Wolfgang, Universal Design Handbook                                                              | 2001                |
| 2    | Adrian B. Robbins, Margaret A. Wylde, Building for a life time, The design for fully accessible homes    | 1994                |
| 3    | Steven Winner, Accessible Home Design,                                                                   |                     |
| 4    | Accessibility for the Disabled: A Design Manual for a Barrier Free Environment, UNCPRD                   | 2008                |
| 5    | CPWD, Guidelines and space standards for barrier free built environment for Disabled and Elderly Persons | 1998                |

**ELECTIVE-III RESEARCH METHODOLOGY****B.ARCH Semester: VII****Code: B7AR07-CP36**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Research – Introduction &amp; Design:</b><br>Research meaning and its significance in Architecture, Relationship between Design & Research, Areas of Research in Architecture, Qualitative and Quantitative Paradigms, Characteristics of Scientific research, Levels of Research, Components of research design, Identification of area of research, Defining the problem, formulation of hypothesis, collection of data through different primary and secondary sources. Analyzing the data and inferring from the data, concepts of dependent and independent variables. Defining the scope and limitations of a Research plan, Significance of the research outcome. |
| 2    | <b>Research – Types &amp; Techniques:</b><br>Historical research, comparative Research, Qualitative Research, Co-relational research, Experimental Research, Normative Research, Case study Research, Simulation & Modeling Research Pilot studies, Educational Research. Descriptive technique, pictorial technique, analytical technique, statistical technique semantic technique etc.                                                                                                                                                                                                                                                                                   |
| 3    | <b>Research Tools:</b><br>Interview techniques – Questionnaires, face to face interviews, internet survey, Designing a questionnaire, interview schedule.<br>Visual Techniques – Observation (Participant / non-participant), Activity mapping, accretion & erosion trace observation, cognitive maps etc. Sampling techniques such as systematic, stratified, random etc.                                                                                                                                                                                                                                                                                                  |
| 4    | <b>Research Analysis</b><br>Understanding the relative advantage, disadvantages and application of various methods and choosing a method appropriate for a research to achieve its objectives, understanding the nature of data collected and methods of analysis suitable for that data i.e. graphical, numerical, descriptive. Introduction to the simple statistical methods of analyzing numerical data – frequencies / percentages, mean, median, mode, correlation, chi square test etc.                                                                                                                                                                              |
| 5    | <b>Research writing</b><br>Different sections of a Research report, Technical writing and language. Abstract, synopsis, Executive summary. Writing Bibliography & References.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                         | YEAR OF PUBLICATION |
|------|------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Groat L, Wang D.; Architectural Research Methods; John Wiley & Sons, Inc.                                  | 2002                |
| 2    | Kaplan A.; The Conduct of Inquiry; Chandler, San Francisco                                                 | 1964                |
| 3    | Zumthor P.; Thinking Architecture; Birkhauser, Basel, Switzerland                                          | 2010                |
| 4    | Shinde S.P. (Dr.); Methodology of Research and issues in Education; Surabhi Educational Society, Hyderabad | 2008                |
| 5    | Creswell J.W.; “Research Design : Qualitative & Quantitative Approaches”; Thousand Oaks : Sage             | 1994                |

**ELECTIVE-III ARCHITECTURAL JOURNALISM****B.ARCH Semester: VII****Code: B7AR07-CP36**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                     |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Introduction: Architectural Journalism as a career and as an occupation of documenting, reporting, validating, writing, editing, photographing and forming opinion and criticism of a project or an architect's work.<br>Role of Architectural Journalism in promoting architectural design theory and developing critical thinking.                        |
| 2    | Architectural Journalism: Emergence & Evolution Global as well as Indian scenario. Emergence of Printed material such as Architectural Magazines and Journals such as Domus, Mimar, Indian Architect & Builder and Research Papers, Monographs, Biographies, Conference Proceedings, Articles and Coverage in national newspapers, as well as online Media. |
| 3    | Tools of Architectural Journalism: Resource finding, Writing content and verifying it through various sources like books, articles, papers, surveys, videos. Use of graphics like sketches, drawings, graphs, pie charts and photographs etc.                                                                                                               |
| 4    | Critical Discourse: appreciating or criticizing through project Documentations, Essays and Critical Writings with respect to architecture by Ada Louise Huxtable, Paul Goldberger, Robert Campbell, Reyner Banham, Peter Blundell Jones, Robert A. M. Stern, Lewis Mumford, Kenneth Frampton, Gautam Bhatia, Kaiwan Mehta, Rahul Mehrotra etc.              |
| 5    | Design & Writing: The student will use tools specific to architecture and construction to access, manage, integrate, and create information. The student is expected to create infographics, articles which document a project and critically analyze the pros and cons of one's work.                                                                      |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                                  | YEAR OF PUBLICATION |
|------|-------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Kenneth Frampton; World Architecture 1900-2000: A Critical Mosaic; Vol.8 South Asia, China Architecture & Building Press            | 2000                |
| 2    | Rahul Mehrotra; Architecture in India since 1990; Pictor                                                                            | 2011                |
| 3    | Stern Robert A.M.; Architecture on the edge of Postmodernism, Collected Essays 1964-1988; Yale University Press, New Haven & London | 2009                |
| 4    | Mohammad Al-Asad with Majid Musa; "Architectural Criticism & Journalism : Global Perspectives"; Umberto Allemandi & Co.             | 2005                |
| 5    | Groat L, Wang D.; Architectural Research Methods; John Wiley & Sons, Inc.                                                           | 2002                |

**PROFESSIONAL PRACTICE & MGMT.**  
**Code: B9AR01-CT22**
**B.ARCH Semester: IX**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Architect's Office &amp; Its administration:</b><br>Nature of profession, difference between trade, business and profession, Office setup and administration. Office organization, proprietorship, partnership, company etc.; Registration as Firm / Company etc.                                                                                                                                                                                                                                                                                                                                          |
| 2    | <b>Architectural Professional Association &amp; Architect Act 1972:</b><br>Practice Procedure and conduct, Introduction to the importance of professional organisations like IIA, COA & their Membership & their role in future developments. Architectural Competition – Types, procedures, as per guidelines of the Council of Architecture                                                                                                                                                                                                                                                                 |
| 3    | <b>Architectural Services:</b><br>Conditions of agreement – scope of work, comprehensive architectural services and conditions of engagement, remuneration, professional fees and charges as per norms. Responsibilities and Liabilities of an architect towards the client.<br>Professional charges of various jobs. Stages of Architectural design and the specific task in each of such stage                                                                                                                                                                                                              |
| 4    | <b>Project Management:</b><br>Role of an architect in construction management, Scientific methods of construction management, Objectives and functions of project management, stages of project management (planning, scheduling and organizing). Introduction of PERT (Project Evaluation & Review Technique), Fundamentals of CPM (Critical Path Method) activity, event, float, network construction, time computation, project completion period, resource allocation. Relationship of work, Time & Cost, Cost Analysis in network planning, construction site practices, Inspection and Quality Control. |
| 5    | <b>Business Management &amp; Ethics:</b><br>Architect's role in society & Human Values. Use of Ethical theories – Kohlberg's theory, Gilligan theory Consensus and controversy, Environment ethics. Business management, sales promotion, human relations and personnel management. Efficiency studies and performance appraisal, billing, accounting, correspondence, information storage and retrieval. Manpower management, safety and labor laws.                                                                                                                                                         |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                            | YEAR OF PUBLICATION |
|------|-----------------------------------------------------------------------------------------------|---------------------|
| 1    | V.S.Apte ; Architectural Practice & Procedure                                                 | 2008                |
| 2    | Roshan Namavati; Professional Practice                                                        | 2008                |
| 3    | Council of Architecture; Handbook of Professional Documents                                   |                     |
| 4    | Dr. P.N.Modi, Sanjeev Modi; PERT and CPM                                                      | 2009                |
| 5    | Dr. B.C.Punmia; Project planning and control with PERT and CPM; Laxmi Publications, New Delhi |                     |

**SUSTAINABLE ARCHITECTURE**  
**Code: B9AR02-CT23**
**B.ARCH Semester: IX**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                       |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Introduction:</b> Introduction to Sustainability and its various dimensions (economic, social and ecological); Sustainable development of built environment; Global Warming and Climate Change; Concepts in sustainable architecture; sustainable buildings, green buildings, climate responsive buildings, ecological responsive buildings, Energy efficient buildings; Energy policy of India and world. |
| 2    | <b>Strategies and Technologies:</b> Solar Passive Design; Recycling/Reuse strategies, optimization techniques, advances in HVAC, Electrical, Lighting and Plumbing technologies; integration of Active energy efficient systems with buildings – PV cells, wind towers, geothermal heat pump, bio-mass energy etc. Study of non conventional energy sources.                                                  |
| 3    | <b>Rating systems:</b> Benchmark: Study of rating systems across globe in general introduction – BREEAM, CASBEE, LEED, detail study of IGBC, GRIHA. Study of energy conservation building codes. Study of LEED/GRIHA rated buildings                                                                                                                                                                          |
| 4    | <b>Materials and Technology:</b> Emphasis on traditional building systems, methodologies and on the use of alternate/substitute and environment friendly materials, to make the students aware of local and / or low cost building materials which are cost effective, environment friendly and appropriate to the context of the site, climate and culture.                                                  |
| 5    | <b>Energy Assessment:</b> Energy calculations through whole building performance method. General introduction about Building information modeling, Introduction to concept and basic software. REVIT at advance level, ArchiCAD, energy plus, green building studio, IEs.                                                                                                                                     |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                 | YEAR OF PUBLICATION |
|------|--------------------------------------------------------------------|---------------------|
| 1    | Sustainable Building Design Manual; Tata Energy Research Institute | 2012                |
| 2    | Green Building Materials; Ross Spiengle & Dru Meadows              | 2004                |
| 3    | Understanding Green Building Guidelines; Traci Rose Rider          | 2009                |
| 4    | Milli Majumdar; Energy Efficient Buildings in India; TERI          | 2001                |
| 5    | Francis D.K.Ching; Green Building Illustrated; John Wille & Sons.  | 2014                |

**DISASTER RESISTANT ARCHITECTURE****B.ARCH Semester: IX****Code: B9AR03-CT24**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Introduction to Disasters</b><br>Hazard, Risk, Disaster, Vulnerability, Classification of disaster, Man Made & Natural Disasters, High, Medium & Low Impact. Disasters and Factor Causing Disasters, Earthquakes, Tsunami, Landslides, Cyclone, Floods, Fire etc.                                                                                                                                                                                   |
| 2    | <b>Impact of Disasters</b><br>Effects of natural and Man-made Disaster, Behaviour of structural and nonstructural members during and after disaster, Standards and Norms for risk reduction for various disasters i.e. Earthquakes, Tsunami, Landslides, Cyclone, Floods & Fire.                                                                                                                                                                       |
| 3    | <b>Pre-Disaster and Mitigation Measures in Disasters</b><br>Disaster Management Plan, Natural Crisis Management Committee, NDMA (national disaster management authority) Management Guideline, Emergency Support Function, Role of Building information systems in Disaster Management.                                                                                                                                                                |
| 4    | <b>Design &amp; Planning Solution</b><br>Design Guideline and Construction Techniques for disaster resistant structure in RCC, Steel, Stone, Brick & wood; Engineering, Architectural, Landscape and site planning solutions for various disasters, Details for foundation, soil stabilization, retaining wall, plinth, plinth fill, flooring, walls, opening, fenestration and other building components. Study of non engineered Building practices. |
| 5    | <b>Case Studies- Disasters in India</b><br>Damaged Caused, Disaster management, Mitigation, post disaster structural up gradation in Earthquakes, cyclones, landslides, floods, droughts and tsunami in India.                                                                                                                                                                                                                                         |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                                                   | YEAR OF PUBLICATION |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Sharma V.K.; Disaster Management; Indian Institute of Public Administration, United Press, New Delhi                                                 | 1995                |
| 2    | Dutta Shekhar Chandra, Mukhopadhyay Parthasarathi ; Improving Earthquake And Cyclone Resistant Structures ; The Energy Resource Institute, New Delhi | 2012                |
| 3    | Tarnath B.S. ; Wind and Earthquake Resistant Buildings Structural Analysis and Design; Marcel Dekkar                                                 | 2005                |
| 4    | National Disaster Management Authority; National Disaster Management Guidelines; National Disaster Management Authority Government of India          | 2009                |
| 5    | IAEE; Guidelines for Earthquake Resistant non-engineered construction; NPEEE 2004.                                                                   | 2005                |

**ARCHITECTURAL DESIGN-VII**  
**Code: B9AR04-CP38**
**B.ARCH Semester: IX**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Theme: Understanding design to integrate complexities of urban dimensions, Architectural language & expression.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2    | Parameters: Urban Networks such as Urban greens, Pedestrian connections, Traffic & Transportation, Local and regional architectural language & expression. Socio- Economic, Cultural and Physical context. Congregation of large number of diverse and unknown people.                                                                                                                                                                                                                                                                                   |
| 3    | Expected Skills: To develop ability and skill to design building as a urban insert by understanding the influence of the building on and of the immediate & distant surrounding. Handle circulation of large member of people and various modes of Transport.                                                                                                                                                                                                                                                                                            |
| 4    | Design Outline: Design of a multi-functional complex programmatic building as an insert at a settlement level ideally on a building site required for a built up area of 5000 – 7500 sqm., Course to be integrated with concurrent courses such as Housing, Urban Design, Conservation, Sustainable Architecture & Disaster Resistance Architecture.                                                                                                                                                                                                     |
| 5    | Projects: At least one sufficiently large project to be given in a semester from the list of suggested projects in various categories of building types.<br>Housing: Mix Group Housing, Townships, etc.<br>Educational: Large scale educational campus, University, etc.<br>Commercial: District Centre, Technology Parks, etc.<br>Transportation: Bus Terminal, Railway Station, Metro Rail Station, Airport Terminal.<br>Recreation: Multipurpose Indoor / Outdoor Sports complex.<br>Hospitality: Hotel with convention / Exposition facilities, etc. |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                         | YEAR OF PUBLICATION |
|------|----------------------------------------------------------------------------|---------------------|
| 1    | T.S.S. for Urban Design; Mc Graw Hill                                      | 2003                |
| 2    | Darek Thomas; Architecture and the Urban Environment; Architectural Press  | 2002                |
| 3    | The Phaidon Atlas of 21st Century; World Architecture; Phaidon Publication | 2008                |
| 4    | The 20th Century World Architecture; Phaidon                               | 2012                |
| 5    | Kevin Lynch; Site planning 3rd Edition                                     | 2012                |

**DISSERTATION & THESIS SEMINAR**  
**Code: B9AR05-CP39****B.ARCH Semester: IX**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p>Research Formulation: The students of the final year are required to undertake research on a topic related to the field of spatial planning on issues emerging out of the present trends and future prospects of the Thesis Project selected.</p> <p>The Thesis Project should be sufficiently large and complex so that student can demonstrate the Skills and Knowledge acquired during the course.</p> <p>The site selected for the Thesis project should be large enough for a built up area more than 7500 Sqm. The project program can be hypothetical however the site selected should be real. Students may select live projects that have real program and objective.</p>                                                                                                                                                                        |
| 2    | <p>Research Design: Once the problem is formulated the student has to undertake extensive literature survey and state in clear terms the working hypothesis.</p> <p>Students are required to state the conceptual structure within which research would be conducted by defining the aim, objectives, scope &amp; limitations of work.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 3    | <p>Research Data: Data shall be collected keeping in mind the cost, time and other resources. Primary data can be collected either through experiment, through survey or by observation such as personal interviews, telephonic interview, mailing of questionnaire or through schedules. Secondary data such as census data, literature studies, unpublished or published thesis or dissertation can be collected.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 4    | <p>Research Analysis &amp; Report: The analysis of data requires a number of closely related operations such as establishment of categories. The application of these categories to see data through coding, tabulation and then drawing statistical inference. Draw conclusions and identify architectural issues involved in the project design and construction. Define strategy to address these issues in the design proposal.</p> <p>Prepare a report of what has been done. The layout of the report should be as follows: the preliminary pages, the main text and end matter. The preliminary pages carry title, declaration, certificate, acknowledgement, list of illustration &amp; tables. The main text of the report should have introduction, review of literature &amp; methodology. The end matter will include glossary and annexure.</p> |
| 5    | <p>Thesis Seminar: Criteria of selection of the site for the thesis project and justification for how the proposed site will support the conceptual idea for the project. Bylaws, zoning regulators &amp; standards applicable to the project.</p> <p>Analytical studies of building prototypes as a whole or in part comparable to the selected project. Formulation of programme of requirements. Conceptual Site analysis and zoning of activities on site.</p>                                                                                                                                                                                                                                                                                                                                                                                           |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                         | YEAR OF PUBLICATION |
|------|------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Groat L, Wang D.; Architectural Research Methods; John Wiley & Sons, Inc.                                  | 2002                |
| 2    | Kaplan A.; The Conduct of Inquiry; Chandler, San Francisco                                                 | 1964                |
| 3    | Zumthor P.; Thinking Architecture; Birkhauser, Basel, Switzerland                                          | 2010                |
| 4    | Shinde S.P. (Dr.); Methodology of Research and issues in Education; Surabhi Educational Society, Hyderabad | 2008                |
| 5    | Creswell J.W.; "Research Design : Qualitative & Quantitative Approaches"; Thousand Oaks : Sage             | 1994                |

**TRAINING PRESENTATION****B.ARCH Semester: IX**

**Code: B9AR06-CP40**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Office Administration: Understanding the basic working system of an Architect's office. Duties & Responsibilities of an Architect. Hierarchy of office staff in various types of Architectural practices. Log-Book with recordings of daily activities of the trainee involved in the office. Preparation of project / presentation reports, Bill of quantities and minutes of meetings with clients / consultants / contractors for the ongoing projects undertaken by the office. |
| 2    | Presentation & Submission Drawings: At least one set of presentation drawings of a project prepared for the approval of the client and one set of sanction drawings of a project prepared for approval of the Local authority by the student in Architect's office.                                                                                                                                                                                                                 |
| 3    | Site Visits and Studies: Visits to construction sites of the on-going projects in the Architect's office for the purpose of checking the accuracy of work or to record progress of work on site and related studies undertaken as per the directions of the supervising architect.                                                                                                                                                                                                  |
| 4    | Critical Appraisal: Critical appraisal of a completed building project designed by the Architect / Firm or on-going project on which the student has worked in the office. The appraisal may be done on the design issues such as functional efficiency, visual appeal, climatic response, Green rating, etc. either one of the parameter or combination there off.                                                                                                                 |
| 5    | Working drawings & details: Preparation of good for construction building drawings such as plans, sections, elevation etc., space details such as stair case, toilets, lifts, etc., fixing details such as wall cladding, balcony railing, structural glazing, etc., construction details such as plinth, sill, lintel, parapet, etc., and Fabrication details such as door, windows, grills, etc. under the guidance of supervising architect.                                     |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                                           | YEAR OF PUBLICATION |
|------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Osamu A. Wakita, Nagy R. Bakhoun, Richard Mlinde; The Professional Practice of Architectural Working Drawings 4th Edition; John Wiley & Sons | 2012                |
| 2    | Dr. Roshan H. Namavati; Professional Practice 9th Edition; Lakhani Book Depot 2009                                                           | 2009                |
| 3    | CPWD; CPWD Specifications Vol. 1 & 2; CPWD                                                                                                   |                     |

**ELECTIVE-IV- HOUSING**  
**Code: B9AR07-CP41**
**B.ARCH Semester: IX**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Introduction:</b> Introduction to House, Home, Household, Apartments, Condominium, Multistoried Buildings, Special Buildings. Neighborhoods- Plotted land development programs, Open Development Plots, Apartments, Gated communities, Townships, Rental Housing, Co-operative Housing.                                                                                                                                                                                                                                                                                                                                                       |
| 2    | <b>Housing Policies &amp; Programs:</b> National Housing Policies including Housing for all, housing for Urban poor, Housing institutions at National, State and Local levels. Sites and Services. Slum Housing Program – Slum improvement – Slum redevelopment and Relocation.                                                                                                                                                                                                                                                                                                                                                                  |
| 3    | <b>Housing Planning and Design:</b> Criteria for site selection : Design principles, norms and standards for infrastructure, land subdivision, housing layout and buildings: Built form, socio-economic and physical implications of various types of housing Building Byelaws, Rules and Development Control Regulations – Site Analysis, Layout Design, Design of Housing Units (Design Problems) – Housing Project Formulation; Concept , criteria and determinants of affordable, low income and informal housing; Design, planning and strategy issues for affordable housing; characteristics and type of low income and informal housing. |
| 4    | <b>Construction Materials &amp; Technologies:</b> Energy efficient, Cost effective Materials and construction technology; innovative and emerging new materials; Prefabricated housing; Materials and techniques for rural housing.                                                                                                                                                                                                                                                                                                                                                                                                              |
| 5    | <b>Housing Finance:</b> Housing Finance at various levels, NHB, HDFC, Subsidy and Cross Subsidy- Various models of Public Private Partnership Projects – Viability Gap Funding – Pricing of Housing Units (Problems).                                                                                                                                                                                                                                                                                                                                                                                                                            |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                          | YEAR OF PUBLICATION |
|------|-----------------------------------------------------------------------------|---------------------|
| 1    | Charles Corea / Housing and Urbanization / Urban Research Insitute          | 1999                |
| 2    | Appropriate Roofing Material for Low Cost Housing / NBO                     | 1985                |
| 3    | A.K.Jain / Building System for Low Cost Housing / Management Publishing Co. | 1992                |
| 4    | Sorgi Costa / High Density Housing in Architecture / Duran Loft Publication | 2009                |
| 5    | John F.C. Turner / Housing by people / Marison Boyars, London               | 1976                |

**ELECTIVE-IV- URBAN DESIGN****B.ARCH Semester: IX****Code: B9AR07-CP41**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                          |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Introduction</b><br>Introduction to Urban Design, its principles and techniques; History of Urban Design; Inter-relationship between Architecture, Urban Design and Urban Planning in terms of scale, time and scope; Introduction to urban legislation and policies.                                         |
| 2    | <b>Terminologies and Theories</b><br>Urban Design Vocabulary; Elements of Urban Design; Theories introduced by various urbanists - Kevin Lynch, Jane Jacobs, Gordon Cullen, Aldo Rossi; Concept of Urban Redevelopment, Renewal and Regeneration                                                                 |
| 3    | <b>Methods and Techniques</b><br>Importance of context in Urban Design-Context analysis, Regional study and Project understanding; Impact of factors such as economy, politics, religion and region on urban design; Mapping and analytical tool- Figure-ground mapping, Activity mapping and Cognitive mapping. |
| 4    | <b>Urban Issues and Theories of New Urbanism</b><br>Urban sprawl , Gentrification, Social exclusion in terms of age, gender, class caste etc.; Concepts of New Urbanism – Sustainable Urbanism, Inclusive City, Neighbourhood Planning, Futuristic City, Walkable Neighbourhood, Smart city etc.                 |
| 5    | <b>Urban Design Responses</b><br>Study of urban projects by eminent urban designers; Urban design exercise.                                                                                                                                                                                                      |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                       | YEAR OF PUBLICATION |
|------|--------------------------------------------------------------------------|---------------------|
| 1    | Lynch K. /Image of the city/ The MIT Press                               | 1960                |
| 2    | Jacob J./Death and Life of Great American Cities/ Random House, New York | 1961                |
| 3    | Rossi A./Architecture of the city/ The MIT Press                         | 1966                |
| 4    | Cullen G./The Concise Townscape/Architectural Press                      | 1961                |
| 5    | Moughtin C./ Urban Design- Method and Techniques/ Architectural Press    | 1999                |

**ELECTIVE-IV- URBAN CONSERVATION**  
**Code: B9AR07-CP41**
**B.ARCH Semester: IX**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Urban Conservation understanding</b><br>Definition, types, need; principles, ethics & value; tangible & intangible components, Degree of Intervention; Concepts & prevailing practices in conservation, restoration, retrofitting, rehabilitation, consolidation, protection, adaptive reuse.                                                                                                                                                                                                                                                      |
| 2    | <b>Philosophies of Urban Conservation</b><br>Preservation & conservation philosophies; Pioneers & societies in field of conservation; International Charters; International approaches from UNESCO, ICCROM, GETTY foundation, etc.; National approaches: A.S.I., State Archeology, INTACH, Urban Art Commission, Heritage Commissions, local bodies, etc.; Techno legal provisions, codes & byelaws for interventions.                                                                                                                                |
| 3    | <b>Assessment &amp; analysing</b><br>Understanding of original building conditions; Documentation and assessment of current conditions-Physical, contextual, political, social, cultural, economic, ecological; non-destructive survey methods, environmental monitoring, simple & sophisticated analytical methods; Types & causes of damages; Damage-building components & structural systems - superstructure & substructure                                                                                                                       |
| 4    | <b>Preservation &amp; Prevention</b><br>Preservation strategies in Urban Conservation: Analysis of problem; types, degree & limitations for intervention; Levels of intervention- Structure, building complex, precinct; Heritage zones; Conservation strategies- documentation, analysis, techniques, interventions & outcomes; models of preservation, reconstruction & adaptive reuse; Influences & benefits of urban conservation; Sequence & phasing; Materials & methods; Detailing & finishing; Preventive maintenance of historical buildings |
| 5    | <b>Adaptation and Application</b><br><b>Case Studies in Urban Conservation:</b> Examples of iconic urban conservation projects like Jaipur walled city bazaars, Sambhar Conservation initiative, Gambhiri riverfront etc;<br><b>Conservation strategies</b> for heritage areas along with revitalisation techniques – projects undertaken as group work will have to ultimately contribute ideas for the improvement of the quality of the urban environment.                                                                                         |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                                        | YEAR OF PUBLICATION |
|------|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | Philip Jodido; The Aga Khan Historic Cities Programme – Strategies for Urban Regeneration; Prestel                                        | 2011                |
| 2    | Dr. Alok Tripathi; The Ancient Monuments and Archaeological sites and Remains Act, 1958; Sundeep Prakashan Delhi                          | 2007                |
| 3    | Rama P. B. Singh; Heritagescapes & cultural landscapes; Shubhi Publication Gurgaon                                                        | 2010                |
| 4    | Sachindra Sekhar Biswas; Protecting the Cultural Heritage – National Legislations and International Conventions; Aryan Book International | 1999                |
| 5    | Gautam Sen Gupta, Kaushik G.; Archaeology in India Individuals, ideas & institutions; M M Publishers Pvt. Ltd.                            | 2007                |

**THESIS PROJECT**  
**Code: B10AR01-CP43**
**B.ARCH Semester: X**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <p><b>Analysis and Concept:</b> In this stage students shall analyze their site to arrive at a zoning of Activities on site.</p> <p>Student is required to Analyze the characteristic features and context of the site including Climatic analysis at both micro and macro level. Drawings, sketches, and physical models necessary to explain circulation, Organization of spaces and form composition shown in Preliminary drawings and study models.</p>                                                                                                                                  |
| 2    | <p><b>Philosophies of Urban Conservation</b></p> <p>Preservation &amp; conservation philosophies; Pioneers &amp; societies in field of conservation; International Charters; International approaches from UNESCO, ICCROM, GETTY foundation, etc.; National approaches: A.S.I., State Archeology, INTACH, Urban Art Commission, Heritage Commissions, local bodies, etc.; Techno legal provisions, codes &amp; bye-laws for interventions.</p>                                                                                                                                               |
| 3    | <p><b>Assessment &amp; analyzing</b></p> <p>Understanding of original building conditions; Documentation and assessment of current conditions-Physical, contextual, political, social, cultural, economic, ecological; non-destructive survey methods, environmental monitoring, simple &amp; sophisticated analytical methods; Types&amp; causes of damages; Damagebuilding components &amp; structural systems - superstructure &amp; substructure</p>                                                                                                                                     |
| 4    | <p><b>Preservation &amp; Prevention</b></p> <p>Preservation strategies in Urban Conservation: Analysis of problem; types, degree &amp; limitations for intervention; Levels of intervention- Structure, building complex, precinct; Heritage zones; Conservation strategies- documentation, analysis, techniques, interventions &amp; outcomes; models of preservation, reconstruction &amp; adaptive reuse; Influences &amp; benefits of urban conservation; Sequence &amp; phasing; Materials &amp; methods; Detailing &amp; finishing; Preventive maintenance of historical buildings</p> |
| 5    | <p><b>Adaptation and Application</b></p> <p><b>Case Studies in Urban Conservation:</b> Examples of iconic urban conservation projects like Jaipur walled city bazaars, Sambhar Conservation initiative, Gambhiri riverfront etc;</p> <p><b>Conservation strategies</b> for heritage areas along with revitalization techniques – projects undertaken as group work will have to ultimately contribute ideas for the improvement of the quality of the urban environment.</p>                                                                                                                 |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                     | YEAR OF PUBLICATION |
|------|----------------------------------------------------------------------------------------|---------------------|
| 1    | BIS; National Building Code of India, SP7:2016; BIS                                    | 2016                |
| 2    | NIASA; Archiving Architectural Thesis; Council of Architecture                         |                     |
| 3    | Naresh Shah with Pramod Anaokar; An Introduction to Predesign; Council of Architecture | 2015                |
| 4    | The Phaidon Atlas of 21st Century World Architecture; Phaidon                          | 2008                |
| 5    | T.S.S. for Building Types; Mc Graw Hill                                                | 2001                |

**ELECTIVE-V : Design Elective Related to Thesis\_ INTERIOR DESIGN****B.ARCH Semester: X****Code: B10AR02-CP44**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Identification:</b> Identify most important interior space / group of spaces from Thesis Project having carpet area greater than 1000 Sqm. Find type, size, organization and activity in space. Define scope of work and methodology                                                                                                                                                                                                        |
| 2    | <b>Data Collection:</b> Find out various theories and concept for designing space / area selected. Find out role of interior elements, their function and aesthetically criteria. Study of similar cases, conduct physical surveys, stakeholders' interviews, study standards and bye laws applicable.                                                                                                                                         |
| 3    | <b>Concept &amp; Analysis:</b> Analysis of thermal, visual, auditory and sanitary conditions necessary for comfort and convenience of occupants through case studies. Drawings showing conceptual layout of the interior space with all elements of interior design and their effect on the perception of the space.                                                                                                                           |
| 4    | <b>Design Synthesis:</b> Coordination of proposed interior space layout with heating and air conditioning system, water supply, sanitary drainage, electrical layout, lighting system, acoustics and structural system.                                                                                                                                                                                                                        |
| 5    | <b>Design Presentation:</b> Final set of drawings showing significance of space selected and Interior design concept. Sectional elevations showing walls, wall elevations and other elements of interior design in section. Furniture details in plan and section to an appropriate scale. Recommended material color and finishes for furniture and all surfaces. Flooring and inverted ceiling plan showing coordination with other systems. |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                      | YEAR OF PUBLICATION |
|------|-------------------------------------------------------------------------|---------------------|
| 1    | T.S.S. for Interior Design and Space Planning; McGraw Hill              | 2001                |
| 2    | Elizabeth Wilhide; The Interior Design Directory; Quadrille             | 2009                |
| 3    | Drew Plunkett; Drawing for Interior Design; Laurence King Publishing    | 2009                |
| 4    | Maureen Mitton; Interior Design Visual Presentation; John Willey & Sons | 1999                |
| 5    | Henry Wilson; India-Contemporary; Thames & Hudson                       | 2007                |

**ELECTIVE-V : Design Elective Related to Thesis\_LANDSCAPE DESIGN****B.ARCH Semester: X****Code: B10AR03-CP44**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                               |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Identification:</b> Identify outdoor activity spaces for design requiring landscape and site planning intervention in area not less than 1 hectare or the entire site area whichever is lesser. Find out type, size, organization and activity in space. Define scope of work & methodology.                       |
| 2    | <b>Data Collection:</b> Study theories and concepts of the space, area selected. Study topography, geology & soil, hydrology at site level. Study climate, existing vegetation, views & context of site. Study of similar cases for the issues selected for landscape intervention. Effect of standards and bye laws. |
| 3    | <b>Concept &amp; Analysis:</b> Analysis of identified issues and challenges by comparing various cases. Drawing showing conceptual layout with landscape elements such as land form, plant material, water, pavement, site structures & buildings with their significance & characteristics.                          |
| 4    | <b>Design Synthesis:</b> Coordination of various services such as water supply, water collection, sewage, electrical, lighting with the landscape proposal.                                                                                                                                                           |
| 5    | <b>Design Presentation:</b> Final set of drawings showing Research & Analysis. Design & Construction drawings such as comprehensive landscape development plan, Grading plan, planting plan, material plan, Drawing & irrigation system layout plan & outdoor lighting system layout plan                             |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                            | YEAR OF PUBLICATION |
|------|-----------------------------------------------------------------------------------------------|---------------------|
| 1    | T.S.S. for Landscape Architecture; McGraw Hills                                               | 1998                |
| 2    | Sabrina Wilk; Construction and Design Manual Drawing for Landscape Architects; DOM Publishers | 2014                |
| 3    | Mohd. Shaheen et.al.; Landscape Architecture in India; LA, Journal of Landscape Architecture  | 2013                |
| 4    | Leonard J. Hopper; Landscape Architectural Graphic Standards; John Wiley & Sons               | 2007                |
| 5    | Grant W. Reid; Landscape Graphics; Whitney Library of Design                                  | 1987                |

**ELECTIVE-V : Design Elective Related to Thesis\_URBAN DESIGN****B.ARCH Semester: X****Code: B10AR03-CP44**

| UNIT | CONTENT                                                                                                                                                                                                                                                                       |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Identification:</b> Identify the area for urban design intervention either a linear stretch approx. 1 Km. in length or area approx. 10 Hectare or a campus whichever is applicable to the thesis project. Find out scope of work and methodology                           |
| 2    | <b>Data Collection:</b> Study of context of the site location, accessibility, networks, surrounding land use, surrounding activities, views & vistas to and from site. Study of human responses by conducting interviews, survey, cognitive mapping etc. standards & byelaws. |
| 3    | <b>Concept &amp; Analysis:</b> Find out various theories & concepts, study of similar cases of urban design intervention. Analysis of contextual issues.                                                                                                                      |
| 4    | <b>Design Synthesis:</b> Study of Green & Communication networks, built fabric and architectural language. Determine issues thereof and suggest strategies or remedial measures.                                                                                              |
| 5    | <b>Design Responses:</b> Drawing showing site context, urban form, urban character, urban networks, urban activities, built fabric, architectural language and its constituents and propose urban design measures & interventions.                                            |
|      | <b>TOTAL</b>                                                                                                                                                                                                                                                                  |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                            | YEAR OF PUBLICATION |
|------|-------------------------------------------------------------------------------|---------------------|
| 1    | T.S.S. for Urban Design; McGraw Hill                                          | 2003                |
| 2    | Cliff Moughtin; Urban Design Green Dimensions; Architectural Press            | 1996                |
| 3    | Francesca Z. Mola; The Sourcebook of Contemporary Urban Design; Harper Design | 2012                |
| 4    | Cliff Moughtin; Urban Design Streets & Squares; Routledge                     | 2016                |
| 5    | Gordon Cullen; The Concise Townscape; Architectural Press                     | 1977                |

**ELECTIVE-V : Design Elective Related to Thesis\_PLUMBING DESIGN****B.ARCH Semester: X****Code: B10AR03-CP45**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Identification:</b> Identify plumbing services for different spaces and activities. Identify sources of supply & quality of water in an area selected for project. Find out existing physical infrastructure.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 2    | <b>Design Calculation:</b> Identify water demand & quality for various spaces & uses. Find out water required for Fire-fighting system for type of building by studying standards & codes.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 3    | <b>Concept &amp; Analysis:</b> Conceptual layout showing water supply system to and from OHT / UGT to individual spaces. Conceptual layout of drainage and disposal system conceptual layout of fire fighting system.                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 4    | <b>Design Synthesis:</b> Plumbing services design in coordination of various services such as water supply, sewage, electrical, lighting, heating & cooling along with landscape planting plan.                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 5    | <b>Design Presentation:</b> Final drawing showing distribution of water from OHT / UGT to individual spaces along with specifications. Drawing showing storage of water, water tanks then type, numbers location & capacity. Drawings showing water harvesting / recycling system as per need of individual project. Drawing showing water supply systems, pressure system. Drawings showing drainage system from single toilet, vertical and horizontal drainage line system with their number, location, size, slopes, interval etc. Drawings showing disposal system to municipal drain, or septic tank or soak pit, their details |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                            | YEAR OF PUBLICATION |
|------|-----------------------------------------------------------------------------------------------|---------------------|
| 1    | Fred Hall & Rager Greeno; Building Services Handbook; Butterworth-Heinmann                    | 2011                |
| 2    | S.J. Arceivala, "Waste Water Treatment for Pollution Control", Tata McGraw Hills Publication. | 2008                |
| 3    | K.N. Duggal,"Elements of Environmental Engineering", Chand & Co.                              | 2010                |
| 4    | "Uniform Illustrated Plumbing Code – India (UIPC-I)", Indian Plumbing Association             | 2014                |
| 5    | Charanjeet S. Shah; Water Supply and Sanitation; Galgotia Publication                         | 2015                |

**ELECTIVE-V : Design Elective Related to Thesis \_ELECTRICAL DESIGN****B.ARCH Semester: X****Code: B10AR03-CP45**

| UNIT | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Identification:</b> Identify electrical services for outdoor and indoor spaces. Identify the type of building & electrical supply sources & components and mandatory provisions.                                                                                                                                                                                                                                                                                                                |
| 2    | <b>Design Calculation:</b> Evaluate power requirements for all services like lighting, HVAC, Fire, Lifts, Escalators and other building equipments.                                                                                                                                                                                                                                                                                                                                                |
| 3    | <b>Concept &amp; Analysis:</b> Identify Electrical system requirement on the basis of load calculations by studying similar cases. Study of National Electrical Code and ECBC. Identification and provision of alternative energy sources for specific requirement. Determine requirement of lighting as per National lighting code for various activities. Drawings showing light zoning diagrams, single line diagram showing distribution system and its components at site and building level. |
| 4    | <b>Design Synthesis:</b> Electrical services design in coordination with various services such as water supply, sewage, lighting, heating & cooling along with landscape planting plan.                                                                                                                                                                                                                                                                                                            |
| 5    | <b>Design Presentation:</b> Drawing showing electrical layout – Power and LV layouts, Wall electrical layouts, Electrical reflected ceiling layout, IBMS provisions. Drawing showing light fixtures, layout & connections in plan and section with specifications such as Type and Number of lamp / luminaries, their lux level and lighting system.                                                                                                                                               |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                     | YEAR OF PUBLICATION |
|------|------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | S.L. Uppal- G.C. Garg; Electrical Wiring Estimation and Costing; Khanna Publication                                    | 2010                |
| 2    | Fred Hall & Rager Greeno; Building Services Handbook; Butterworth-Heinmann                                             | 2011                |
| 3    | Raina K.B. & Bhattacharya S.K.; Electrical Design, Estimation and Costing; New Age International Publishers, New Delhi | 2007                |
| 4    | Steve Doty & Wayne C. Turner; Energy Management Handbook; The Fourmount Press, USA                                     | 2009                |
| 5    | B. Mazumdaar; Textbook of Energy Technology; APH Publishing Corporation                                                | 2005                |

**ELECTIVE-V : Design Elective Related to Thesis\_MECHANICAL DESIGN****B.ARCH Semester: X****Code: B10AR03-CP45**

| UNIT | CONTENT                                                                                                                                                                                                                                                                    |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Identification:</b> Identify Mechanical Services for different spaces and activities. Find out area of conditioned spaces and non conditioned spaces.                                                                                                                   |
| 2    | <b>Design Calculation:</b> Identify system requirements for various mechanical services (HVAC, Fire, Vertical Circulation) and evaluate the requirement through heat load calculation, waiting time calculation etc.                                                       |
| 3    | <b>Concept &amp; Analysis:</b> Identify mechanical system through analysis of similar cases and manuals such as ECBC, NBC and ASHRAE.                                                                                                                                      |
| 4    | <b>Design Synthesis:</b> Preparing Mechanical System Design in Coordination with interior furniture, water supply, sewage, electrical, lighting & sound reinforcement system.                                                                                              |
| 5    | <b>Design Presentation:</b> Drawing showing concept of minimizing various loads. Design showing HVAC, Fire, Vertical Circulation showing all its components, their capacity, number, location, size, etc in plans & sections with specifications at site & building level. |

**REFERENCE BOOKS**

| S.NO | NAME OF AUTHORS / BOOKS/ PUBLISHER                                                                                 | YEAR OF PUBLICATION |
|------|--------------------------------------------------------------------------------------------------------------------|---------------------|
| 1    | John W. Mitchell, James E. Braun; Heating, Ventilation, and Air Conditioning in Buildings ; John Wiley & Sons Inc. | 2012                |
| 2    | Norbert Lencher; Heating Cooling Lighting; John Wiley & sons, London                                               | 2014                |
| 3    | M.Y.H. Bangash, T. Bangash; Lifts, Elevators, Escalators and Moving Walkways; Travelators/Taylor & Francis/Balkema | 2007                |
| 4    | Fred Hall & Rager Greeno; Building Services Handbook; Butterworth-Heinmann                                         | 2011                |
| 5    | William H. Severns and Julian R. Fellows; Air conditioning and Refrigeration; John Wiley & sons, London            | 1987                |

# Mohan Lal Sukhadia University Udaipur



## **B. Tech. Program** (Effective from session 2021-2022)

Civil Engineering

Semesters III

**Syllabus**

**BT3CE01-CT01: ADVANCE ENGINEERING MATHEMATICS-I****Credit: 3****Max. Marks: 150 (IA:30, ETE:120)****3L+0T+0P****End Term Exam: 3 Hours**

| <b>SN</b>    | <b>Contents</b>                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Hrs.</b> |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>1</b>     | <b>Numerical Methods – 1:</b> Finite differences, Relation between operators, Interpolation using Newton's forward and backward difference formulae. Gauss's forward and backward interpolation formulae. Stirling's Formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange's formulae. Numerical Differentiation, Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules. | <b>8</b>    |
| <b>2</b>     | <b>Numerical Methods – 2:</b> Numerical solution of ordinary differential equations: Taylor's series, Euler and modified Euler's methods. Runge- Kutta method of fourth order for solving first and second order equations. Milne's and Adam's predictor-corrector methods. Solution of polynomial and transcendental equations-Bisection method, Newton-Raphson method and Regula-Falsi method.                                | <b>8</b>    |
| <b>3</b>     | <b>Laplace Transform:</b> Definition and existence of Laplace transform, Properties of Laplace Transform and formulae, Unit Step function, Dirac Delta function, Heaviside function, Laplace transform of periodic functions. Finding inverse Laplace transform by different methods, convolution theorem. Evaluation of integrals by Laplace transform, solving ODEs by Laplace transforms method.                             | <b>8</b>    |
| <b>4</b>     | <b>Fourier Transform:</b> Fourier Complex, Sine and Cosine transform, properties and formulae, inverse Fourier transforms, Convolution theorem, application of Fourier transforms to partial ordinary differential equation (One dimensional heat and wave equations only).                                                                                                                                                     | <b>8</b>    |
| <b>5</b>     | <b>Z-Transform:</b> Definition, properties and formulae, Convolution theorem, inverse Z-transform, application of Z-transform to difference equation.                                                                                                                                                                                                                                                                           | <b>8</b>    |
| <b>Total</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>40</b>   |

## BT3CE02-CT02: TECHNICAL COMMUNICATION

Credit: 2

Max. Marks: 100 (IA: 20, ETE: 80)

2L+0T+0P

End Term Exam: 2 Hours

| SN | Contents                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Hours     |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 1  | <b>Introduction to Technical Communication-</b> Definition of technical communication, Aspects of technical communication, forms of technical communication, importance of technical communication, technical communication skills (Listening, speaking, writing, reading writing), linguistic ability, style in technical communication.                                                                                                                                   | 5         |
| 2  | <b>Comprehension of Technical Materials/Texts and Information Design &amp; development-</b> Reading of technical texts, Reading and comprehending instructions and technical manuals, Interpreting and summarizing technical texts, Note-making. Introduction of different kinds of technical documents, Information collection, factors affecting information and document design, Strategies for organization, Information design and writing for print and online media. | 5         |
| 3  | <b>Technical Writing,</b> - Technical writing process, forms of technical discourse, Writing, drafts and revising, Basics of grammar, common error in writing and speaking,                                                                                                                                                                                                                                                                                                 | 5         |
| 4  | <b>Grammar and Editing</b> Study of advanced grammar, Editing strategies to achieve appropriate technical style, Introduction to advanced technical communication. Planning, drafting and writing Official Notes, Letters, E-mail, Resume, Job Application, Minutes of Meetings.                                                                                                                                                                                            | 5         |
| 5  | <b>Advanced Technical Writing-</b> Technical Reports, types of technical reports, Characteristics and formats and structure of technical reports. Technical Project Proposals, types of technical proposals, Characteristics and formats and structure of technical proposals. Technical Articles, types of technical articles, Writing strategies, structure and formats of technical articles.                                                                            | 5         |
|    | <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>25</b> |

**BT3CE03-CT03: ENGINEERING MECHANICS**

**Credit: 2**

**Max. Marks: 100 (IA:20, ETE:80)**

**2L+0T+0P**

**End Term Exam: 2 Hours**

| SN           | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Hrs.      |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>1</b>     | <p><b>Introduction: objective, scope and outcome of the course.</b></p> <p><b>Statics of particles and rigid bodies:</b> Fundamental laws of mechanics, Principle of transmissibility, System of forces (conservative and non- conservative), Resultant force, Resolution of force, Moment and Couples, Resolution of a force into a force and a couple, Free body diagram, Equilibrium, Conditions for equilibrium, Lami's theorem.</p>                                                                                                                                                                                                                                    | <b>6</b>  |
| <b>2</b>     | <p><b>Plane trusses:</b> Types of structures, Trusses, Support Conditions, Types of Loadings, Classification of trusses, Determinacy of trusses, Basic assumptions of truss analysis (zero force member, tension or compression member), Method of joints, Method of sections.</p> <p><b>Simple Stresses and Strains:</b> Concept of stress and strain in three dimensions and generalized Hooke's law; Young's modulus, Shear stress, Shear strain, Modulus of rigidity, Complementary shear stress; Poisson's ratio, Volumetric strain, Bulk modulus, relation between elastic constants, Stress and strain thin cylinder and spherical cell under internal pressure.</p> | <b>6</b>  |
| <b>3</b>     | <p><b>Friction:</b> Types of Friction, Laws of friction, Angle of friction, Angle of repose, Ladder, Wedge, Belt Friction.</p> <p><b>Springs:</b> Stiffness of springs, springs in series and parallel, Introduction to laminated plate springs, leaf spring, close coiled helical springs, open coiled springs.</p>                                                                                                                                                                                                                                                                                                                                                        | <b>6</b>  |
| <b>4</b>     | <p><b>Centroid &amp; Moment of inertia (M.I.):</b> Location of centroid, Moment of inertia (mass and area), Parallel axis and perpendicular axis theorems, M.I of composite section, M.I. of solid bodies, Polar moment of inertia, principle axis and principle moment of inertia.</p>                                                                                                                                                                                                                                                                                                                                                                                     | <b>6</b>  |
| <b>5</b>     | <p><b>Virtual work:</b> Principle of Virtual Work, Active forces and active force diagram, Stability of equilibrium.</p> <p><b>Work, Energy and Power:</b> Work of a force, weight and couple, Power, Efficiency, Energy, Kinetic energy of rigid body, Principle of work and energy, Conservation of energy.</p>                                                                                                                                                                                                                                                                                                                                                           | <b>6</b>  |
| <b>TOTAL</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>30</b> |

**BT3CE04-CT04: SURVEYING****Credit: 3****Max. Marks: 150 (IA: 30, ETE:120)****3L+0T+0P****End Term Exam: 3 Hours**

| <b>SN</b> | <b>Contents</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Hrs.</b> |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>1</b>  | <b>LINEAR AND ANGULAR MEASUREMENTS</b><br>Method of linear measurements, Correction to length measured with a chain/tape, Ranging a survey line; direct and indirect Angular measurement by compass, Designation of bearing, Traversing with tape and compass, Correction to measured bearing,<br>Angular measurement by theodolite; Temporary adjustments, Method of horizontal angle measurement and vertical angle, Traverse computation, plotting of traverse and determining the closing error, Balancing traverse. | <b>8</b>    |
| <b>2</b>  | <b>LEVELLING</b><br>Measurements of elevations methods of levelling; direct/differential, Indirect/Trigonometrical, and Profile/Cross sectional levelling.<br>Digital and Auto level, Errors in levelling, contours and contour lines; methods of contouring; direct and indirect, characteristics, uses, area and vol. measurements.                                                                                                                                                                                    | <b>8</b>    |
| <b>3</b>  | <b>CURVE SURVEYING</b><br>Elements of simple and compound curves, Types of curves, Elements of circular, reverse, and transition curves. Method of setting out simple, circular, transition and reverse curves, Types of vertical curves, length of vertical curves, setting out vertical curves. Tangent corrections.                                                                                                                                                                                                   | <b>8</b>    |
| <b>4</b>  | <b>TACHEOMETRY AND PHOTOGRAMMETRY SURVEYING</b><br>Advantages of tacheometric surveying, different systems of tacheometric measurements, Stadia system of tacheometry, distance elevation formulae for horizontal sights. Determination of tacheometric constants, distance and elevation formulae for inclined sights with staff vertical.<br>Introduction to basic concepts perspective geometry of aerial photographs, relief and tilt displacements, Terrestrial Photogrammetry, flight planning                     | <b>8</b>    |
| <b>5</b>  | <b>SETTING OUT WORKS &amp; MODERN FIELD SURVEY SYSTEMS</b><br>Instruments and methods for laying out buildings, setting out culverts, setting out sewer lines.<br>Principle of E.D.M. (Electronic Distance Measurements), Modulation, Type of E.D.M., Distomat, Total station, parts of total station, advantages and application.                                                                                                                                                                                       | <b>8</b>    |
|           | <b>TOTAL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>40</b>   |

### BT3CE05-CT05: FLUID MECHANICS

Credit: 2

Max. Marks: 100 (IA:20, ETE:80)

2L+0T+0P

End Term Exam: 2 Hours

| SN           | Contents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Hrs.      |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>1</b>     | <p><b>Introduction to objective, scope and outcome of the course.</b></p> <p><b>Fluids:</b> Definition, Type of fluids, Ideal fluids, real fluids, Newtonian and non-Newtonian fluids.</p> <p><b>Properties of Fluids:</b> Units of measurement, Mass density, Specific weight, Specific volume, Specific Gravity, Viscosity, Surface tension and Capillarity, Compressibility and Elasticity.</p>                                                                                                                                                                         | <b>6</b>  |
| <b>2</b>     | <p><b>Principles of Fluid Statics:</b> Basic equations, Pascal Law, Type of pressure:- atmospheric pressure, Gauge pressure, vacuum pressure, absolute pressure, manometers, Bourdon pressure gauge.</p> <p><b>Fluid Dynamics:</b> Control volume approach, Euler's equation, Bernoulli's equation and its applications, venturimeter, orificemeter, orifices &amp; mouthpieces, time of emptying of tanks by orifices, momentum and angular momentum equations and their applications, pressure on flat plates and nozzles.</p>                                           | <b>6</b>  |
| <b>3</b>     | <p><b>Buoyancy;</b> Forces acting on immersed plane surface. Centre of pressure, forces on curved surfaces. Conditions of equilibrium for floating bodies, meta-centre and analytical determination of meta centric height.</p>                                                                                                                                                                                                                                                                                                                                            | <b>6</b>  |
| <b>4</b>     | <p><b>Kinematics of Flow:</b> Visualisation of flow, Types of flow: Steady and unsteady, uniform and non-uniform, rotational and irrotational flow, Laminar and turbulent flow, streamline, path line, streak line, principle of conservation of mass, equation of continuity, acceleration of fluid particles local and convective, velocity, acceleration, velocity potential and stream function, elementary treatment of flow net, vorticity, circulation, free and forced vortex. Fluid mass subject to horizontal and vertical acceleration and uniform rotation</p> | <b>6</b>  |
| <b>5</b>     | <p><b>Laminar Flow through Pipes:</b> Laminar flow through pipes, Relation between shear &amp; pressure gradient. Flow between plates &amp; pipes. Hagen- Poiseuille equation, Equations for velocity distribution, pressure difference velocity distribution over a flat plate and in a pipe section, Darcy-Weisbach equation, friction factor, minor losses, pipe networks.</p>                                                                                                                                                                                          | <b>6</b>  |
| <b>TOTAL</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>30</b> |

## BT3CE06-CT06: BUILDING MATERIALS AND CONSTRUCTION

Credit: 3

Max. Marks: 150 (IA: 30, ETE: 120)

3L+0T+0P

End Term Exam: 3 Hours

| SN | Contents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Hrs. |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 1  | <b>Introduction to objective, scope and outcome of the course.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 8    |
|    | <p><b>Basic Civil Engineering Materials (Properties, Types and Uses):</b> Stone: Compressive strength, Water absorption, Durability, Impact value, Tensile strength; Bricks: Water absorption, Compressive strength, Effloresces, Dimension and Tolerance; Tiles: Water absorption, Tolerance, Impact value and Glazing; Light weight concrete blocks.</p> <p><b>Lime:</b> classification as per IS, properties, standard tests and uses in construction.</p> <p><b>Fly-ash:</b> Properties and Use in manufacturing of bricks &amp; cement;</p> <p><b>Miscellaneous:</b> Gypsum, Plaster of Paris, PVC materials, Paints, Varnish and Distemper.</p> |      |
| 2  | <p><b>Timber &amp; Steel:</b> Timber: Definitions of related terms, Classifications and Properties, Defects in Conversion of wood, Seasoning wood, Preservation, Fire proofing, Ply woods, Fibre boards;</p> <p>Steel: Mild steel and HYSD steel, Properties and their use, common tests on steel</p>                                                                                                                                                                                                                                                                                                                                                 | 8    |
|    | <p><b>Mortar and Plaster:</b> Mortar preparation methods: Functions and tests &amp; their uses in various types of pointing &amp; plastering</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |
|    | <p><b>Brick and Stone Masonry:</b> Basic principle of masonry work, different types of bonds, relative merits and demerits of English, Single Flemish and Double Flemish bond. Comparison between stone and brick masonry. General principles, classification of stone masonry and their relative merits and demerits.</p>                                                                                                                                                                                                                                                                                                                            |      |
| 3  | <p><b>Building Requirements &amp; Construction System:</b> Building components, their functions and requirements. Types of construction: load bearing and framed structure construction, RCC beam, column and slab construction, Precast and In-situ construction, Relative merits and demerits. Fire resistance construction, FRC.</p> <p><b>Ground &amp; Upper floors:</b> Floor components and their functions, Floor types and Selection of flooring, construction details of ground and upper floors, merits and demerits.</p>                                                                                                                   | 7    |
| 4  | <p><b>Foundation &amp; Site Preparation:</b> Purpose, types of foundation: like shallow, deep, pile, raft, grillage foundation and their suitability. Depth of foundation, Sequence of construction activity and co-ordination, site clearance, layout of foundation plan.</p>                                                                                                                                                                                                                                                                                                                                                                        | 8    |

|   |                                                                                                                                                                                                                                                                                                                                      |           |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|   | <p><b>Temporary structures:</b> Types &amp; methods of shoring, underpinning and scaffolding.</p>                                                                                                                                                                                                                                    |           |
|   | <p><b>Damp Proofing:</b> Causes and Effects of dampness, Methods and materials for damp proofing, Methods and materials for anti-termite treatment.</p> <p><b>Construction and Expansion Joints:</b> Requirements, Types material used, Construction details.</p>                                                                    |           |
| 5 | <p><b>Arches and Lintels:</b> Terms used, types of arches and their construction detail, types of lintels and constructions.</p> <p><b>Partition Wall:</b> Types, purpose and use of partition wall.</p>                                                                                                                             | 8         |
|   | <p><b>Stairs:</b> Terms used, requirements of good staircase, classification, construction details and suitability of different types of stairs, Lifts and Ramps.</p>                                                                                                                                                                |           |
|   | <p><b>Roof and Roof Covering:</b> Purposes, classification of roofs, terms used. Introduction to Solid slab, Flat slab, Shell Roofs and Pitched roofs, and their constructional features. Types of pitched roofs and Trusses, typical constructional details; Roof covering materials, types and typical constructional details.</p> |           |
|   | <b>Total</b>                                                                                                                                                                                                                                                                                                                         | <b>40</b> |

### BT3CE07-CT07: ENGINEERING GEOLOGY

Credit: 2

Max. Marks: 100 (IA:20, ETE:80)

2L+0T+0P

End Term Exam: 2 Hours

| SN           | Contents                                                                                                                                                                                                                                                          | Hrs.      |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 1            | <b>Introduction to objective, scope and outcome of the course.</b><br><b>General Geology:</b> Branches and Scope of Geology, Types of Weathering & Geological work of natural agencies like River & Wind. Geological Time Scale. Physical Properties of Minerals. | 6         |
| 2            | <b>Petrology:</b> Formation, Texture, Structure and Classification of Igneous, Sedimentary and Metamorphic Rocks. Engineering Properties of Rocks for Building & Road Material. Laboratory and Field & in-situ Test for Site Construction.                        | 6         |
| 3            | <b>Structural Geology:</b> Causes, Terminology, Classification, Recognition, Effects and Engineering consideration of Fold, Fault, Joints and Unconformities.                                                                                                     | 6         |
| 4            | <b>Engineering Geology:</b> Geophysical methods as applied to Civil Engineering for Subsurface Analysis (Electrical and Seismic methods). Terminology, Types and Geological consideration for site selection of Dam & Tunnel.                                     | 6         |
| 5            | <b>Remote Sensing &amp; GIS:</b> Application of Remote Sensing and GIS in Various fields of Civil Engineering.                                                                                                                                                    | 6         |
| <b>TOTAL</b> |                                                                                                                                                                                                                                                                   | <b>30</b> |

## BT3CE08-CP01: SURVEYING LAB

**Credit: 2**  
**0L+0T+4P**

**Max. Marks: 100 (IA:4, ETE:60)**

### List of Experiments

1. Linear Measurement by Tape:
  - a. Ranging and Fixing of Survey Station.
  - b. Plotting Building Block by offset with the help of cross staff.
2. Compass Survey: Using Surveyor's and Prismatic compass
  - a. Measurement of bearing of lines
  - b. Adjustment of included angles of compass traverse.
3. Levelling: Using Tilting/ Dumpy/ Automatic Level
  - a. To determine the reduced levels in closed circuit.
  - b. To carry out profile levelling and plot longitudinal and cross sections for road.
4. Theodolite Survey: Using Vernier Theodolite
  - a. To carryout temporary adjustment of Theodolite & Measurement of horizontal and vertical angle: by method of repetition and method of Reiteration.
  - b. To measure and adjust the angles of a braced quadrilateral.
5. Trigonometric Levelling: To determine the Height of an object by trigonometric levelling:
  - a. By using Instruments in same vertical plane.
  - b. By using Instruments in different vertical planes.
6. Tacheometry Survey:
  - a. To determine the tachometric constant.
  - b. To determine the horizontal and vertical distance by tachometric survey.
7. To study the various electronic surveying instruments like EDM, Total Station etc.

*One-week Survey Camp for topographic/ project survey/Contouring be arranged before or after Term End Exam.*

## **BT3CE09-CP02: FLUID MECHANICS LAB**

**Credit: 01**  
**0L+0T+2P**

**Max. Marks: 50 (IA: 20, ETE:30)**

### **List of Experiments**

1. To study the various pressure measuring devices
2. To verify the Bernoulli's theorem.
3. To calibrate the Venturi-meter.
4. To calibrate the Orifice-meter.
5. To determine Metacentric Height.
6. To determine  $C_c$ ,  $C_v$ ,  $C_d$  of an orifice.
7. To determine  $C_d$  of a mouthpiece.
8. To determine  $C_d$  of a V-notch.
9. To determine viscosity of a given fluid.
10. To study the velocity distribution in pipes.

## **BT3CE10-CP03: COMPUTER AIDED CIVIL ENGINEERING DRAWING**

**Credit: 2**  
**0L+0T+4P**

**Max. Marks: 100 (IA:40, ETE:60)**

### **List of Assignments**

**To study and draw the labelled sketch of different Building Components on sheets with exposure to CAD:**

1. Drawing of walls
  - a. Brick and Stone masonry
  - b. Cross section of external wall from foundation to parapet
  - c. Partition wall, cavity wall and
2. Pointing, Arches, Lintels and Floors
3. Doors and Windows
4. Stairs, Cross section of Dog legged stairs
5. Roofs: Flat and Pitched roof (Steel truss)
6. Development of Front Elevation and Sectional Elevation from a given plan
7. Development of Plan, Front Elevation and Sectional Elevation from line diagram

## **BT3CE11-CP04: CIVIL ENGINEERING MATERIALS LAB**

**Credit: 01**  
**0L+0T+2P**

**Max. Marks: 50 (IA:20, ETE:30)**

### **List of Experiments**

1. To determine properties of following materials:
  - A. STONE:
    - a. Compressive strength,
    - b. Water absorption,
    - c. Impact value,
    - d. Tensile strength;
  - B. Bricks:
    - a. Water absorption,
    - b. Compressive strength,
    - c. Dimension and Tolerance;
  - C. Tiles:
    - a. Water absorption,
    - b. Tolerance,
    - c. Impact value
  - D. Timber: Compressive and Tensile Strength of Timber across and along the Grain
2. To Study the Properties & Utilization of Fly Ash in Construction
3. To Study the Different Aluminum and Steel Sections
4. To Study the Manufacturing and Use of Concrete Hollow Blocks
5. To Study the Properties and Uses of Kota Stone and its Slurry

## **BT3CE12-CP05: GEOLOGY LAB**

**Credit: 01**  
**0L+0T+2P**

**Max. Marks: 50 (IA:20, ETE:30)**

### **List of Experiments**

1. Physical Properties of Minerals
2. Physical Properties of Rocks
3. Identification of Minerals in Hand Specimen
4. Identification of Rocks in Hand Specimen
5. Identification of Geological features through wooden Models
  - a. Structural Geological Diagrams
  - b. Petrological Diagrams
  - c. Engineering Geological Diagrams
6. Interpretation of Geological Map (10 Nos.)
7. Dip & Strike Problems (8 Nos.)

# **Mohan Lal Sukhadia University Udaipur**



## **B. Tech. Program** **(Effective from session 2021-2022)**

Civil Engineering

Semesters IV

**Syllabus**

**BT4CE01-CT01: ADVANCE ENGINEERING MATHEMATICS-II****Credit: 2****Max. Marks: 100 (IA:20, ETE:80)****2L+0T+0P****End Term Exam: 2 Hours**

| <b>SN</b> | <b>CONTENTS</b>                                                                                                                                                                                                                          | <b>Hours</b> |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>1</b>  | Fourier Series: Fourier series, even and odd functions; Half range series; Change of interval; Exponential form of Fourier series; Harmonic analysis.                                                                                    | <b>6</b>     |
| <b>2</b>  | Roots of Nonlinear (Algebraic and Transcendental) Equations: Bisection method, False position method, Newton Raphson method; Convergence of False position and Newton Raphson method. Complex roots of polynomials by Bairstow's method. | <b>6</b>     |
| <b>3</b>  | Partial Differential Equations: Classifications of partial differential equations; Method of separation of variables to solve Heat equation, Wave equation and Laplace's equations.                                                      | <b>6</b>     |
| <b>4</b>  | Statistics: Correlation and regression; Principle of least square method and curve fitting.                                                                                                                                              | <b>6</b>     |
| <b>5</b>  | Probability Distribution Functions: Random variable; Mathematical expectations; Moment generating functions; Discrete and continuous distribution functions; Binomial, Poisson and Normal distributions.                                 | <b>6</b>     |
|           | <b>TOTAL</b>                                                                                                                                                                                                                             | <b>30</b>    |

**BT4CE02-CT02: MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING****Credit-2**  
**2L+0T+0P****Max. Marks : 100 (IA:20,ETE:80)**  
**End Term Exam: 2 Hours**

| <b>SN</b> |                                                                                                                                                                                                                                                                                                                                                                                         | <b>Hours</b> |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>1</b>  | <b>Basic economic concepts-</b><br>Meaning, nature and scope of economics, deductive v/s inductive methods, static and dynamics, Economic problems: scarcity and choice, circular flow of economic activity, national income-concepts and measurement.                                                                                                                                  | <b>5</b>     |
| <b>2</b>  | <b>Demand and Supply analysis-</b><br>Demand-types of demand, determinants of demand, demand function, elasticity of demand, demand forecasting –purpose, determinants and methods, Supply-determinants of supply, supply function, elasticity of supply.                                                                                                                               | <b>5</b>     |
| <b>3</b>  | <b>Production and Cost analysis-</b><br>Theory of production- production function, law of variable proportions, laws of returns to scale, production optimization, least cost combination of inputs, isoquants. Cost concepts-explicit and implicit cost, fixed and variable cost, opportunity cost, sunkcosts, cost function, cost curves, cost and output decisions, cost estimation. | <b>5</b>     |
| <b>4</b>  | <b>Market structure and pricing theory-</b><br>Perfect competition, Monopoly, Monopolistic competition, Oligopoly.                                                                                                                                                                                                                                                                      | <b>5</b>     |
| <b>5</b>  | <b>Financial statement analysis-</b><br>Balance sheet and related concepts, profit and loss statement and related concepts, financial ratioanalysis, cash-flow analysis, funds- flow analysis, comparative financial statement, analysisand interpretation of financial statements, capital budgeting techniques.                                                                       | <b>5</b>     |
|           | <b>TOTAL</b>                                                                                                                                                                                                                                                                                                                                                                            | <b>25</b>    |

**BT4CE03-CT03: BASIC ELECTRONICS FOR CIVIL ENGINEERING APPLICATIONS****Credit: 2****Max. Marks: 100 (IA:20, ETE:80)****2L+0T+0P****End Term Exam: 2 Hours**

| <b>SN</b> | <b>CONTENTS</b>                                                                                                                                                                                                                                                                                                    | <b>Hrs.</b> |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>1</b>  | <b>Introduction:</b> to objective, scope and outcome of the subject.                                                                                                                                                                                                                                               | <b>6</b>    |
|           | <b>Basic Electronics:</b> Number systems & Their conversion used in digital electronics, Demorgan's theorem, Logic Gates, half and full adder circuits, R-S flip flop, J-K flipflop.                                                                                                                               |             |
|           | Introduction to Semiconductors, Diodes, V-I characteristics, Bipolar junction transistors (BJT) and their working, introduction to CC, CB & CE transistor configurations.                                                                                                                                          |             |
| <b>2</b>  | <b>Instrumentation:</b> mechanical, electrical, electronic system and their calibration, Use of automatic and digital levels, electronic theodolites, total stations; Control surveys using GNSS, Total station and traversing methods (adjustment and computations of coordinates).                               | <b>6</b>    |
|           | <b>Measurement errors:</b> Gross error and systematic errors, absolute and relative errors, accuracy, precision, resolution and significant figures. Full-field measurements;                                                                                                                                      |             |
| <b>3</b>  | <b>Data acquisition system and data processing:</b> analog systems, digital systems using personal computers, dynamic measurement, numerical and graphical data processing and archiving.                                                                                                                          | <b>6</b>    |
| <b>4</b>  | <b>Sensors &amp; Transducers:</b> various types of sensors for displacement, velocity, acceleration, pressure, loads, strains, Displacement sensors, Mass & Piezoelectric, strain gauges, Temperature sensors thermocouple, flow sensors : Ultrasonic, electromagnetic, laser and thermal                          | <b>6</b>    |
|           | <b>Sensor types characteristics:</b> types of resolution, FOV, IFOV, PSF; Geometric and radiometric distortions, Geo-referencing, re-sampling methods; Atmospheric errors and removal; Satellite orbits and characteristics; Applications of optical and microwave remote sensing techniques in Civil Engineering. |             |
| <b>5</b>  | <b>Digital Image Processing:</b> Digital image, introduction to digital image processing, pre-processing, enhancement, classification, accuracy assessment.                                                                                                                                                        | <b>6</b>    |
|           | <b>TOTAL</b>                                                                                                                                                                                                                                                                                                       | <b>30</b>   |

**BT4CE04-CT04: STRENGTH OF MATERIALS****Credit: 3****Max. Marks: 150 (IA:30, ETE:120)****3L+0T+0P****End Term Exam: 3 Hours**

| <b>SN</b>    | <b>CONTENTS</b>                                                                                                                                                                                                                                                                                                          | <b>Hrs.</b> |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>1</b>     | <b>Introduction:</b> to objective, scope and outcome of the subject                                                                                                                                                                                                                                                      | <b>8</b>    |
|              | <b>Simple Stresses and Strains in different members:</b> Stresses in prismatic & non prismatic members and in composite members; Thermal stresses; Stresses in composite members, Compatibility condition.                                                                                                               |             |
| <b>2</b>     | <b>Compound Stress:</b> Two dimensional stress system: stress resultant, principal planes and principal stresses, state of pure shear maximum shear stress, Mohr's circle & its application. Introduction to theories of failures.                                                                                       | <b>8</b>    |
| <b>3</b>     | <b>Bending of Beams:</b> Bending moment, Shear force and Axial thrust diagrams for statically determinate beams subjected to various types of loads and moments, Point of Contraflexure, relation between load, SF and BM.                                                                                               | <b>8</b>    |
|              | <b>Theory of simple bending:</b> Distribution of bending and shear stresses for simple and composite sections, Combined direct and bending stress,                                                                                                                                                                       |             |
| <b>4</b>     | <b>Torsion:</b> Elementary concepts of torsion, shear stress in solid and hollow circular shafts, angle of twist, power transmitted by a shaft, combined bending and torsion;                                                                                                                                            | <b>8</b>    |
|              | <b>Columns:</b> Short and long columns, slenderness ratio, crushing and buckling of column, short column subjected to axial and eccentric loads; Euler's theory and its limitation, concept of effective length of columns; Rankine & Secant formulae, middle third rule, core of a section.                             |             |
| <b>5</b>     | <b>Deflection of Beams:</b> Differential relation between load, shear force, bending moment, slope deflection. Slope & deflection in determinate beams using double integration method, Macaulay's method, area moment method and conjugate beam method and their application to statically determinate prismatic beams. | <b>8</b>    |
| <b>TOTAL</b> |                                                                                                                                                                                                                                                                                                                          | <b>40</b>   |

**BT4CE05-CT05: HYDRAULICS ENGINEERING**

**Credit: 3**

**Max. Marks: 150 (IA:30, ETE:120)**

**3L+0T+0P**

**End Term Exam: 3 Hours**

| SN | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                            | Hrs. |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 1  | <b>Introduction:</b> to scope, objective and outcome of subject                                                                                                                                                                                                                                                                                                                                                     | 8    |
|    | <b>Dimensional Analysis &amp; Models:</b> Dynamical Similarity and Dimensional Homogeneity Model experiment, geometric, Kinematic and Dynamic similarity. Reynold's, froudes, Weber's, Euler and Mach numbers. Distorted river models and undistorted models, proper choice of scale ratios. Scale effect. Principle of dimensional analysis Rayleigh method, Buckingham theorem.                                   |      |
| 2  | <b>Turbulent flow</b> , Reynolds equations, Prandtl's mixing length theory, Equations of velocity distribution and friction coefficient<br><b>Boundary Layer Theory:</b> Concept of boundary layer, laminar and turbulent boundary layers, boundary layer thickness, von Karman integral equation, laminar sub-layer, hydrodynamically smooth and rough boundaries, separation of flow and its control, cavitation. | 8    |
| 3  | <b>Open channel Flow</b> Uniform, Non-Uniform and variable flow. Resistance equations of Chezy and Manning. Section factor for uniform flow. Most Efficient rectangular, triangular and trapezoidal sections. Velocity distribution in open channels.                                                                                                                                                               | 8    |
|    | <b>Gradually varied flow</b> in Prismatic channels. Specific energy of flow. Critical depth in prismatic channels. Alternate depths. Rapid, critical and sub critical Flow Mild, steep and Critical Slopes. Classification of surface curves in prismatic channels and elementary computation                                                                                                                       |      |
| 4  | <b>Rapidly varied flow:</b> Hydraulic jump or standing wave in rectangular channels. Conjugate or sequent depths Losses in jump, location of jump. velocity distribution in open channels. Energy correction factor. Moment correction factor                                                                                                                                                                       | 8    |
|    | <b>Impact of free Jets:</b> Impact of a jet on a flat or a curved vane, moving and stationary vane. <b>Introduction of Hydraulic machine</b> – Type of pumps and turbine and its brief description. Draft tube and its principle                                                                                                                                                                                    |      |
|    | <b>Hydrology:</b> Definition, Hydrologic cycle, Application to Engineering problems, measurement of rain fall, rain gauge, peak flow, flood frequency method, catchment area formulae, Flood hydrograph, Rainfall analysis, Infiltration, Run off, Unit hydrograph and its determination, Estimation of run off.                                                                                                    | 8    |
|    | <b>Ground Water:</b> Aquifers and its types, Confined and unconfined aquifer, Darcy's Law, hydraulic conductivity, transmissivity, well hydraulics.                                                                                                                                                                                                                                                                 |      |

|   |                                                                                                                                                                                                                                                                                                                  |           |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 5 | <b>Canal Hydraulics:</b> Types of canals, parts of canal irrigation system, channel alignment, assessment of water requirements, estimation of channel losses, design of channels, regime and semi theoretical approaches (Kennedy's Theory, Lacey's Theory), cross section of channels, silt control in canals. |           |
|   | <b>TOTAL</b>                                                                                                                                                                                                                                                                                                     | <b>40</b> |

## BT4CE06-CT06: BUILDING PLANNING

Credits: 2

Max. Marks: 100 (IA:20, ETE:80)

2L+0T+0P

End Term Exam: 2 Hours

| SN           | CONTENTS                                                                                                                                                                                                                                          | Hrs.      |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 1            | <b>Introduction:</b> to scope, objective and outcome of subject                                                                                                                                                                                   | 6         |
|              | <b>Introduction:</b> Types of buildings, criteria for location and site selection, site plan and its detail.                                                                                                                                      |           |
|              | <b>Sun Consideration :</b> Different methods of drawing sun chart, sun shading devices, design of louvers.                                                                                                                                        |           |
| 2            | <b>Climatic and comfort Consideration:</b> Elements of climate, global climate, climatic zones of India, thermal comfort, bi-climatic chart,                                                                                                      | 6         |
|              | <b>Orientation:</b> Meaning, factors affecting orientation, orientation criteria for tropical climate.                                                                                                                                            |           |
| 3            | <b>Building Bye Laws and NBC Regulations:</b> Objective of by-laws, regulation regarding; means of access, lines of building frontages, covered area, floor area ratio, open spaces around buildings, height & sizes of rooms, plinth regulation. | 6         |
|              | <b>Principles of Planning:</b> Different factors affecting planning viz-aspect, prospect, furniture requirement, roominess, grouping, circulation, elegance, privacy etc.                                                                         |           |
| 4            | <b>Vastu Shastra In Modern Building planning:</b> Factors considered in Vastu, site selection, orientation, planning and design of residential buildings, school/hospital                                                                         | 6         |
|              | <b>Functional Design And Accommodation Requirements Of Non Residential Buildings:</b> viz-school buildings, rest house, primary health centers, post office etc.                                                                                  |           |
| 5            | <b>Services in Buildings</b><br>(A) Lighting and ventilation, doors and windows, lifts.<br>(B) Acoustics, sound insulation and noise control.<br>(C) Fire fighting provisions                                                                     | 6         |
| <b>TOTAL</b> |                                                                                                                                                                                                                                                   | <b>30</b> |

## BT4CE07-CT07: CONCRETE TECHNOLOGY

**Credit: 3**

**Max. Marks: 150 (IA:30, ETE:120)**

**3L+0T+0P**

**End Term Exam: 3 Hours**

| SN       | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                             | Hrs.     |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>1</b> | <b>Introduction:</b> to objective, scope and outcome of the subject                                                                                                                                                                                                                                                                                                                                  | <b>8</b> |
|          | <b>Ingredients of concrete:</b> Cement: hydration of cement and its basic compounds, structure of hydrated cement, C-S-H gel, heat of hydration, gel-space ratio etc.                                                                                                                                                                                                                                |          |
|          | <b>Aggregates:</b> types, physical properties and standard methods for their determination, including Grading of aggregates as per IS. Manufactured sand- properties and IS Specifications for use in concrete.                                                                                                                                                                                      |          |
| <b>2</b> | <b>Concrete:</b> Grade of concrete, proportioning of ingredients, water content and its quality, water/cement ratio and its role, Properties of fresh concrete including workability, air content, Flow ability, Segregation, Bleeding and Viscosity etc. Factors affecting, methods of determination.                                                                                               | <b>8</b> |
|          | Properties of hardened concrete such as strengths, permeability, creep, shrinkage, factors influencing, Standard tests on fresh and hardened concrete as per IS code. Aggregate-cement interface, its effect on properties of concrete.                                                                                                                                                              |          |
|          | <b>NDT:</b> Introduction and their importance. Application & use of Rebound Hammer, Ultrasonic pulse velocity meter, Rebar & Cover meter, half-cell potential meter, corrosion resistivity meter, core sampling. Interpretation of their results,                                                                                                                                                    |          |
| <b>3</b> | <b>Concrete Handling in Field:</b> Batching, mixing, placing and transportation of concrete, equipments for material handling, various methods their suitability and precautions. Compaction of concrete: methods & equipments. Curing of concrete: various methods their suitability.                                                                                                               | <b>8</b> |
|          | Durability of concrete. Causes of deterioration, Carbonation, Tests for durability assessment                                                                                                                                                                                                                                                                                                        |          |
|          | <b>Admixture in concrete:</b> Chemical and mineral admixtures, their types and uses: accelerator, retarders, water-proofing, plasticisers, super plasticizers-types, their suitability. Fly ash-properties for use in concrete, specifications of flyash as per IS 3812, and effect on properties of concrete. GGBFS, Microsilica and metakaolin- propertie, specifications and utility in concrete. |          |
| <b>4</b> | Concrete mix design (IS method)- with and without water reducing admixtures                                                                                                                                                                                                                                                                                                                          | <b>8</b> |

|              |                                                                                                                                                                                                                                              |           |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|              | <b>Form work:</b> Requirements, their types. Typical formworks and shuttering/centering for Columns, beams, slabs, walls, etc. Slip and moving formwork.                                                                                     |           |
| <b>5</b>     | <b>Special types of concrete:</b> Sulphate resisting concrete, under water concreting, pumpable concrete: methods and issues in making, salient properties and applications.                                                                 | <b>8</b>  |
|              | Concretes with tailored properties- including high performance concrete, with specific properties in fresh and hardened states, self-compacting concrete-materials, mix proportioning, test methods, use and applications with case studies. |           |
| <b>TOTAL</b> |                                                                                                                                                                                                                                              | <b>40</b> |

## **BT4CE08-CP01: MATERIAL TESTING LAB**

**Credit: 01**

**Max. Marks: 50 (IA:20, ETE:30)**

**0L+0T+2P**

1. Tests on Mild steel and HYSD Bar –To determine compressive and tensile strength, yield strength, percentage elongation etc.
2. Tests on Cement and concrete cubes/ core to establish their strength
3. Hardness Test – Rockwell Hardness and Brinell Hardness
4. Impact Test – Izod and Charpy
5. Modulus of Rupture of Wooden Beam
6. Fatigue Test
7. Spring Test
8. Torsion Test

**BT4CE09-CP02: HYDRAULICS ENGINEERING LAB**

**Credit: 01**

**Max. Marks: 50 (IA:20, ETE:30)**

**0L+0T+2P**

1. To determine the minor losses.
2. To determine the friction factor.
3. To determine Cd of Broad crested weir.
4. To verify the momentum equation.
5. To determine the discharge of venturimeter.
6. To determine Manning's & Chezy's coefficient of roughness for the bed of a given Channel.
7. To study and plot characteristics curve of hydraulic jump.
8. To study velocity distribution in open channel flow.

## **BT4CE10-CP03: BUILDING DRAWING**

**Credit: 2**  
**0L+0T+3P**

**Max. Marks: 100 (IA:40, ETE: 60)**

- 1- To plan and draw working drawing of a Residential building with following detail.
  - (a) Site plan
  - (b) Foundation plan
  - (c) Plan
  - (d) Two sectional elevations
  - (e) Front elevation
  - (f) Furniture plan
  - (g) Water supply and sanitary plan
  - (h) Electric fitting plan
- 2- To design and draw a Primary Health Center
- 3- To design and draw a Primary School
- 4- To design and draw a Rest House
- 5- To design and draw a Post Office
- 6- To design and draw a Bank
- 7- To design and draw a College Library
- 8- To design and draw a Cinema Theatre

## **BT4CE11-CP04: ADVANCED SURVEYING LAB**

**Credit: 01**

**Max. Marks: 50 (IA:20, ETE:30)**

**0L+0T+2P**

1. To measure the horizontal and vertical angles by Theodolite.
2. To determine the Height of an object by trigonometric leveling (Instruments in same vertical plane).
3. To determine the Height of an object by trigonometric leveling (Instruments in different vertical planes).
4. Measurement of angles, length of survey line using Total Station, finding the coordinate of station
5. To measure and adjust the angles of a braced quadrilateral.
6. To prepare the map of given area by plane tabling.
7. Measurement of area of a traverse by Total Station

## **BT4CE12-CP05: CONCRETE LAB**

**Credit: 2**

**Max. Marks: 100 (IA: 40, ETE: 60)**

**0L+0T+3P**

1. To determine the fineness of Cement by Blaine's air permeability test.
2. To determine the flexural strength of Concrete.
3. To determine Soundness of cement by Le-chatelier apparatus.
4. To determine the specific gravity of fine aggregate (sand) by Pycnometer.
5. To determine the bulking of fine aggregate and to draw curve between water content and bulking.
6. Sieve analysis of coarse aggregates and fine aggregates.
7. To determine the workability of given concrete mix by slump test.
8. To determine the optimum dose of super plasticizers by Flow table test.
9. To design concrete mix of M-20 grade in accordance with I S 10262.
10. To design concrete mix of M-40 grade with super plasticizer in accordance with I S 10262.
11. To determine the Permeability of Concrete.
12. Study of Core cutter, UPV & Rebound Hammer equipment.

# **Mohan Lal Sukhadia University Udaipur**



## **B. Tech. Program** (Effective from session 2021-2022) (Effective from session 2022-2023)

I and II Semesters  
(Common to all branches of Engineering)

**Course structure and Syllabus**

**Teaching and Examination Scheme  
Common for all Engineering branches  
Semester I**

| SN           | Category | Course Code   | Course Title                         | Credit    |           |          |          | Contact Hours |           |          |           | Max. Marks |            |             |
|--------------|----------|---------------|--------------------------------------|-----------|-----------|----------|----------|---------------|-----------|----------|-----------|------------|------------|-------------|
|              |          |               |                                      | Total     | L         | T        | P        | Total         | L         | T        | P         | IA         | ETE        | Total       |
| 1            | BSC      | BT1FY01-CT01  | Engineering Mathematics-I            | 4         | 3         | 1        | 0        | 4             | 3         | 1        | -         | 40         | 160        | 200         |
| 2            | BSC      | BT1FY02-CT02/ | Engineering Physics/                 | 4         | 3         | 1        | 0        | 4             | 3         | 1        | -         | 40         | 160        | 200         |
|              |          | BT1FY03-CT03  | Engineering Chemistry                |           |           |          |          |               |           |          |           |            |            |             |
| 3            | HSMC     | BT1FY04-CT04/ | Communication Skills/                | 2         | 2         | 0        | 0        | 2             | 2         | -        | -         | 20         | 80         | 100         |
|              |          | BT1FY05-CT05  | Human Values                         |           |           |          |          |               |           |          |           |            |            |             |
| 4            | ESC      | BT1FY06-CT06/ | Programming for Problem Solving/     | 2         | 2         | 0        | 0        | 2             | 2         | -        | -         | 20         | 80         | 100         |
|              |          | BT1FY07-CT07  | Basic Mechanical Engineering         |           |           |          |          |               |           |          |           |            |            |             |
| 5            | ESC      | BT1FY08-CT08/ | Basic Electrical Engineering/        | 2         | 2         | 0        | 0        | 2             | 2         | -        | -         | 20         | 80         | 100         |
|              |          | BT1FY09-CT09  | Basic Civil Engineering              |           |           |          |          |               |           |          |           |            |            |             |
| 6            | BSC      | BT1FY10-CP01/ | Engineering Physics Lab/             | 1         | 0         | 0        | 1        | 2             | -         | -        | 2         | 20         | 30         | 50          |
|              |          | BT1FY11-CP02  | Engineering Chemistry Lab            |           |           |          |          |               |           |          |           |            |            |             |
| 7            | HSMC     | BT1FY12-CP03/ | Language Lab/                        | 1         | 0         | 0        | 1        | 2             | -         | -        | 2         | 20         | 30         | 50          |
|              |          | BT1FY13-CP04  | Human Values Activities and Sports   |           |           |          |          |               |           |          |           |            |            |             |
| 8            | ESC      | BT1FY14-CP05/ | Computer Programming Lab/            | 2         | 0         | 0        | 2        | 4             | -         | -        | 4         | 40         | 60         | 100         |
|              |          | BT1FY15-CP06  | Manufacturing Practices Workshop     |           |           |          |          |               |           |          |           |            |            |             |
| 9            | ESC      | BT1FY16-CP07/ | Basic Electrical Engineering Lab/    | 1         | 0         | 0        | 1        | 2             | -         | -        | 2         | 20         | 30         | 50          |
|              |          | BT1FY17-CP08  | Basic Civil Engineering Lab          |           |           |          |          |               |           |          |           |            |            |             |
| 10           | ESC      | BT1FY18-CP09  | Computer Aided Engineering Graphics/ | 2         | 0         | 0        | 2        | 4             | -         | -        | 4         | 40         | 60         | 100         |
|              |          | BT1FY19-CP10  | Computer Aided Machine Drawing       |           |           |          |          |               |           |          |           |            |            |             |
| <b>Total</b> |          |               |                                      | <b>21</b> | <b>12</b> | <b>2</b> | <b>7</b> | <b>28</b>     | <b>12</b> | <b>2</b> | <b>14</b> | <b>280</b> | <b>770</b> | <b>1050</b> |

L = Lecture, T = Tutorial, P = Practical, IA=Internal Assessment, ETE=End Term Exam

**Teaching and Examination Scheme  
Common for all Engineering branches**

**Semester II**

| SN           | Category | Course Code   | Course Title                         | Credit    |           |          |          | Contact Hours |           |          |           | Max. Marks |            |             |
|--------------|----------|---------------|--------------------------------------|-----------|-----------|----------|----------|---------------|-----------|----------|-----------|------------|------------|-------------|
|              |          |               |                                      | Total     | L         | T        | P        | Total         | L         | T        | P         | IA         | ETE        | Total       |
| 1            | BSC      | BT2FY01-CT01  | Engineering Mathematics-II           | 4         | 3         | 1        | 0        | 4             | 3         | 1        | -         | 40         | 160        | 200         |
| 2            | BSC      | BT2FY03-CT03  | Engineering Chemistry/               | 4         | 3         | 1        | 0        | 4             | 3         | 1        | -         | 40         | 160        | 200         |
|              |          | BT2FY02-CT02  | Engineering Physics                  |           |           |          |          |               |           |          |           |            |            |             |
| 3            | HSMC     | BT2FY05-CT05/ | Human Values/                        | 2         | 2         | 0        | 0        | 2             | 2         | -        | -         | 20         | 80         | 100         |
|              |          | BT2FY04-CT04  | Communication Skills                 |           |           |          |          |               |           |          |           |            |            |             |
| 4            | ESC      | BT2FY07-CT07/ | Basic Mechanical Engineering         | 2         | 2         | 0        | 0        | 2             | 2         | -        | -         | 20         | 80         | 100         |
|              |          | BT2FY06-CT06  | Programming for Problem Solving      |           |           |          |          |               |           |          |           |            |            |             |
| 5            | ESC      | BT2FY09-CT09  | Basic Civil Engineering              | 2         | 2         | 0        | 0        | 2             | 2         | -        | -         | 20         | 80         | 100         |
|              |          | BT2FY08-CT08  | Basic Electrical Engineering/        |           |           |          |          |               |           |          |           |            |            |             |
| 6            | BSC      | BT2FY11-CP02  | Engineering Chemistry Lab            | 1         | 0         | 0        | 1        | 2             | -         | -        | 2         | 20         | 30         | 50          |
|              |          | BT2FY10-CP01/ | Engineering Physics Lab/             |           |           |          |          |               |           |          |           |            |            |             |
| 7            | HSMC     | BT2FY13-CP04  | Human Values Activities and Sports   | 1         | 0         | 0        | 1        | 2             | -         | -        | 2         | 20         | 30         | 50          |
|              |          | BT2FY12-CP03/ | Language Lab/                        |           |           |          |          |               |           |          |           |            |            |             |
| 8            | ESC      | BT2FY15-CP06  | Manufacturing Practices Workshop     | 2         | 0         | 0        | 2        | 4             | -         | -        | 4         | 40         | 60         | 100         |
|              |          | BT2FY14-CP05/ | Computer Programming Lab/            |           |           |          |          |               |           |          |           |            |            |             |
| 9            | ESC      | BT2FY17-CP08  | Basic Civil Engineering Lab          | 1         | 0         | 0        | 1        | 2             | -         | -        | 2         | 20         | 30         | 50          |
|              |          | BT2FY16-CP07/ | Basic Electrical Engineering Lab/    |           |           |          |          |               |           |          |           |            |            |             |
| 10           | ESC      | BT2FY19-CP10  | Computer Aided Machine Drawing       | 2         | 0         | 0        | 2        | 4             | -         | -        | 4         | 40         | 60         | 100         |
|              |          | BT2FY18-CP09  | Computer Aided Engineering Graphics/ |           |           |          |          |               |           |          |           |            |            |             |
| <b>Total</b> |          |               |                                      | <b>21</b> | <b>12</b> | <b>2</b> | <b>7</b> | <b>28</b>     | <b>12</b> | <b>2</b> | <b>14</b> | <b>280</b> | <b>770</b> | <b>1050</b> |

**L = Lecture, T = Tutorial, P = Practical, IA=Internal Assessment, ETE=End Term Exam**

**SYLLABUS**  
**Semester I**  
**Common for all Engineering branches**

**BT1FY01-CT01: Engineering Mathematics-I**

**Credit: 4**  
**3L+1T+0P**

**Max. Marks: 200 (IA:40, ETE:160)**  
**End Term Exam: 3 Hours**

| SN           | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Hours     |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>1</b>     | <b>Calculus:</b><br>Improper integrals (Beta and Gamma functions) and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.                                                                                                                                                                                                                                                                                                                                                                   | 8         |
| <b>2</b>     | <b>Sequences and Series:</b><br>Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions.                                                                                                                                                                                                                                                                                                                                                           | 8         |
| <b>3</b>     | <b>Fourier Series:</b><br>Periodic functions, Fourier series, Euler's formula, Change of intervals, Half range sine and cosine series, Parseval's theorem.                                                                                                                                                                                                                                                                                                                                                                                         | 8         |
| <b>4</b>     | <b>Multivariable Calculus (Differentiation):</b><br>Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.                                                                                                                                                                                                                                                                          | 8         |
| <b>5</b>     | <b>Multivariable Calculus (Integration):</b><br>Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Centre of mass and Gravity (constant and variable densities); Triple integrals (Cartesian), Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes. | 8         |
| <b>TOTAL</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>40</b> |

**Suggested Readings:**

1. Thomas' Calculus, George B. Thomas, Jr., Maurice D. Weir, Joel R. Hass, Pearson Educations.
2. Calculus with Early Transcendental Functions, James Stewart, Cengage Learning Publication.
3. Engineering Mathematics, C.B. Gupta, S.R. Singh and Mukesh Kumar, McGraw Hill Education.
4. Engineering Mathematics, S. Pal and S.C. Bhunia, Oxford University Press.
5. Higher Engineering Mathematics, B.V. Ramana, McGraw Hill Education.
6. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley.

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY02-CT02/ BT2FY02-CT02: Engineering Physics**

**Credit: 4**  
**3L+1T+0P**

**Max. Marks: 200 (IA:40, ETE:160)**  
**End Term Exam: 3 Hours**

| SN           | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Hours     |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>1</b>     | <b>Wave Optics:</b><br>Newton's Rings, Michelson's Interferometer, Fraunhofer Diffraction from a Single Slit. Diffraction grating: Construction, theory and spectrum, Resolving power and Rayleigh criterion for limit of resolution, Resolving power of diffraction grating, X-Ray diffraction and Bragg's Law.                                                                                                                                                                                                                                                                                                                                                                                    | <b>8</b>  |
| <b>2</b>     | <b>Quantum Mechanics:</b><br>Introduction to quantum Mechanics, Wave-particle duality, Matter waves, Wave function and basic postulates, Time dependent and time independent Schrodinger's Wave Equation, Physical interpretation of wave function and its properties, Applications of the Schrodinger's Equation: Particle in one dimensional and three dimensional boxes.<br><b>Coherence and Optical Fibers:</b><br>Spatial and temporal coherence: Coherence length; Coherence time and „Q“ factor for light, Visibility as a measure of Coherence and spectral purity, Optical fiber as optical wave guide, Numerical aperture; Maximum angle of acceptance and applications of optical fiber. | <b>8</b>  |
| <b>3</b>     | <b>Laser:</b><br>Einstein's Theory of laser action; Einstein's coefficients; Properties of Laser beam, Amplification of light by population inversion, Components of laser, Construction and working of He-Ne and semiconductor lasers, Applications of Lasers in Science, engineering and medicine.                                                                                                                                                                                                                                                                                                                                                                                                | <b>8</b>  |
| <b>4</b>     | <b>Material Science &amp; Semiconductor Physics:</b><br>Bonding in solids: covalent and metallic bonding, Energy bands in solids: Classification of solids as Insulators, Semiconductors and Conductors, Intrinsic and extrinsic semiconductors, Fermi dirac distribution function and Fermi energy, Conductivity in semiconductors, Hall Effect: Theory, Hall Coefficient and applications.                                                                                                                                                                                                                                                                                                        | <b>8</b>  |
| <b>5</b>     | <b>Introduction to Electromagnetism:</b><br>Divergence and curl of electrostatic field, Laplace's and Poisson's equations for electrostatic potential, Bio-Savart law, Divergence and curl of static magnetic field, Faraday's law, Displacement current and magnetic field arising from time dependent electric field, Maxwell's equations, Flow of energy and Poynting vector.                                                                                                                                                                                                                                                                                                                    | <b>8</b>  |
| <b>TOTAL</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>40</b> |

**Suggested Readings:**

1. Engineering Physics: Malik and Singh (Tata McGraw Hill)
2. Engineering Physics: Naidu (Pearson)
3. Optics : Ajay Ghatak (Tata McGraw Hill)
4. Concept of Modern Physics: A. Baiser (Tata McGraw Hill)
5. Fundamental of Optics : Jetkins and White (Tata McGraw Hill)
6. Material Science: Smith (McGraw Hill)

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY03-CT03/ BT2FY03-CT03: Engineering Chemistry**

**Credit: 4**  
**3L+1T+0P**

**Max. Marks: 200 (IA:40, ETE:160)**  
**End Term Exam: 3 Hours**

| SN | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Hours |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1  | <p><b>Water:</b><br/>Common impurities, hardness, determination of hardness by complexometric (EDTA method), Degree of hardness, Units of hardness<br/>Municipal water supply: Requisite of drinking water, Purification of water; sedimentation, filtration, disinfection, breakpoint chlorination. Boiler troubles: Scale and Sludge formation, Internal treatment methods, Priming and Foaming, Boiler corrosion and Caustic embrittlement<br/>Water softening; Lime-Soda process, Zeolite (Permutit) process, Demineralization process.<br/>Numerical problems based on Hardness, EDTA, Lime-Soda and Zeolite process.</p>                                                                                                                                                                                                                                                               | 8     |
| 2  | <p><b>Organic Fuels:</b><br/>Solid fuels: Coal, Classification of Coal, Proximate and Ultimate analyses of coal and its significance, Gross and Net Calorific value, Determination of Calorific value of coal by Bomb Calorimeter. Metallurgical coke, Carbonization processes; Otto-Hoffmann by-product oven method.<br/>Liquid fuels : Advantages of liquid fuels, Mining, Refining and Composition of petroleum, Cracking, Synthetic petrol, Reforming, Knocking, Octane number, Anti-knocking agents, Cetane number Gaseous fuels; Advantages, manufacturing, composition and Calorific value of coal gas and oil gas, Determination of calorific value of gaseous fuels by Junker's calorimeter<br/>Numerical problems based on determination of calorific value (bomb calorimeter/Junker's calorimeter/Dulong's formula, proximate analysis &amp; ultimate and combustion of fuel.</p> | 8     |
| 3  | <p><b>Corrosion and its control:</b><br/>Definition and significance of corrosion, Mechanism of chemical (dry) and electrochemical (wet) corrosion, galvanic corrosion, concentration corrosion and pitting corrosion. Protection from corrosion; protective coatings-galvanization and tinning, cathodic protection, sacrificial anode and modifications in design.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 8     |
| 4  | <p><b>Engineering Materials:</b><br/>Portland Cement; Definition, Manufacturing by Rotary kiln. Chemistry of setting and hardening of cement. Role of Gypsum.<br/>Glass: Definition, Manufacturing by tank furnace, significance of</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 8     |

|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|              | annealing, Types and properties of soft glass, hard glass, borosilicate glass, glass wool, safety glass<br>Lubricants: Classification, Mechanism, Properties; Viscosity and viscosity index, flash and fire point, cloud and pour point.<br>Emulsification and steam emulsion number.                                                                                                                                                                                                                                           |           |
| 5            | Organic reaction mechanism and introduction of drugs:<br>Organic reaction mechanism: Substitution; SN1, SN2, Electrophilic aromatic substitution in benzene, free radical halogenations of alkanes, Elimination; elimination in alkyl halides, dehydration of alcohols, Addition: electrophilic and free radical addition in alkenes, nucleophilic addition in aldehyde and ketones, Rearrangement; Carbocation and free radical rearrangements<br>Drugs : Introduction, Synthesis, properties and uses of Aspirin, Paracetamol | 8         |
| <b>TOTAL</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>40</b> |

**Suggested Readings:**

1. Engineering Chemistry by Monica Jain and P C Jain, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
2. Engineering Chemistry Wiley, India.
3. The Chemistry and Technology of Coal, by J G Speigh, CRC Press.
4. The Chemistry and Technology of Petroleum, by J G Speigh, CRC Press.
5. Polymer Chemistry: An Introduction, Malcolm P. Stevens, Oxford University Press.
6. Lubricants and Lubrications, Theo Mang, Wilfeied, Wiley-VCH.
7. Chemistry of water treatment, Samuel Faust & Osman M Aly, CRC Press.
8. Boilers water treatment. Principles and Practice, Colin Frayne, CRC Press.
9. Corrosion Understanding the Basic, by Joseph R Davis, ASM International.
10. Engineering Chemistry, by O.G. Palanna, McGraw Hill Education, India.

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY04-CT04/ BT2FY04-CT04: Communication Skills**

**Credit: 2**  
**2L+0T+0P**

**Max. Marks: 100 (IA:20, ETE:80)**  
**End Term Exam: 2 Hours**

| SN           | CONTENTS                                                                                                                                                                                                                                                                                                                                                                  | Hours     |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>1</b>     | <b>Communication:</b><br>Meaning, Importance and Cycle of Communication. Media and Types of Communication. Verbal and Non-Verbal Communication. Barriers to communication. Formal and Informal Channels of Communication (Corporate Communication). Divisions of Human Communication and Methods to improve Interpersonal Communication. Qualities of good communication. | <b>5</b>  |
| <b>2</b>     | <b>Grammar:</b><br>Passive Voice. Reported Speech. Conditional Sentences. Modal Verbs. Linking Words (Conjunctions)                                                                                                                                                                                                                                                       | <b>5</b>  |
| <b>3</b>     | <b>Composition:</b><br>Job Application and Curriculum-Vitae Writing. Business Letter Writing. Paragraph Writing. Report Writing.                                                                                                                                                                                                                                          | <b>5</b>  |
| <b>4</b>     | <b>Short Stories:</b><br>“Luncheon” by Somerset Maugham. “How Much Land Does a Man Need?” by Count Leo Tolstoy. “The Night Train at Deoli” by Ruskin Bond.                                                                                                                                                                                                                | <b>5</b>  |
| <b>5</b>     | <b>Poems:</b><br>“No Men are Foreign” by James Kirkup. “If” by Rudyard Kipling. “Where the Mind is without Fear” by Rabindranath Tagore.                                                                                                                                                                                                                                  | <b>5</b>  |
| <b>TOTAL</b> |                                                                                                                                                                                                                                                                                                                                                                           | <b>25</b> |

**Suggested Readings:**

1. Communication Skills, Pushplata & Sanjay Kumar, Oxford University Press, India.
2. The Written Word, Vandana Singh, Oxford University Press, India.
3. Current English Grammar and Usage with Composition, R. P. Sinha, Oxford University Press, India.
4. Rodrigues M. V., ‘Effective Business Communication’, Concept Publishing Company, New Delhi, 1992 reprint (2000).
5. Bansal, R K and Harrison J B, ‘Spoken English’ Orient Longman, Hyderabad.
6. Binod Mishra & Sangeeta Sharma, ‘Communication Skills for Engineers and Scientists, PHI Learning Private Ltd, New Delhi, 2011.
7. Gartside L. ‘Modern Business Correspondence, Pitman Publishing, London.

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY05-CT05/ BT2FY05-CT05: Human Values**

**Credit: 2**  
**2L+0T+0P**

**Max. Marks: 100 (IA:20, ETE:80)**  
**End Term Exam: 2 Hours**

| SN       | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Hours    |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>1</b> | <p><b>Course Introduction - Need, Basic Guidelines, Content and Process for Value Education</b></p> <p>Understanding the need, basic guidelines, Self Exploration - its content and process; „Natural Acceptance” and Experiential Validation, Continuous Happiness and Prosperity- Human Aspirations, Right understanding, Relationship and Physical Facilities, Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario.</p> <p>Method to fulfill the above human aspirations: understanding and living in harmony at various levels</p>                                                                                                                                                                              | <b>5</b> |
| <b>2</b> | <p><b>Understanding Harmony in the Human Being - Harmony in Myself</b></p> <p>Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’</p> <p>Understanding the needs of Self (‘I’) and ‘Body’ - Sukh and Suvidha</p> <p>Understanding the Body as an instrument of ‘I’, Understanding the characteristics and activities of ‘I’ and harmony in ‘I’ Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya.</p>                                                                                                                                                                                        | <b>5</b> |
| <b>3</b> | <p><b>Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship</b></p> <p>Understanding harmony in the Family, Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) , meaning of Vishwas; Difference between intention and competence, meaning of Samman, Difference between respect and differentiation;</p> <p>the other salient values in relationship, harmony in the society , Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals ,Visualizing a universal harmonious order in society- Undivided Society (AkhandSamaj), Universal Order (SarvabhaumVyawastha )- from family to world family.</p> | <b>5</b> |

|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 4            | <p><b>Understanding Harmony in the Nature and Existence - Whole existence as Coexistence</b></p> <p>Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all pervasive Space.</p> <p>Holistic perception of harmony at all levels of existence</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5         |
| 5            | <p><b>Implications of the above Holistic Understanding of Harmony on Professional Ethics. Natural acceptance of human values</b></p> <p>Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in Professional Ethics: a) Ability to utilize the professional competence for augmenting universal human order, (b) Ability to identify the scope and characteristics of people-friendly and eco- friendly production systems, technologies and management models. Strategy for transition from the present state to Universal Human Order: (a). At the level of individual: as socially and ecologically responsible engineers, technologists and managers. (b). At the level of society: as mutually enriching institutions and organization.</p> <p>Case studies related to values in professional life and individual life.</p> | 5         |
| <b>TOTAL</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>25</b> |

**Suggested Readings:**

1. R R Gaur, R Sangal, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, Excel Books, 2009. ISBN: 978-9-350-62091-5
2. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA
3. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
4. R. Subramanian, Professional Ethics includes Human Values, Oxford Univ. Press.
5. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
6. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome’s report, Universe Books.
7. A Nagaraj, 1998, Jeevan Vidya Ek Parichay, Divya Path Sansthan, Amarkantak.
8. P L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
9. A N Tripathy, 2003, Human Values, New Age International Publishers.
10. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
11. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers , Oxford University Press
12. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
13. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books.
14. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.

**Semester I**  
**Common for all Engineering branches**

**BT1FY06-CT06/ BT2FY06-CT06: Programming for Problem Solving**

**Credit: 2**  
**2L+0T+0P**

**Max. Marks: 100 (IA:20, ETE:80)**  
**End Term Exam: 2 Hours**

| <b>SN</b>    | <b>CONTENTS</b>                                                                                                                                                                                                                                                                                                                         | <b>Hours</b> |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>1</b>     | <b>Fundamentals of Computer:</b><br>Stored program architecture of computers, Storage device- Primary memory, and Secondary storage, Random, Direct, Sequential access methods, Concepts of High-level, Assembly and Low-level languages.                                                                                               | <b>6</b>     |
| <b>2</b>     | <b>Number system:</b><br>Data representations, Concepts of radix and representation of numbers in radix r with special cases of r=2, 8, 10 and 16 with conversion from radix r1 to r2, r's and (r-1)'s complement, Binary addition, Binary subtraction, Representation of alphabets.                                                    | <b>6</b>     |
| <b>3</b>     | <b>Algorithms Statements:</b><br>Representing algorithms through flowchart and pseudo code. Three construct of Algorithm and flowchart: Sequence, Decision (Selection) and Repetition.                                                                                                                                                  | <b>6</b>     |
| <b>4</b>     | <b>Fundamental of C programming:</b><br>Character Set, Identifiers and keywords, Data types, Constants, Variables, input output statements, developing simple C programs, If statement, for loops, while loops, do-while loops, switch statement, break statement, continue statement, development of C programs using above statements | <b>6</b>     |
| <b>5</b>     | <b>Functions and file handling Programming:</b><br>Arrays, functions, parameter passing, recursion, Programming in C using these statements, Structures, files, pointers and multi file handling.                                                                                                                                       | <b>6</b>     |
| <b>TOTAL</b> |                                                                                                                                                                                                                                                                                                                                         | <b>30</b>    |

**Suggested Readings:**

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY07-CT07/ BT2FY07-CT07: Basic Mechanical Engineering**

**Credit: 2**  
**2L+0T+0P**

**Max. Marks: 100 (IA:20, ETE:80)**

**End Term Exam: 2 Hours**

| SN           | CONTENTS                                                                                                                                                                                                                                                                                                               | Hours     |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>1</b>     | <b>Fundamentals:</b><br>Introduction to mechanical engineering, concepts of thermal engineering. Steam Boilers classification and types of steam boilers and steam turbines. Introduction and Classification of power plants.                                                                                          | <b>6</b>  |
| <b>2</b>     | <b>Pumps and IC Engines:</b><br>Applications and working of Reciprocating and Centrifugal pumps. Introduction, Classification of IC Engines, Main Components of IC Engines, Working of IC Engines and its components.                                                                                                  | <b>6</b>  |
| <b>3</b>     | <b>Refrigeration and Air Conditioning:</b><br>Introduction, classification and types of refrigeration systems and air-conditioning. Applications of refrigeration and Air-conditioning.                                                                                                                                | <b>6</b>  |
| <b>4</b>     | <b>(a) Transmission of Power:</b><br>Introduction and types of Belt and Rope Drives, Gears.<br><b>(b) Engineering Materials and Heat Treatment of Steel:</b><br>Introduction to various engineering materials and their properties.                                                                                    | <b>6</b>  |
| <b>5</b>     | <b>Primary Manufacturing Processes:</b><br>Metal Casting Process: Introduction to Casting Process, Patterns, Molding, Furnaces. Metal Forming Processes: Introduction to Forging, Rolling, Extrusion, Drawing. Metal Joining Processes: Introduction to various types of Welding, Gas Cutting, Brazing, and Soldering. | <b>6</b>  |
| <b>Total</b> |                                                                                                                                                                                                                                                                                                                        | <b>30</b> |

**Suggested Readings:**

1. G. Shanmugam and S Ravindran, Basic Mechanical Engineering, Mc Graw hill, fourth edition.
2. K Venu Gopal and Prabhu Raja V, Basic Mechanical Engineering, Anuradha agencies pub, Chennai.

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY08-CT08/ BT2FY08-CT08: Basic Electrical Engineering**

**Credit: 2**  
**2L+0T+0P**

**Max. Marks: 100 (IA:20, ETE:80)**  
**End Term Exam: 2 Hours**

| SN           | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                         | Hours     |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>1</b>     | <b>DC Circuits:</b><br>Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, Series-Parallel circuits, Node voltage method, Mesh current method, Superposition, Thevenin's, Norton's and Maximum power transfer theorems.                                                                                                                                                    | <b>6</b>  |
| <b>2</b>     | <b>AC Circuits:</b><br>Representation of sinusoidal waveforms, peak and r.m.s values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase AC circuits consisting of R, L, C, RL, RC and RLC combinations, resonance. Three phase balanced circuits, voltage and current relations in star and delta connections.                                                           | <b>6</b>  |
| <b>3</b>     | <b>Transformers:</b><br>Ideal and practical transformer, EMF equation, equivalent circuit, losses in transformers, regulation and efficiency.<br><b>DC machine:</b> Construction, working and types of Generator and motor, EMF equation, torque and speed equation                                                                                                                                                              | <b>6</b>  |
| <b>4</b>     | <b>Electrical Machines:</b><br>Generation of rotating magnetic fields, Construction and working of a three-phase induction motor. Starting and speed control of induction motor.<br>Working Principle and types of single-phase induction motor.<br>Construction and working of synchronous generators.                                                                                                                          | <b>6</b>  |
| <b>5</b>     | <b>Power Converters:</b><br>Semiconductor PN junction diode and transistor (BJT). Characteristics of SCR, power transistor and IGBT. Basic circuits of single phase rectifier with R load, Single phase Inverter, DC-DC converter.<br><b>Electrical Installations:</b><br>Layout of LT switchgear: Switch fuse unit (SFU), MCB, ELCB, MCCB, Type of earthing. Power measurement, elementary calculations for energy consumption. | <b>6</b>  |
| <b>TOTAL</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>30</b> |

**Suggested Readings:**

- 1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.**
- 2. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.**
3. L.S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
4. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
5. V.D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.
6. Basic Electrical and Electronics Engineering by Sukhija and Nagsarkar, Oxford Publication

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY09-CT09/ BT2FY09-CT09: Basic Civil Engineering**

**Credit: 2**  
**2L+0T+0P**

**Max. Marks: 100 (IA:20, ETE:80)**  
**End Term Exam: 2 Hours**

| SN       | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Hours     |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>1</b> | <b>Introduction:</b><br><b>Introduction to objective, scope and outcome the subject</b><br>Scope and Specialization of Civil Engineering, Role of civil Engineer in Society, Impact of infrastructural development on economy of country.                                                                                                                                                                                                                                                                                                                                                           | <b>6</b>  |
| <b>2</b> | <b>Buildings:</b><br>Selection of site for Buildings, Layout of Building Plan, Types of buildings, Plinth area, carpet area, floor space index, Introduction to building byelaws, concept of sun light and ventilation. Components of Buildings & their functions, Introduction to types of foundation                                                                                                                                                                                                                                                                                              | <b>6</b>  |
| <b>3</b> | <b>Surveying:</b><br>Object Principles & Types of Surveying; Site Plans, Plans & Maps; Scales & Unit of different Measurements.<br>Linear Measurements: Instruments used. Linear Measurement by Tape, Ranging out Survey Lines and overcoming Obstructions;<br>Angular Measurements: Instruments used; Introduction to Compass Surveying, Bearings and Longitude & Latitude of a Line, Introduction to total station.                                                                                                                                                                               | <b>6</b>  |
| <b>4</b> | <b>Transportation:</b><br>Introduction to Transportation Engineering; Traffic and Road Safety: Types and Characteristics of Various Modes of Transportation; Various Road Traffic Signs, Causes of Accidents and Road Safety Measures.                                                                                                                                                                                                                                                                                                                                                              | <b>6</b>  |
| <b>5</b> | <b>Environmental Engineering:</b><br>Environmental Pollution, Environmental Acts and Regulations, Functional Concepts of Ecology, Basics of Species, Biodiversity, Ecosystem, Hydrological Cycle; Energy Flow in Eco-systems.<br>Water Pollution: Introduction to Treatment & Disposal of Waste Water.<br>Solid Waste Management: Classification of Solid Waste and Disposal of Solid.<br>Air & Noise Pollution: Primary and Secondary air pollutants, Harmful effects of Air Pollution, Control of Air Pollution. Noise Pollution, Harmful Effects of noise pollution, control of noise pollution. | <b>6</b>  |
|          | <b>TOTAL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>30</b> |

**Suggested Readings:**

1. Palancharny, Basic Civil Engineering, McGraw Hill publishers.
2. Satheesh Gopi, Basic Civil Engineering, Pearson Publishers.
3. Ketki Ranwala Dalal, Essentials of Civil Engineering, Charotar Publishing House.
4. Basic Environmental Engineering by Prof. R.C. Gaur, New Age International Publication.

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY10-CP01/ BT2FY10-CP01: Engineering Physics Lab**

**Credit: 1**  
**0L+0T+2P**

**Max. Marks: 50 (ETE:30, IA:20)**

1. To determine the wave length of monochromatic light with the help of Michelson's interferometer.
2. To determine the wave length of sodium light by Newton's Ring.
3. To determine the wave length of prominent lines of mercury by plane diffraction grating with the help of spectrometer.
4. Determination of band gap using a P-N junction diode.
5. To determine the height of given object with the help of sextant.
6. To determine the dispersive power of material of a prism with the help of spectrometer.
7. To study the charge and discharge of a condenser and hence determine the same constant (both current and voltage graphs are to be plotted).
8. To determine the coherence length and coherence time of laser using He – Ne laser.
9. To measure the numerical aperture of an optical fibre.
10. To study the Hall Effect and determine the Hall Voltage and Hall coefficients.

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY11-CP02/ BT2FY11-CP02: Engineering Chemistry Lab**

**Credit: 1**  
**0L+0T+2P**

**Max. Marks: 50 (ETE:30, IA:20)**

1. Determination the hardness of water by EDTA method
2. Determination of residual chlorine in water
3. Determination of dissolved oxygen in water
4. Determination of the strength of Ferrous Ammonium sulphate solution with the help of  $K_2Cr_2O_7$  solution by using diphenyl amine indicator
5. Determination of the strength of  $CuSO_4$  solution iodometrically by using hypo solution
6. Determination of the strength of  $NaOH$  and  $Na_2CO_3$  in a given alkali mixture
7. Proximate analysis of Coal
8. Determination of the flash & fire point and cloud & pour point of lubricating oil
9. Determination of the kinematic viscosity of lubricating oil by Redwood viscometer no. 1 at different temperature
10. Synthesis of Aspirin/ Paracetamol

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY12-CP03/ BT2FY12-CP03: Language Lab**

**Credit: 1**  
**0L+0T+2P**

**Max. Marks: 50 (ETE:30, IA:20)**

1. Phonetic Symbols and Transcriptions.
2. Extempore.
3. Group Discussion.
4. Dialogue Writing.
5. Listening comprehension.

**Suggested Readings:**

1. Technical Communication: principles and Practice, Meenakshi Raman & Sangeeta Sharma, Oxford University Press, India.
2. Effective Technical Communication, Barun K. Mitra, Oxford University Press, India.
3. Binod Mishra & Sangeeta Sharma, 'Communication Skills for Engineers and Scientists, PHI Learning Private Ltd, New Delhi, 2011.
4. Communication Skills, Pushplata & Sanjay Kumar, Oxford University Press, India.
5. Bhattacharya, Indrajit, An Approach to Communication Skills, Dhanpat Rai & Co. (Pvt) Ltd., New Delhi.
6. Wright, Crissy, Handbook of Practical Communication Skills, Jaico Publishing House, Mumbai.
7. Gimson, A C, 'An Introduction to the Pronunciation of English', ELBS.

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY13-CP04/ BT2FY13-CP04: Human Values Activities and Sports**

**Credit: 1**  
**0L+0T+2P**

**Max. Marks: 50 (ETE:30, IA:20)**

**PS 1:**

Introduce yourself in detail. What are the goals in your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your salient achievements and shortcomings in your life? Observe and analyze them.

**PS 2:**

Now-a-days, there is a lot of talk about many techno-genic maladies such as energy and material resource depletion, environmental pollution, global warming, ozone depletion, deforestation, soil degradation, etc. - all these seem to be manmade problems, threatening the survival of life Earth - What is the root cause of these maladies & what is the way out in opinion?

On the other hand, there is rapidly growing danger because of nuclear proliferation, arms race, terrorism, breakdown of relationships, generation gap, depression & suicidal attempts etc. - what do you think, is the root cause of these threats to human happiness and peace - what could be the way out in your opinion?

**PS 3:**

1. Observe that each of us has the faculty of „Natural Acceptance“, based on which one can verify what is right or not right for him. (As such we are not properly trained to listen to our „Natural Acceptance“ and may a time it is also clouded by our strong per-conditioning and sensory attractions).

Explore the following:

- (i) What is „Naturally Acceptable“ to you in relationship the feeling of respect or disrespect for yourself and for others?
  - (ii) What is „naturally Acceptable“ to you - to nurture or to exploit others? Is your living in accordance with your natural acceptance or different from it?
2. Out of the three basic requirements for fulfillment of your aspirations - right understanding, relationship and physical facilities - observe how the problems in your family are related to each. Also observe how much time & effort you devote for each in your daily routine.

**PS 4:**

1. a. Observe that any physical facility you use, follows the given sequence with time:  
Necessary and tasteful - unnecessary but still tasteful - unnecessary and tasteless - intolerable  
b. In contrast, observe that any feeling in you is either naturally acceptable or not acceptable at all. If not acceptable, you want it continuously and if not acceptable, you do not want it any moment!
2. List down all your important activities. Observe whether the activity is of „I“ or of Body or with the participation of both or with the participation of both „I“ and Body.
3. Observe the activities within „I“. Identify the object of your attention for different

moments (over a period of say 5 to 10 minutes) and draw a line diagram connecting these points. Try to observe the link between any two nodes.

**PS 5:**

1. Write a narration in the form of a story, poem, skit or essay to clarify a salient Human Value to the children.
2. Recollect and narrate an incident in your life where you were able to exhibit willful adherence to values in a difficult situation.

**PS 6:**

List down some common units (things) of Nature which you come across in your daily life and classify them in the four orders of Nature. Analyse and explain the aspect of mutual fulfillment of each unit with other orders.

**PS 7:**

Identify any two important problems being faced by the society today and analyze the root cause of these problems. Can these be solved on the basis of natural acceptance of human values? If so, how should one proceed in this direction from the present situation?

**PS 8:**

1. Suggest ways in which you can use your knowledge of Science/Technology/Management etc. for moving towards a universal human order.
2. Propose a broad outline for humanistic Constitution at the level of Nation.

**Project:**

**Every student required to take-up a social project e.g. educating children in needy/weaker section; services in hospitals, NGO's and other such work i.e. social work at villages adopted by respective institute/ college.**

**Sports:**

- a) Planning in Sports,
- b) Sports & Nutrition
- c) Yoga and Lifestyle
- d) Measures Physical Education & Sports for CWSN (Children with Special needs - Divyang)
- e) Children & Sports
- f) Women & Sports
- g) Test & Measurement in Sports
- h) Physiology & Sports
- i) Sports Medicine
- j) Kinesiology, Biomechanics & Sports
- k) Psychology & Sports
- l) Training in Sports

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY14-CP05/ BT2FY14-CP05: Computer Programming Lab**

**Credit: 2**  
**0L+0T+3P**

**Max. Marks: 100 (ETE:60, IA:40)**

1. To learn about the C Library, Preprocessor directive, Input-output statement.
2. Programs to learn data type, variables, If-else statement
3. Programs to understand nested if-else statement and switch statement
4. Programs to learn iterative statements like while and do-while loops
5. Programs to understand for loops for iterative statements
6. Programs to learn about array and string operations
7. Programs to understand sorting and searching using array
8. Programs to learn functions and recursive functions
9. Programs to understand Structure and Union operation
10. Programs to learn Pointer operations
11. Programs to understand File handling operations
12. Programs to input data through Command line argument

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY15-CP06/ BT1FY15-CP06: Manufacturing Practices Workshop**

**Credit: 2**  
**0L+0T+3P**

**Max. Marks: 100 (ETE:60, IA:40)**

**Carpentry Shop**

1. T – Lap joint
2. Bridle joint

**Welding Shop**

3. Lap joint by gas welding
4. Butt joint by arc welding
5. Lap joint by arc welding
6. Demonstration of brazing, soldering & gas cutting

**Machine Shop Practice**

7. Job on lathe with one step turning and chamfering operations

**Fitting and Sheet Metal Shop**

8. Finishing of two sides of a square piece by filing
9. Making mechanical joint and soldering of joint on sheet metal
10. To cut a square notch using hacksaw and to drill a hole and tapping

**Suggested Readings:**

1. Elements of Workshop Technology Hajra & Choudhary, Media Promoters & Publisher.
2. Workshop Practice HS Bawa, Tata McGraw Hill 2nd ed. India.
3. Mechanical Workshop Practice, K.C. John, PHI Learning New Delhi.
4. Workshop Technology, W.A.J.Chapman, CBS Publisher & Distributor New Delhi.

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY16-CP07/ BT2FY16-CP07: Basic Electrical Engineering Lab**

**Credit: 1**  
**0L+0T+2P**

**Max. Marks: 50 (ETE:30, IA:20)**

1. Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
2. To understand Series & Parallel circuit
3. To verify Mesh Analysis and to verify Nodal Analysis
4. To verify Superposition, Thevenin's, Norton's Theorem
5. To analyse the phase relationships for Series RL AC Circuit
6. To analyse phase relationships for Series RC AC Circuit
7. To understand series RLC resonant Circuit
8. Transformers: Observation of the no-load current waveform on an oscilloscope. Loading of a transformer: measurement of primary and secondary voltages and currents, and power.
9. Demonstration of cut-out sections of machines: dc machine (commutator- brush arrangement),
10. Demonstration of cut-out sections of induction machine (squirrel cage rotor).
11. Demonstration of cut-out sections of synchronous machine (field winding - slip ring arrangement).
12. Demonstration of cut-out sections of single-phase induction machine.
13. Demonstration of (a) dc-dc converters (b) dc-ac converters – PWM waveform (c) the use of dc-ac converter for speed control of an induction motor and (d) Components of LT switchgear.

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY17-CP08/ BT2FY17-CP08: Basic Civil Engineering Lab**

**Credit: 1**  
**0L+0T+2P**

**Max. Marks: 50 (ETE:30, IA:20)**

1. Linear Measurement by Tape:
  - a) Ranging and Fixing of Survey Station along straight line and across obstacles.
  - b) Laying perpendicular offset along the surveyline
2. Compass Survey: Measurement of bearing of lines using Surveyor's and Prismatic compass
3. Levelling: Using Tilting/ Dumpy/ Automatic Level
  - a) To determine the reduced levels in closed circuit.
  - b) To carry out profile levelling and plot longitudinal and cross sections for road by Height of Instrument and Rise & Fall Method.
4. To study and take measurements using various electronic surveying instruments like EDM, Total Station etc.
5. To determine pH, hardness and turbidity of the given sample of water.
6. To study various water supply Fittings.
7. To determine the pH and total solids of the given sample of sewage.

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY18-CP09/ BT2FY18-CP09: Computer Aided Engineering Graphics**

**Credit: 2**  
**0L+0T+3P**

**Max. Marks: 100 (ETE:60, IA:40)**

**Introduction:** Principles of drawing, lines, type of lines, usage of Drawing instruments, lettering, Conic sections including parabola, hyperbola, Rectangular Hyperbola (General method only); Scales- Plain, Diagonal and Vernier Scales.

**Projections of Point & Lines:** Position of Point, Notation System, Systematic Approach for projections of points, front view & Top view of point, Position of straight lines, line parallel to Both the RPs, Line perpendicular to either of the RPs, Line inclined to one RP and parallel to the other, Line inclined to Both the RPs, Traces of a line (One drawing sheet, one assignment in sketch book).

**Projection of Planes:** Positions of planes, Terms used in projections of planes, plane parallel to RP, plane inclined to one RP and perpendicular to the other RP, plane perpendicular to Both the RPs, plane Inclined to Both the RPs, True shape of the plane, Distance of a point from plane, Angle between two planes.

**Projections of Regular Solids:** frustum and truncated solids, those inclined to both the Planes- Auxiliary Views.

**Section of Solids:** Theory of sectioning, section of prisms and cubes, section of pyramids and Tetrahedron section of Cylinders, section of cones, section of spheres (One drawing sheet, one assignment in sketch book)

**Overview of Computer Graphics :** Covering theory of CAD software [such as: The menu System, Toolbars (standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.: Isometric Views of lines, Planes, Simple and compound Solids.

**Suggested Readings:**

1. Engineering Drawing Geometrical Drawing P.S.Gill , S.K.Katara & Sons
2. Engineering Drawing,Dhanarajay A Jolhe ,Tata McGraw Hill.
3. Engineering Drawing, Basant Agarwal & CM Agarwal ,Tata McGraw Hill
4. Engineering Drawing, N.D.Bhatt, Charotar Publishing House Pvt. Ltd.
5. Engineering Drawing with an introduction to AutoCAD, Dhananjay A Jolhe
6. Engineering Drawing with AutoCAD, B.V.R. Gupta and M. Rajaroy
7. AutoCAD 2017 for Engineers & Designers (Basic and Intermediate), Sham Tickoo,

**Semester I & II**  
**Common for all Engineering branches**

**BT1FY19-CP10/ BT1FY19-CP10: Computer Aided Machine Drawing**

**Credit: 1**  
**0L+0T+3P**

**Max. Marks: 75 (IA:45, ETE:30)**

**Introduction:** Principles of drawing, conventional representation of machine components and materials, lines, types of lines, dimensioning types, rules of dimensioning.

**Conversion of pictorial views into orthographic views:** (1 drawing sheet) Introduction to orthographic projection, concept of first angle and third angle projection, drawing of simple machine elements in first angle projection, missing view problems covering Principles of Orthographic Projections.

**Sectional views of mechanical components:** (1 drawing sheet) Introduction, cutting plane line, type of sectional views-full section, half section, partial or broken section, revolved section, removed section, offset section, sectioning conventions-spokes, web rib, shaft, pipes, different types of holes, conventions of section lines for different metals and materials.

**Fasteners and other mechanical components:** (Free hand sketch) Temporary and permanent fasteners, thread nomenclature and forms, thread series, designation, representation of threads, bolted joints, locking arrangement of nuts, screws, washers, foundation bolts etc., keys, types of keys, cotter and knuckle joints. Riveted joints, rivets and riveting, type of rivets, types of riveted joints etc. Bearing: Ball, roller, needle, foot step bearing. Coupling: Protected type, flange, and pin type flexible coupling. Other components: Welded joints, belts and pulleys, pipes and pipe joints, valves etc.

**Overview of Computer Graphics:** (2 drawing sheets) Covering theory of CAD software such as: The menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), Command Line (Where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.: Isometric Views of Lines, Planes, Simple and compound Solids.

**Suggested Readings:**

1. Laxminarayan and M.L. Mathur, Machine Drawing, Jain Brothers
2. Gill P S, Machine Drawing, Kataria & Sons 2009
3. Basudeb Bhattacharya, Machine Drawing, Oxford University Press 2011
4. Dhawan, R.K., A Text Book of Machine Drawing, S. Chand & Company, 1996
5. Ostrowsky, O., Engineering Drawing with CAD Applications, ELBS, 1995
6. Siddeshwar N., P Kannaiah, VVS Shastry, Machine Drawing, Tata McGraw Hill

**Semester II**  
**Common for all Engineering branches**

**BT2FY01-CT01 : Engineering Mathematics-II**

**Credit: 4**  
**3L+1T+0P**

**Max. Marks: 200 (IA:40, ETE:160)**

**End Term Exam: 3 Hours**

| SN           | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Hours     |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>1</b>     | <b>Matrices:</b><br>Rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.                                                                                                                                                                                                                                                                 | <b>8</b>  |
| <b>2</b>     | <b>First order ordinary differential equations:</b><br>Linear and Bernoulli's equations, Exact equations, Equations not of first degree: equations solvable for $p$ , equations solvable for $y$ , equations solvable for $x$ and Clairaut's type.                                                                                                                                                                                                                                                                            | <b>8</b>  |
| <b>3</b>     | <b>Ordinary differential equations of higher orders:</b><br>Linear Differential Equations of Higher order with constant coefficients, Simultaneous Linear Differential Equations, Second order linear differential equations with variable coefficients: Homogenous and Exact forms, one part of CF is known, Change of dependent and independent variables, method of variation of parameters, Cauchy- Euler equation;<br>Power series solutions including Legendre differential equation and Bessel differential equations. | <b>8</b>  |
| <b>4</b>     | <b>Partial Differential Equations – First order:</b><br>Order and Degree, Formation; Linear Partial differential equations of First order, Lagrange's Form, Non Linear Partial Differential equations of first order, Charpit's method, Standard forms.                                                                                                                                                                                                                                                                       | <b>8</b>  |
| <b>5</b>     | <b>Partial Differential Equations– Higher order:</b><br>Classification of Second order partial differential equations, Separation of variables method to simple problems in Cartesian coordinates including two dimensional Laplace, one dimensional Heat and one dimensional Wave equations.                                                                                                                                                                                                                                 | <b>8</b>  |
| <b>TOTAL</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>40</b> |

**Suggested Readings:**

1. Advanced Engineering Mathematics, Peter O Neil, Cengage Learning Publication.
2. Advanced Engineering Mathematics, 4th Edition, Dennis G. Zill, Warren S. Wright, Jones & Bartlett Publications.
3. Engineering Mathematics, S. Pal and S.C. Bhunia, Oxford University Press.
4. Engineering Mathematics, C.B. Gupta, S.R. Singh and Mukesh Kumar, McGrawHill Education.
5. Advanced Engineering Mathematics, Jain and Iyengar, Narosa Publications.
6. Higher Engineering Mathematics, B.V. Ramana, McGraw Hill Education.
7. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley.