

B.A (Three Year Degree Program)	
Sixth Semester	
Subject- Geography	
Code of the Course	GEG7102T
Title of the Course	REGIONAL DEVELOPMENT IN INDIA
Qualification Level of the Course	5.5
Credit of the Course	4
Type of the Course	DSE
Delivery type of the Course	L
Prerequisites	Understanding of the geographical concepts of Senior Secondary level.
Co-requisites	None
Objectives of the Course	<ul style="list-style-type: none"> • To understand the concept of Region, Development and Regional Planning. • To familiarize the students with theories and models for Regional Planning. • To develop understanding about concept of Development, Sustainable Development and different programmes and policies in India
Learning Outcomes	<p>After studying, students will be able to:</p> <ul style="list-style-type: none"> • Conceptualize the Regional Planning and its theories. • Get the overview of sustainable development. • Have sound knowledge to sustainable development policies and programmes.
Syllabus पाठ्यक्रम	

UNIT - I	Definition of Region, concept and types of Region, Formal, Functional, Planning Regions and Regional Planning of India क्षेत्र की परिभाषा, क्षेत्र की अवधारणा और प्रकार, औपचारिक, कार्यात्मक, योजना क्षेत्र और भारत की क्षेत्रीय योजना
UNIT - II	Theories and Models for Regional Planning: Growth Pole Model of Myrdal, Hirschman, Rostow and Friedmann क्षेत्रीय योजना के लिए सिद्धांत और मॉडल : मिर्डल, हर्षमैन, रोस्टोव और फ्रीडमैन का विकास ध्रुव मॉडल
UNIT - III	Concept of Development and Underdevelopment in context of World and India, Human Development विश्व एवं भारत के संदर्भ में विकसित एवं अविकसित की अवधारणा, मानव विकास
UNIT - IV	Sustainable Development, Sustainable Development Goals (SDG) 2030, Sustainable Development Policies and Programmes: Rio+20; Goal-based development of Indian States. सतत विकास, सतत विकास के लक्ष्य (एसडीजी) 2030 , सतत विकास नीतियां और कार्यक्रम :रियो20+; भारतीय राज्यों का लक्ष्य आधारित विकास
UNIT - V	Planning Commission, Five year Plans and NITI Aayog composition and function, Concept of Good Governance योजना आयोग, पंचवर्षीय योजनाएँ और नीति आयोग रचना और कार्य, सुशासन की अवधारणा
	Suggested Readings सहायक ग्रन्थ / सामग्री
Text Books	<ul style="list-style-type: none"> Regional Planning and Development, R.C. Chandna, (Hindi and English) Kalyani Publishers, New Delhi Agyeman, Julian, Robert, D. Bullard and Bob, Evans. (Eds.) (2003). Just Sustainability's: Development in an Unequal World. London: Earthscan. (Introduction and conclusion.). Friedmann, J. and Alonso W. (1975). Regional Policy - Readings in Theory and Applications. Massachusetts, USA: MIT Press. Misra, R. P., Sundaram, K.V., and Rao, V.L.S. (1974). Regional Development planning in India. Delhi, India: Vikas Publishing House. 5. Peet, R. (1999). Theories of

	<p>Development. New York, USA: The Guilford Press.</p> <ul style="list-style-type: none"> • एस डी मौर्य , प्रादेशिक नियोजन एवं विकास, प्रवालिका प्रकाशन, प्रयागराज
Reference Books	<ul style="list-style-type: none"> • Regional Development Planning and Practice, Contemporary Issues in South Asia, Editors:, Mukunda Mishra, R. B. Singh, Andrews José de Lucena, Soumendu Chatterjee • Baker, Susan, (2006). Sustainable Development. Milton Park, Abingdon, Oxon; New York, N.Y.: Routledge. (Chapter 2, “The concept of sustainable development”). • Gore C. G. (1984). Regions in Question: Space, Development Theory and Regional Policy. London, UK: Methuen. • Haynes J. (2008). Development Studies. London: Polity Short Introduction Series. 5. Johnson E. A. J. (1970). The Organization of Space in Developing Countries, Massachusetts, USA: MIT Press.
Suggested E-resources	<p>https://www.niti.gov.in/verticals/sustainable-dev-goals</p> <p>https://www.niti.gov.in/sites/default/files/2021-08/India_ActionAgenda.pdf</p> <p>https://krishi.icar.gov.in/jspui/bitstream/123456789/32452/1/Tree-based%20farming%20systems%20for%20different%20agro-eco-sub%20regions%20of%20Andhra%20Pradesh.pdf</p>

B.A. (Three Years Degree Program)	
Sixth Semester	
Subject-Geography	
Code of the Course	GEG7102P
Title of the Course	LAB VI (A) GEOGRAPHICAL INFORMATION SYSTEM (GIS)
Qualification Level of the Course	5.5
Credit of the course	2
Type of the course	DSE
Delivery type of the Course	P
Prerequisites	Basic knowledge of Geography of secondary level.
Co-requisites	Basic computer knowledge
Objectives of the course	To introduce student with basics of state-of-the-art technology of Geographical Information System (GIS) in geographical studies.
Learning outcomes	<ul style="list-style-type: none"> • To train the students in state-of-the-art geospatial technology. • To introduce the fundamental concepts of GIS, methods of geospatial data visualization and the vast repository of data available on web-geoportals. • To create awareness regarding the potential of GIS in decision making and planning. • To introduce student to the fundamental technical skills for employment opportunities as GIS consultant/analyst/project associates/entrepreneurs across private and public sector.
Syllabus पाठ्यक्रम	
UNIT - I	<p>Definition, evolution and components of GIS. Representation of geographical data in GIS. Geospatial data structure and formats. Data models: raster and vector data models (02 sheets)</p> <p>जीआईएस की परिभाषा, विकास एवं घटक। जीआईएस में भौगोलिक डेटा का प्रतिनिधित्व. भू-स्थानिक डेटा संरचना एवं प्रारूप। डेटा मॉडल: रास्टर एवं वेक्टर डेटा मॉडल। (02 शीट्स)</p>
UNIT - II	Datums, Ellipsoid, Geoid. Projected and Geographic Coordinate

	<p>Systems, UTM coordinate system. Georeferencing: Resampling, Root Mean Square Error. (04 sheets)</p> <p>डेटम्स, गोलाभ, जियोइड। प्रक्षेपित एवं भौगोलिक निर्देशांक प्रणाली, यूटीएम समन्वय प्रणाली। भू-सन्दर्भ: पुनः नमूनाकरण, वर्ग माध्य मूल त्रुटि। (04 शीट्स)</p>
UNIT - III	<p>Attribute data input and management: data types, data entry, joining and relating tables. Attribute data manipulation Spatial data editing. Topology. (02 sheets)</p> <p>लक्षण आंकड़े प्रविष्टि एवं प्रबंधन: आंकड़ों के प्रकार, आंकड़े प्रविष्टि, तालिका जोड़ना एवं सम्बंधित करना। लक्षण आंकड़ा परिचालन। आंकड़े प्रविष्टि, धरातलीय आंकड़े संपादन। स्थान विज्ञान। (02 शीट्स)</p>
UNIT - IV	<p>Spatial data query, attribute data query. Data generalization; data classification. Data visualization and map composition. (04 sheets)</p> <p>स्थानिक आंकड़ा जाँच, लक्षण आंकड़ा जाँच। आंकड़े सामान्यीकरण, आंकड़ा वर्गीकरण। आंकड़ा दृश्यांकन एवं मानचित्र संरचना। (04 शीट्स)</p>
UNIT - V	<p>Introduction to Web Data Sources: Google Earth, Bhuvan, Water Resources Information System (India-WRIS), Open Street Maps (OSM).</p> <p>Hands-on / Demo: Introduction to QGIS, Data generation, query, generalization, visualization, classification and map composition. (08 exercises)</p> <p>वेब आंकड़ा स्रोतों का परिचय: गूगल अर्थ, भुवन, जल संसाधन सूचना प्रणाली (भारत-WRIS), ओपन स्ट्रीट मैप्स (OSM)।</p> <p>हैंड्स-ऑन / डेमो : क्यू. जी. आई. एस. का परिचय, डेटा निर्माण, जाँच, सामान्यीकरण, दृश्यांकन, वर्गीकरण एवं मानचित्र संरचना। (08 अभ्यास)</p>
	<p style="text-align: center;">Suggested Readings सहायक ग्रन्थ / सामग्री</p>
Text Books	<ul style="list-style-type: none"> Burrough, P.A. and McDonnell, R., 1998. Principles of Geographic Information Systems. Oxford University Press, Oxford Chang, Kang-tsung, 2003. Introduction to Geographical Information Systems. Tata McGraw Hill Publ. Co., New Delhi Chauniyal, D.D., 2004. Remote Sensing and Geographical Information Systems (in Hindi), Sharda Pustak Bhawan, Allahabad
Reference Books	<ul style="list-style-type: none"> Demers, Michael N., 2000. Fundamentals of Geographical Information Systems, John Wiley, Singapore Lo, C.P. and Yeung, Albert K. W. 2002. Concepts and Techniques of Geographic Information Systems. Prentice Hall of India, New Delhi. Vyas P.R., Remote Sensing and Geographical Information System and

	Remote Sensing: Basics and Applications, Rawat Publications, Jaipur, New Delhi-2014
Suggested E-resources	<ul style="list-style-type: none">• www.qgistutorials.com• http://www.pasda.psu.edu/tutorials/gisbasics.asp• https://earth.google.com• bhuvan.nrsc.gov.in

B.A. (Three Years Degree Program)	
Sixth Semester	
Subject - Geography	
Code of the Course	GEG7103T
Title of the Course	GEOGRAPHY OF RAJASTHAN
Qualification Level of the Course	5.5
Credit of the course	4
Type of the course	DSE
Delivery type of the Course	L
Prerequisites	This course on the Geography of Rajasthan assumes that the students are familiar with the basic physical and economic characteristics of Rajasthan (RBSE class 8 level awareness).
Co-requisites	
Objectives of the course	<ul style="list-style-type: none"> • To give a comprehensive & integrated knowledge and understanding of geography of the state. • To give an overview of the location, physical divisions, drainage system, climate, vegetation, people and economic aspects of the state. • To give an understanding of the strength and challenges of the state. • The course would help students to contextualize their further learnings, teaching and research on various relevant issues facing the state.
Learning outcomes	<ul style="list-style-type: none"> • Knowledge and understanding of location and physical characteristics and natural resources of Rajasthan. • Knowledge and understanding of human resources of Rajasthan. • Knowledge and understanding of agricultural activities of Rajasthan. • Knowledge and understanding of minerals, energy resources and industrial development of Rajasthan. • Knowledge and understanding of transportation, tourism and drought.

Syllabus पाठ्यक्रम	
UNIT - I	<p>Rajasthan in the context of India; location and diversity and unity. Physical divisions of Rajasthan. Drainage system of Rajasthan. Climate: Seasons, Monsoon, Climatic regions by Koeppen. Types of forest and soil.</p> <p>भारत के संदर्भ में राजस्थान: स्थिति एवं विविधता एवं एकता। राजस्थान के भौतिक विभाग। राजस्थान का अपवाह तंत्र। जलवायु: ऋतुएं, मानसून, कोपेन का जलवायु वर्गीकरण। वन एवं मृदा के प्रकार।</p>
UNIT - II	<p>Population: Distribution, Density, Growth, Literacy, Sex-ratio, Occupational structure, Urbanization and Migration. Major tribes of Rajasthan: Bhil, Meena, Sahria, Garasia and Kathodi. Population: associated problems.</p> <p>जनसंख्या: वितरण, घनत्व, वृद्धि, साक्षरता, लिंगानुपात, व्यावसायिक संरचना, नगरीकरण एवं प्रवास। राजस्थान की प्रमुख जनजातियां: भील, मीणा, सहारिया, गरसिया एवं कथोड़ी। जनसंख्या: संबंधित समस्याएं।</p>
UNIT - III	<p>Importance of agriculture in economy of Rajasthan. Major crops: study of Bajra, Wheat, Maize, Cotton, pulses and oilseed. Sources of irrigation, major irrigation projects: Indira Gandhi Canal and Chambal Command Area and Associated problems. Livestock resource: Distribution and major breeds of Sheep, Goat, Cattle, Buffalo, Camel; dairy development. Major agricultural problems and their solution.</p> <p>राजस्थान की अर्थव्यवस्था में कृषि का योगदान। प्रमुख फसलें: बाजरा, गेहूँ, मक्का, कपास, दलहन एवं तिलहन फसलों का अध्ययन। सिंचाई के साधन, प्रमुख सिंचाई परियोजनाएं: इंदिरा गांधी नहर एवं चंबल नियंत्रण क्षेत्र तथा संबंधित समस्याएं। पशुधन: भेड़, बकरी, गाय, भैंस एवं ऊट का वितरण एवं प्रमुख नस्लें, डेयरी विकास। कृषि संबंधी प्रमुख समस्याएं एवं उपाय।</p>
UNIT - IV	<p>Minerals: Distribution of Copper, Rock phosphate, Mica, Marble, Granite, Limestone, Lignite, Petroleum and Natural gas. Development of Hydroelectricity, Solar energy, Wind energy and Atomic energy. Major industries: Zinc, Cement and Cotton Textile industry. Industrial Development and problems in Rajasthan.</p> <p>खनिज: तांबा, रॉक फॉस्फेट, अभ्रक, मार्बल एवं ग्रेनाइट, चुना पत्थर, लिग्नाइट, पेट्रोलियम एवं प्राकृतिक गैस का वितरण। जल विद्युत, सौर ऊर्जा, पवन ऊर्जा एवं परमाणु ऊर्जा का विकास। प्रमुख उद्योग: जस्ता, सीमेंट एवं सूती वस्त्र उद्योग। राजस्थान में औद्योगिक विकास एवं समस्याएं।</p>
UNIT - V	<p>Means of transportation: development of Roads, Railways and Airports. Tourism circuits, major Geographical, Historical and Religious tourist destinations. Droughts in Rajasthan: nature and causes. Basis of regions of Rajasthan and study of schemes of</p>

	<p>regionalization of R.L. Singh, Detailed study of Marusthali and Aravali regions.</p> <p>परिवहन के साधन: सड़कें, रेलमार्ग एवं हवाई अड्डों का विकास। पर्यटन मंडल: प्रमुख भौगोलिक, ऐतिहासिक एवं धार्मिक पर्यटन स्थल। राजस्थान में सूखा: प्रकृति एवं कारण। राजस्थान में प्रादेशीकरण के आधार एवं आर.एल. सिंह द्वारा प्रस्तुत रूपरेखा का अध्ययन तथा प्रमुख वृहत् प्रदेश। मरुस्थली एवं अरावली प्रदेश का विस्तृत अध्ययन।</p>
	<p style="text-align: center;">Suggested Readings सहायक ग्रन्थ / सामग्री</p>
Text Books	<ul style="list-style-type: none"> • Saxena, H.M., Geography of Rajasthan, Rawat Publications, Jaipur • Sharma, P.K., Mishra, Preeti, Geography of Rajasthan, Pareek Publication, Jaipur • Bhalla, L. R., Geography of Rajasthan, Kuldeep Publication, Ajmer. • शर्मा, एच. एस., शर्मा, एम. एल., राजस्थान का भूगोल, पंचशील प्रकाशन, जयपुर • सक्सेना, हरिमोहन, राजस्थान का भूगोल, राजस्थान हिंदी ग्रंथ अकादमी, जयपुर • भल्ला, आर. एल., राजस्थान का भूगोल, कुलदीप पब्लिकेशन्स, जयपुर
Reference Books	<ul style="list-style-type: none"> • Mishra, V. C., Geography of Rajasthan, National Book Trust, New Delhi.
Suggested E-resources	<ul style="list-style-type: none"> • https://indiawris.gov.in/downloads/ • https://phedwater.rajasthan.gov.in/ • https://water.rajasthan.gov.in/ • https://mausam.imd.gov.in/jaipur/ • https://forest.rajasthan.gov.in/content/raj/forest/en/home.html • https://farmer.gov.in/STLDetails.aspx?State=8 • www.agriculture.rajasthan.gov.in/ • https://rajcensus.gov.in/PE_DATA.html • https://sje.rajasthan.gov.in/Default.aspx?PageID=66 • https://cag.gov.in/uploads/old_reports/state/Rajasthan/rep_2003/civil_Chapter-3.pdf • https://animalhusbandry.rajasthan.gov.in/ • https://agriculture.rajasthan.gov.in/ • https://mines.rajasthan.gov.in/dmgcms/page?menuName=Home • https://energy.rajasthan.gov.in/rrecl/ • https://www.tourism.rajasthan.gov.in/ • https://roads.rajasthan.gov.in/content/raj/roads/en/home.html • https://nwr.indianrailways.gov.in/

B.A. (Three Year Bachelor of Arts Program)	
Sixth Semester	
Subject - Geography	
Code of the Course	GEG7103P
Title of the Course	LAB VI (B) SOCIO-ECONOMIC SURVEY TECHNIQUES
Qualification Level of the Course	5.5
Credit of the course	2
Type of the course	DSE
Delivery type of the Course	P
Prerequisites	This course on the socio-economic survey techniques assumes that the students are familiar with the basic knowledge of cartography, toposheet, census data, cadastral map, questionnaire and interview.
Co-requisites	None
Objectives of the course	<ul style="list-style-type: none"> • To develop understanding of cartographic and socio-economic survey techniques. • To impart practical knowledge of field visit, data collection and socio-economic survey. • To impart practical knowledge for prepare a report of collected data.
Learning outcomes	<ul style="list-style-type: none"> • Knowledge and understanding of concept of survey, data and data collection methods, data editing and tabulation. • Knowledge and understanding of topographic maps and census data collection. • Knowledge and understanding of land use pattern of village/town and land use mapping. • Knowledge and understanding of questionnaire and practical knowledge of socio-economic survey. • Practical knowledge of report writing using collected data.
Syllabus पाठ्यक्रम	
UNIT - I	<p>Concept of survey, Types of data, Methods of primary data collection-observation, interview, questionnaire and schedule. Data editing and tabulation.</p> <p>सर्वेक्षण की संकल्पना, आंकड़ों के प्रकार, प्राथमिक आंकड़ों के संकलन की</p>

	विधियाँ—अवलोकन, साक्षात्कार, प्रश्नावली एवं अनुसूची। आंकड़ा संशोधन एवं सारणीकरण।
UNIT - II	<p>Procure a topographic map of 1:50,000 or 1:25,000 scale to study the settlements selected in its regional setting. Collect demographic, social & economic data of the village/town from Census Reports to study the temporal changes in the profile of such characteristics.</p> <p>अपनी क्षेत्रीय अवस्थिति से चयनित बस्तियों का अध्ययन करने के लिए 1:50000 अथवा 1:25000 मापनी के स्थलाकृतिक मानचित्र प्राप्त करना। जनगणना रिपोर्ट से कालीक परिवर्तन का अध्ययन करने के लिए गांव/कस्बा के जनसांख्यिकीय, सामाजिक एवं आर्थिक आंकड़ों को एकत्र करना।</p>
UNIT - III	<p>Procure a cadastral map of the village/town for field mapping of the features of land-use and land quality. Procure/prepare the settlement-site map through rapid survey to map the residential, commercial, recreational (parks, playgrounds), educational, religious and other prominent features.</p> <p>भूमि उपयोग और भूमि की गुणवत्ता की विशेषताओं के क्षेत्र मानचित्रण के लिए गांव/कस्बा का भू-संपत्ति मानचित्र प्राप्त करना। तीव्र सर्वेक्षण द्वारा आवासीय, वाणिज्यिक, मनोरंजक (उद्यान, खेल के मैदान), शैक्षिक, धार्मिक और अन्य प्रमुख विशेषताओं का मानचित्र तैयार करना।</p>
UNIT - IV	<p>Conduct a socio-economic survey of the households with a structured questionnaire. Supplement the information by personal observations and perceptions.</p> <p>संरचित प्रश्नावली द्वारा परिवारों का सामाजिक-आर्थिक सर्वेक्षण करना। व्यक्तिगत अवलोकनों एवं धारणाओं द्वारा एकत्र जानकारी को जोड़ना।</p>
UNIT - V	<p>Based on results of the land-use and socio-economic enquiry of the households, prepare a critical field-survey report. Photographs and sketches, in addition to maps and diagrams, may supplement the report.</p> <p>भूमि उपयोग की सूचना एवं परिवारों के सामाजिक-आर्थिक सर्वेक्षण के आधार पर एक सर्वेक्षण रिपोर्ट तैयार करना। मानचित्रों एवं आरेखों के साथ फोटोग्राफ एवं रेखाचित्रों को रिपोर्ट में जोड़ना।</p>
	Suggested Readings सहायक ग्रन्थ / सामग्री
Text Books	<ul style="list-style-type: none"> • Kothari, C.S., Research Methodology, New Age International Publishers, New Delhi • बंसल, एस.सी., शोध विधितंत्र: भूगोल, मीनाक्षी प्रकाशन, मेरठ • कोठारी, सी.आर., शोध पद्धति, न्यू एज इंटरनेशनल पब्लिशर्स, नई दिल्ली • शर्मा, जे.पी., प्रयोगात्मक भूगोल, रस्तोगी पब्लिशर्स, मेरठ • मिश्रा, आर.एन., शर्मा, पी.के., प्रायोगिक भूगोल, रावत पब्लिकेशन, जयपुर • खुल्लर, डी.आर., प्रयोगात्मक भूगोल, कल्याणी पब्लिशर्स, नई दिल्ली
Reference Books	<ul style="list-style-type: none"> • Kanetkar, T.P., Kulkarni, S.V. Surveying and Levelling, Pune

	<p>Vidyarthi Griha Prakashan, Pune</p> <ul style="list-style-type: none">• Creswell, J.W., Creswell, J.D., Research Design: Qualitative, Quantitative and Mixed Methods approaches, SAGE Publication, California
Suggested E-resources	<p>https://apnakhata.rajasthan.gov.in/ https://bhuvan.nrsc.gov.in/home/index.php https://earth.google.com/web/ https://vedas.sac.gov.in/usis/index.html</p>

B.A. (Three Years Degree Program)	
Sixth Semester	
Subject-Geography	
Code of the Course	SEA7314P
Title of the Course	REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEM
Qualification Level of the Course	5.5
Credit of the course	2
Type of the course	SEC
Delivery type of the Course	P
Prerequisites	Basic computer skills. Understanding of Mathematics and Physics up to secondary level.
Co-requisites	None
Objectives of the course	<ul style="list-style-type: none"> • Developing fundamental geospatial skills required for geospatial data generation. Strengthening vocational capabilities and multi-disciplinary research skills. • Filling the gap in demand and supply of geospatial workforce to further the vision of National Geospatial Policy, 2022; to strengthen application of geospatial technology in every sector by developing geospatial thinking.
Learning outcomes	<ul style="list-style-type: none"> • Understanding basic concepts and developing working skills in state-of-the-art geospatial technology. • To create awareness regarding the unique capabilities of geospatial technology for planning and decision making. • Strengthened technical skills and enhanced employment opportunities at lower strata of geospatial workforce in public and private sector. • Enhanced technical skills for self-employment.

	<ul style="list-style-type: none"> • Geospatial skill development for research across disciplines.
<p style="text-align: center;">Syllabus पाठ्यक्रम</p>	
UNIT - I	<p>Introduction to Remote Sensing and GIS. Electromagnetic Radiation (EMR) spectrum, Laws of radiation. Spectral signatures, spectral reflectance curves of vegetation, soil and water.</p> <p>सुदूर संवेदन एवं जी.आई.एस. का परिचय। विद्युत चुम्बकीय विकिरण (ई.एम.आर.) स्पेक्ट्रम, विकिरण के नियम। स्पेक्ट्रल सिग्नेचर, वनस्पति, मिट्टी एवं पानी के स्पेक्ट्रल परावर्तन वक्र।</p>
UNIT - II	<p>Orbits and Platforms. Sensor types: Geostationary and polar satellites, Active and Passive sensors. Image display: TCC, FCC and Pseudo Color composites. Types of Resolutions: spatial, spectral, temporal and radiometric.</p> <p>विभेदन के प्रकार: धरातलीय, स्पेक्ट्रल, कालिक एवं रेडियोमेट्रिक। परिक्रमा पथ एवं प्लेटफार्म। उपग्रहों के कक्षीय प्रकार: भू-स्थैतिक उपग्रह एवं ध्रुव कक्षीय उपग्रह, सक्रिय एवं निष्क्रिय संवेदक। इमेज प्रदर्शन: टी.सी.सी., एफ.सी.सी. और छद्म-रंग कंपोजिट।</p>
UNIT - III	<p>Sensor specification of IRS and Landsat satellite series. Geometric and radiometric errors and correction – geometric rectification, DOS. Image enhancement techniques: Linear stretching, Histogram equalization. Elements of visual image interpretation.</p> <p>आई.आर.एस. एवं लैंडसैट उपग्रह श्रृंखला के सेंसर विशेषताएं। ज्यामितीय एवं रेडियोमेट्रिक त्रुटियाँ एवं शुद्धता – ज्यामितीय शुद्धता, DOS। इमेज उच्चीकरण तकनीकें: रेखीय प्रसरण, हिस्टोग्राम प्रसामन्यीकरण। दृश्य इमेज विश्लेषण के तत्व।</p>
UNIT - IV	<p>Definition, evolution and components of GIS. Geospatial data models - raster and vector data models. Raster and vector data structure and formats. Geodatabase, Thematic data modeling – layer design. Spatial data editing – generation of vector data. Topology.</p> <p>जीआईएस की परिभाषा, विकास एवं घटक। भू-स्थानिक डेटा मॉडल: रास्टर एवं वेक्टर डेटा मॉडल। रास्टर एवं वेक्टर डेटा संरचना तथा प्रारूप। भू-आंकड़ा आधार, विषयगत डेटा मॉडलिंग - परत डिजाइन। धरातलीय आंकड़ा संपादन - वेक्टर डेटा का निर्माण। स्थान विज्ञान।</p>
UNIT - V	<p>Relational Database Management System (RDBMS), Attribute data input and management: data types, data entry, joining and relating tables. Attribute data manipulation. Data generalization, visualization, classification. Map composition. Hands-on (Demo): In SAGA GIS and</p>

	<p>QGIS softwares.</p> <p>संबंधनात्मक डेटाबेस प्रबंधन प्रणाली (आर.डि.बी.एम.एस.)। लक्षण आंकड़े प्रविष्टि एवं प्रबंधन: आंकड़ों के प्रकार, आंकड़े प्रविष्टि, तालिका जोड़ना एवं सम्बंधित करना। लक्षण आंकड़ा परिचालन। धरातलीय आंकड़े संपादन। आंकड़े सामान्यीकरण, आंकड़ा वर्गीकरण एवं मानचित्र संरचना। हैन्ड्स-ऑन (डेमो): सागा जी.आई.एस. एवं क्यू जी. आई. एस. सॉफ्टवेयर में।</p>
	<p style="text-align: center;">Suggested Readings सहायक ग्रन्थ / सामग्री</p>
Text Books	<ul style="list-style-type: none"> • Lillesand, T.M., Keifer R.W. & Chipman, J.W., 2008. Remote Sensing and Image Interpretation. John Wiley & Sons, New Delhi • Chauniyal, D.D., 2004. Remote Sensing and Geographical Information Systems (in Hindi), Sharda Pustak Bhawan, Allahabad • Burrough, P.A. and McDonnell, R., 1998. Principles of Geographic Information Systems. Oxford University Press, Oxford • Chang, Kang-tsung, 2003. Introduction to Geographical Information Systems. Tata McGraw Hill Publ. Co., New Delhi
Reference Books	<ul style="list-style-type: none"> • Jenson, J.R., 2000. Remote Sensing of the Environment: An Earth Resource Perspective. Pearson Education. • Demers, Michael N., 2000. Fundamentals of Geographical Information Systems, John Wiley, Singapore • Lo, C.P. and Yeung, Albert K. W. 2002. Concepts and Techniques of Geographic Information Systems. Prentice Hall of India, New Delhi. • Vyas P.R., Remote Sensing and Geographical Information System and Remote Sensing: Basics and Applications, Rawat Publications, Jaipur, New Delhi-2014
Suggested E-resources	<ul style="list-style-type: none"> • E-book on Remote Sensing Applications, www.nrsc.gov.in/Learning_Centre_EBook.html • E-Tutorial on Fundamentals of Remote Sensing, Canada Centre for Mapping and Earth Observation, Natural Resources Canada, accessible at http://www.nrcan.gc.ca/earth-sciences/geomatics • E-Tutorial on QGIS by Ujjwal Gandhi https://www.qgistutorials.com/en/ • www.qgistutorials.com • http://www.pasda.psu.edu/tutorials/gisbasics.asp • https://earth.google.com • bhuvan.nrsc.gov.in