K. C. E. Society's
Moolji Jaitha College
An 'Autonomous College' Affiliated to
K.B.C. North Maharashtra University, Jalgaon.
NAAC Reaccredited Grade - A (CGPA : 3.15 - 3rd Cycle)
UGC honoured "College of Excellence" (2014-2019)
DST(FIST) Assisted College

KNOWLEDGE IS POWER
ESTD. 1945

के. सी. ई. सोसायटीचे
मूळजी जेठा महाविद्यालय
क.ब.चौ. उत्तर महाराष्ट्र विद्यापीठ, जळगाव संलग्नित
'स्वायत्त महाविद्यालय'
नॅकद्वारा पुनर्मानांकित श्रेणी – 'ए' (सी.जी.पी.ए. : ३.१५ – तिसरी फेरी)
विद्यापीठ अनुदान आयोगाद्वारा घोषित 'कॉलेज ऑफ एक्सलन्स' (२०१४-२०१९)
डी.एस.टी. (फीस्ट) अंतर्गत अर्थसहाय्य प्राप्त

Date :- 25/04/2025

NOTIFICATION

Sub :- CBCS Syllabi of B. Sc. in Geography (Sem. V & VI)

Ref. :- Decision of the Academic Council at its meeting held on 22/04/2025.

The Syllabi of B. Sc. in Geography (Fifth and Sixth Semesters) as per **NATIONAL EDUCATION POLICY – 2020 (2024 Pattern)** and approved by the Academic Council as referred above are hereby notified for implementation with effect from the academic year 2025-26.

Copy of the Syllabi Shall be downloaded from the College Website (www.kcesmjcollege.in)

Sd/-
Chairman,
Board of Studies

To :

1) The Head of the Dept., M. J. College, Jalgaon.
2) The office of the COE, M. J. College, Jalgaon.
3) The office of the Registrar, M. J. College, Jalgaon.

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समर्थ कॉलनी जवळ, जळगांव – ४२५ ००२. (महाराष्ट्र, भारत) । दूरध्वनी क्र. : +९१ २५७–२२३७३६३, २२३४२८१ । ई–मेलः mjcollege@kces.in । वेबसाईटः mjcollege.kces.in

Khandesh College Education Society's

Moolji Jaitha College, Jalgaon

An "Autonomous College"

Affiliated to

Kavayitri Bahinabai Chaudhari
North Maharashtra University, Jalgaon-425001

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STRUCTURE AND SYLLABUS

B.Sc. Honours/Honours with Research (T.Y. B.Sc. Geography)

Under Choice Based Credit System (CBCS)
and
as per NEP-2020 Guidelines

[w.e.f. Academic Year: 2025-26]

Preface

Geography, as a subject, is an ancient discipline that explores the interactions between humans and their environment. Over the years, geography has evolved and incorporated various technological advancements, leading to significant developments in the field. One such noteworthy transformation has been the integration of Remote Sensing (RS), Geographic Information Systems (GIS), and Global Positioning System (GPS) technologies. These cutting-edge tools have revolutionized how geographers collect, analyze, and interpret spatial data, making geography an even more dynamic and relevant subject in contemporary times.

The Department of Geography at M. J. College (Autonomous), Jalgaon, is at the forefront of embracing these recent trends in geography. Through the courses offered, including B.A. Geography, B.Sc. Geography, M.A/M.Sc. Geography, and Ph.D., the department equips students with comprehensive knowledge and practical skills to navigate the complexities of modern geography. Additionally, the Certificate Course in Geoinformatics serves as a valuable platform for students to delve deeper into the applications of RS, GIS, and GPS technologies.

One of the standout characteristics of the Department is its team of expert and qualified faculties. These educators not only possess extensive academic knowledge but also have hands-on experience in utilizing geospatial technologies effectively. Their guidance empowers students to explore and understand the intricacies of geographical phenomena using the latest tools and methodologies. The Department boasts state-of-the-art facilities, including smart laboratories for practicals, a central library supplemented with a departmental library, and a well-equipped GIS computer lab with internet access. The availability of these resources ensures that students have ample opportunities to engage in hands-on learning and conduct research, contributing to a comprehensive understanding of geographic concepts. Moreover, the Department has been recognized as a research center for Ph.D. studies, encouraging scholarly pursuits in the realm of geography. This designation highlights the institution's commitment to pushing the boundaries of geographical knowledge and fostering innovative research in the field. The integration of technology in geography education is further augmented by the presence of smart classrooms and advanced geographical instruments. These resources enable interactive learning and support students in developing a deep appreciation for the spatial dimensions of various phenomena. In addition to academic excellence, the Department is devoted to providing specialized coaching for national-level exams such as NET/SET and competitive examinations. This emphasis on exam preparation equips students with the necessary skills to excel in their careers and become leading professionals in the field of geography. The collaboration with the Indian Institute of Remote Sensing (IIRS) as an Outreach Training Program center is a testament to the Department's commitment to keeping abreast of the latest advancements in geospatial technology. This association allows students and faculties to participate in training programs conducted by experts in the field, enhancing their knowledge and skills in RS, GIS, and GPS applications. Furthermore, the Department of Geography at M. J. College (Autonomous), Jalgaon, proudly boasts access to the best telescopes for sky watching. This unique feature provides students with an opportunity to explore celestial phenomena and their connections with the Earth, bridging the gap between the terrestrial and astronomical realms.

Finally, the Department's focus on career opportunities in geography ensures that graduates are well-prepared to enter various professional fields. The interdisciplinary nature of geography opens doors to careers in environmental management, urban planning, disaster management, cartography, geospatial analysis, and more. The versatility of geography as a subject makes it a rewarding and promising choice for students seeking diverse and impactful

career paths. The Department of Geography at M. J. College (Autonomous), Jalgaon, stands as a vibrant and progressive hub for geography education. The integration of RS, GIS, and GPS technologies, coupled with expert faculty, modern facilities, and extensive research opportunities, equips students to become adept geographers, ready to address the pressing challenges of our ever-changing world.

Hence, Board of Studies in Geography in its meeting held on 22/03/2025 resolved to accept the revised syllabus for T. Y. B. Sc. (Geography) based on Choice Based Credit System (CBCS) of UGC, NEP-2020 and the Government of Maharashtra guidelines.

Program Outcomes (PO) for B.Sc. Program:

Program outcomes associated with a B.Sc. degree are as follows:

PO No.	PO
1	Graduates should have a comprehensive knowledge and understanding of the fundamental principles, theories, and concepts in their chosen field of study.
2	Graduates should possess the necessary technical skills and competencies related to their discipline, including laboratory techniques and data analysis.
3	Graduates should be able to identify, analyze, and solve complex problems using logical and critical thinking skills. They should be able to apply scientific methods and principles to investigate and find solutions.
4	Graduates should be proficient in effectively communicating scientific information, both orally and in writing.
5	Graduates should have a basic foundation in research methods and be capable of designing and conducting scientific investigations.
6	Graduates should be able to work effectively as part of a team, demonstrating the ability to collaborate with others, respect diverse perspectives, and contribute to group projects.
7	Graduates should recognize the importance of ongoing learning and professional development. They should be equipped with the skills and motivation to engage in continuous learning, adapt to new technologies and advancements in their field, and stay updated with current research.

Programme Specific Outcome (PSO) for B.Sc. Geography Honours/Honours with Research:

After completion of this course, students are expected to learn/understand the:

PSO No.	PSO
PSO1	Geographical terms, concepts, and theories and will be able to explain and find out the relation between geographical factors and processes.
PSO2	Develop and prepare various thematic maps and map reading skills.
PSO 3	How their life is related to different geographical factors such as environmental, economic, social, and cultural at the local and global scale. He/she will be able to evaluate factors such as environmental, economic, social, and cultural, with respect to spatial dimensions from a local to global scale.
PSO 4	Interpretation of thematic maps through visual and/or digital interpretation of topographic maps, weather maps, aerial photographs, and satellite images.
PSO 5	Remote sensing concepts, & techniques in various fields of earth & environment sciences.
PSO 6	Geographical distribution of the global human population and factors affecting human populations including human settlement and economic activities and transport networks. The students will be able to understand the impacts of human activities on the physical environment.

Multiple Entry and Multiple Exit options:

The multiple entry and exit options with the award of UG certificate/ UG diploma/ or three-year degree depending upon the number of credits secured;

Levels	Qualification Title	Credit Requirements		Semester	Year
		Minimum	Maximum		
4.5	UG Certificate	40	44	2	1
5.0	UG Diploma	80	88	4	2
5.5	Three Year Bachelor's Degree	120	132	6	3
6.0	Bachelor's Degree- Honours **Or** Bachelor's Degree- Honours with Research	160	176	8	4

Credit distribution structure for Three/ Four year Honors/ Honors with Research Degree Programme with Multiple Entry and Exit

F.Y. B.Sc.

Year (Level)	Sem	Subject-I (M-1)	Subject-II (M-2)	Subject-III (M-3)	Open Elective (OE)	VSC, SEC (VSEC)	AEC, VEC, IKS	CC, FP, CEP, OJT, RP	Cumulative Credits/Sem	Degree/ Cumulative Credit
I (4.5)	I	DSC-1(2T) DSC-2(2P)	DSC-1(2T) DSC-2(2P)	DSC-1(2T) DSC-2(2P)	OE-1(2T)	---	AEC-1(2T) (Eng) VEC-1(2T) (ES) IKS(2T)	CC-1(2T)	22	**UG Certificate**
	II	DSC-3(2T) DSC-4(2P)	DSC-3(2T) DSC-4(2P)	DSC-3(2T) DSC-4(2P)	OE-2(2T) OE-3(2P)	---	AEC-2(2T) (Eng) VEC-2(2T) (CI)	CC-2(2T)	22	
	Cum. Cr.	**8**	**8**	**8**	**6**	**---**	**10**	**4**	**44**	
Exit option: Award of UG Certificate with 44 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Major and Minor.										

S.Y. B.Sc.

Year (Level)	Sem	Subject-I (M-1) Major*		Subject-II (M-2) Minor #	Subject-III (M-3)	Open Elective (OE)	VSC, SEC (VSEC)	AEC, VEC, IKS	CC, FP, CEP, OJT/Int/RP	Cumulative Credits/Sem	Degree/ Cumulative Credit
		Mandatory (DSC)	Elective (DSE)	(MIN)							
2 (5.0)	III	DSC-5(2T) DSC-6(2T) DSC-7(2P)	---	MIN-1(2T) MIN-2(2T) MIN-3(2P)	---	OE-4(2T)	SEC-1(2T)	AEC-3(2T) (MIL)	CC-3(2T) CEP(2)	22	**UG Diploma**
	IV	DSC-8(2T) DSC-9(2T) DSC-10(2P)	---	MIN-4(2T) MIN-5(2P)	---	OE-5(2T)	SEC-2(2T) SEC-3(2P)	AEC-4(2T) (MIL)	CC-4(2T) ۞ FP(2)	22	
	Cum. Cr.	**12**	**---**	**10**	**---**	**4**	**6**	**4**	**8**	**44**	
	Exit option: Award of UG Diploma in Major and Minor with 88 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Major & Minor.										

***** Student must choose one subject as a Major subject out of M-1, M-2 and M-3 that he/she has chosen at First year

Student must choose one subject as a Minor subject out of M-1, M-2 and M-3 that he/she has chosen at First year (Minor must be other than Major)

۞ OJT/Internship/CEP should be completed in the summer vacation after 4th semester

T.Y. B.Sc.

Year (Level)	Sem	Subject-I (M-1) Major		Subject-II (M-2) Minor	Subject-III (M-3)	Open Elective (OE)	VSC, SEC (VSEC)	AEC, VEC, IKS	CC, FP, CEP, OJT/Int/RP	Cumulative Credits/Sem	Degree/ Cumulative Credit
		Mandatory (DSC)	Elective (DSE)	(MIN)							
3 (5.5)	V	DSC-11(2T) DSC-12(2T) DSC-13(2T) DSC-14(2P) DSC-15(2P)	DSE-1A/B (2T) DSE-2A/B (2P)	---	---	---	VSC-1(2T) VSC-2(2P)	---	OJT/Int (4)	22	UG Degree
	VI	DSC-16(2T) DSC-17(2T) DSC-18(2T) DSC-19(2T) DSC-20(2T) IKS DSC-21(2P) DSC-22(2P)	DSE-3A/B (2T) DSE-4A/B (2P)	---	---	---	VSC-3(2T) VSC-4(2P)	---	---	22	
	Cum. Cr.	**24**	**8**	**---**	**---**	**---**	**8**	**---**	**4**	**44**	
	Exit option: Award of UG Degree in Major with 132 credits OR Continue with Major and Minor										

Fourth Year B.Sc. (Honours)

Year (Level)	Sem	Major Core Subjects		Research Methodology (RM)	VSC, SEC (VSEC)	OE	AEC, VEC, IKS	CC, FP, CEP, OJT/Int/RP	Cumulative Credits/Sem	Degree/ Cumulative Credit
IV (6.0)	VII	DSC-23(4T) DSC-24(4T) DSC-25(4T) DSC-26(2P)	DSE-5A/B (2T) DSE-6A/B (2P)	RM(4T)	---	---	---	---	22	UG Honours Degree
	VIII	DSC-27(4T) DSC-28(4T) DSC-29(4T) DSC-30(2P)	DSE-7A/B (2T) DSE-8A/B (2P)	---	---	---	---	OJT/Int (4)	22	
	Cum. Cr.	**28**	**8**	**4**	**---**	**---**	**---**	**4**	**44**	
Four Year UG Honors Degree in Major and Minor with 176 credits										

Fourth Year B.Sc. (Honours with Research)

Year (Level)	Sem	Major Core Subjects		Research Methodology (RM)	VSC, SEC (VSEC)	OE	AEC, VEC, IKS	CC, FP, CEP, OJT/Int/RP	Cumulative Credits/Sem	Degree/ Cumulative Credit
IV (6.0)	VII	DSC-23(4T) DSC-24(4T) DSC-26(2P)	DSE-5A/B (2T) DSE-6A/B (2P)	RM(4T)	---	---	---	RP(4)	22	UG Honours with Research Degree
	VIII	DSC-27(4T) DSC-28(4T) DSC-30(2P)	DSE-7A/B (2T) DSE-8A/B (2P)	---	---	---	---	RP(8)	22	
	Cum. Cr.	**20**	**8**	**4**	**---**	**---**	**---**	**12**	**44**	
Four Year UG Honours with Research Degree in Major and Minor with 176 credits										

Sem- Semester, **DSC**- Department Specific Course, **DSE**- Department Specific Elective, **OE/GE**- Open/Generic elective, **VSC**- Vocational Skill Course, **SEC**- Skill Enhancement Course, **VSEC**- Vocation and Skill Enhancement Course, **AEC**- Ability Enhancement Course, **IKS**- Indian Knowledge System, **VEC**- Value Education Course, **T**- Theory, **P**- Practical, **CC**-Co-curricular **RM**- Research Methodology, **OJT**- On Job Training, **FP**- Field Project, **Int**- Internship, **RP**- Research Project, **CEP**- Community Extension Programme, **ENG**- English, **CI**- Constitution of India, **MIL**- Modern Indian Language

- Number in bracket indicate credit
- The courses which do not have practical 'P' will be treated as theory 'T'
- If student select subject other than faculty in the subjects M-1, M-2 and M-3, then that subject will be treated as Minor subject, and cannot be selected as Major at second year.

Details of T.Y. B.Sc. Geography

Course	Course Type	Course Code	Course Title	Credits	Teaching Hours/ Week			Marks			
								Internal		External	
					T	P	Total	T	P	T	P
Semester V, Level – 5.5											
DSC-11	DSC	GEO-DSC-351	Population Resource and Dynamics	2	2	---	2	20	---	30	---
DSC-12	DSC	GEO-DSC-352	Geography of Rural Settlement	2	2	---	2	20	---	30	---
DSC-13	DSC	GEO-DSC-353	Research Methodology in Geography	2	2	---	2	20	---	30	---
DSC-14	DSC	GEO-DSC-354	Practical on Prismatic Compass	2	---	4	4	---	20	---	30
DSC-15	DSC	GEO-DSC-355	Practical on IMD weather maps	2	---	4	4	---	20	---	30
DSE-1A	DSE	GEO-DSE-351A	Regional Planning	2	2	---	2	20	---	30	---
DSE-1B	DSE	GEO-DSE-351B	Biogeography	2	2	---	2	20	---	30	---
DSE-2A	DSE	GEO-DSE-352A	Practical on Morphometric Analysis	2	---	4	4	---	20	---	30
DSE-2B	DSE	GEO-DSE-352B	Practical on Aerial Photography	2	---	4	4	---	20	---	30
VSC-1	VSC	GEO-VSC-351	Introduction to DBMS	2	2	---	2	20	---	30	---
VSC-2	VSC	GEO-VSC-352	Practical on Open Source GIS	2	---	4	4	---	20	---	30
OJT/Int	OJT	GEO-OJT-351	On Job Training/Internship	4	---	8	8	---	40	---	60
Semester VI, Level – 5.5											
DSC-16	DSC	GEO-DSC-361	Geographical Thoughts	2	2	---	2	20	---	30	---
DSC-17	DSC	GEO-DSC-362	Geography of Urban Settlement	2	2	---	2	20	---	30	---
DSC-18	DSC	GEO-DSC-363	Oceanography	2	2	---	2	20	---	30	---
DSC-19	DSC	GEO-DSC-364	Sustainable Development	2	2	---	2	20	---	30	---
DSC-20	DSC/IKS	GEO-DSC-365	IKS Geography	2	2	---	2	20	---	30	---
DSC-21	DSC	GEO-DSC-366	Practical on Digital skills in Geography	2	---	4	4	---	20	---	30
DSC-22	DSC	GEO-DSC-367	Practical on Geo-statistics	2	---	4	4	---	20	---	30
DSE-3A	DSE	GEO-DSE-361A	Political Geography	2	2	---	2	20	---	30	---
DSE-3B	DSE	GEO-DSE-361B*****	Remote Sensing and GIS for Rural Development	2	2	---	2	20	---	30	---
DSE-4A	DSE	GEO-DSE-362A	Practical on Thematic Maps	2	---	4	4	---	20	---	30
DSE-4B	DSE	GEO-DSE-362B	Practical on Theodolite	2	---	4	4	---	20	---	30
VSC-3	VSC	GEO-VSC-361	GIS Data Visualization	2	2	---	2	20	---	30	---
VSC-4	VSC	GEO-VSC-362	Practicals on GIS Data Visualization	2	---	4	4	---	20	---	30

*** Shows the Swayam-NPTEL online course**

Examination Pattern

Theory Question Paper Pattern:

- 30 (External) +20 (Internal) for 2 credits
    - External examination will be of 1½ hours duration
    - There shall be 3 questions: Q1 carrying 6 marks and Q2, Q3 carrying 12 marks each. The tentative pattern of question papers shall be as follows;
    - Q1 Attempt any 2 out of 3 sub-questions; each 3 marks
    - Q 2 and Q3 Attempt any 3 out of 4 sub-question; each 4 marks.

Rules of Continuous Internal Evaluation:

The Continuous Internal Evaluation for theory papers shall consist of two methods:

1. Continuous & Comprehensive Evaluation (CCE): CCE will carry a maximum of 30% weightage (30/15 marks) of the total marks for a course. Before the start of the academic session in each semester, the subject teacher should choose any three assessment methods from the following list, with each method carrying 10/5 marks:

i. Individual Assignments
ii. Seminars/Classroom Presentations/Quizzes
iii. Group Discussions/Class Discussion/Group Assignments
iv. Case studies/Case lets
v. Participatory & Industry-Integrated Learning/Field visits
vi. Practical activities/Problem Solving Exercises
vii. Participation in Seminars/Academic Events/Symposia, etc.
viii. Mini Projects/Capstone Projects
ix. Book review/Article review/Article preparation
x. Any other academic activity
xi. Each chosen CCE method shall be based on a particular unit of the syllabus, ensuring that three units of the syllabus are mapped to the CCEs.

2. Internal Assessment Tests (IAT): IAT will carry a maximum of 10% weightage (10/5 marks) of the total marks for a course. IAT shall be conducted at the end of the semester and will assess the remaining unit of the syllabus that was not covered by the CCEs. The subject teacher is at liberty to decide which units are to be assessed using CCEs and which unit is to be assessed on the basis of IAT. The overall weightage of Continuous Internal Evaluation

(CCE + IAT) shall be 40% of the total marks for the course. The remaining 60% of the marks shall be allocated to the semester-end examinations. The subject teachers are required to communicate the chosen CCE methods and the corresponding syllabus units to the students at the beginning of the semester to ensure clarity and proper preparation.

Practical Examination Credit 2: Pattern (30+20)

External Practical Examination (30 marks):

- Practical examination shall be conducted by the respective department at the end of the semester.
- Practical examination will be of 3 hours duration and shall be conducted as per schedule.
- Practical examination shall be conducted for 2 consecutive days for 2 hr/ day where incubation conditions required.
- There shall be 05 marks for journal and viva-voce. Certified journal is compulsory to appear for practical examination.

Internal Practical Examination (20 marks):

- Internal practical examination of 10 marks will be conducted by department as per schedule given.
- For internal practical examination student must produce the laboratory journal of practicals completed along with the completion certificate signed by the concerned teacher and the Head of the department.
- There shall be continuous assessment of 30 marks based on student performance throughout the semester. This assessment can include quizzes, group discussions, presentations and other activities assigned by the faculty during regular practicals. For details refer internal theory examination guidelines.
- Finally 40 (10+30) marks performance of student will be converted into 20 marks.

SEMESTER-V

T.Y. B.Sc. Geography (Major)
Semester-V
GEO-DSC-351: Population Resource and Dynamics

Total Hours: 30 **Credits: 2**

Course Objectives	• To analyze the concept of population as a human resource and the factors contributing to its development. • To know the quality of a population through indicators such as education, health, and workforce skills, and analyze the impact of employment and unemployment. • To know about the population dynamics in terms of fertility, mortality and Sex ratio. • To critically examine population theories, policies, and contemporary issues, including child sex ratio imbalances and population aging.	
Course Outcomes	After successful completion of this course, students are expected to: • Understand the patterns of population distribution and density, and explain the factors that influence these patterns. • Evaluate the quality of a population based on key indicators and analyze the challenges related to employment and unemployment. • Understand the population dynamics in terms of fertility, mortality and Sex ratio. • Apply demographic concepts and theories to understand population dynamics and critically assess population policies and contemporary issues, particularly in the Indian context.	
Unit	**Content**	**Hours**
Unit I	**Population Resource** • Factors making population a Human Resource • Distribution of Population • Density of Population • Factors affecting distribution and density of population Physical Factors, Socio-economic Factors	**08**
Unit II	**The quality of population** • Education • Health • Work force skilled and unskilled. • Employment and Unemployment	**08**
Unit III	**Population Dynamics** • Introduction • Population Dynamics: Meaning and Importance • Fertility: Meaning and Measures • Mortality and Factors Affecting Mortality • Sex Ratio, Dependency Ratio and Migration	**07**
Unit IV	**Population Distribution and Growth** • Population size, Distribution and Growth – Determinants and Patterns; Theories of population growth: Malthusian and Marx • Population policies of India. Contemporary Issues – Patterns of child sex ratio and Ageing Population.	**07**

	• Population theory, Malthus and Karl marks	
Study Resources	• Johnston, R. J., Gregory, D., Pratt, G., Watts, M., & Whatmore, S. 2000. The Dictionary of Human Geography. Blackwell Publishing. • Jones, H. R. 1981. A Population Geography. Harper & Row. • Knox, P. L., & Marston, S. A. 2013. Human Geography: Places and Regions in Global Context. Pearson. • Haggett, P. 2001. Geography: A Global Synthesis. Pearson Education. • Zelinsky, W.1966. A Prologue to Population Geography. Prentice-Hall. • Boyle, P., &Halfacree, K. 1999. Migration and Gender in the Developed World. Routledge. • Trewartha, G. T. 1969. A Geography of Population: World Patterns. John Wiley & Sons. • Clarke, J. I. 1965. Population Geography. Pergamon Press. • Chandna, R. C. 2016. Geography of Population: Concepts, Determinants and Patterns. Kalyani Publishers. • Dyson, T., Cassen, R., &Visaria, L. 2004. Twenty-First Century India: Population, Economy, Human Development, and the Environment. Oxford University Press. • Kundu, A. 2006. India's Population: Aspects of Quality and Control. South Asian Publishers. • Malthus, T. R. 1798. An Essay on the Principle of Population. J. Johnson. • Lee, E. S. 1966. A Theory of Migration. Demography. • Visaria, P., &Visaria, L. 1995. India's Population in Transition. Oxford University Press. • Bose, A. 2003. India’s Billion Plus People: 2001 Census Highlights, Methodology, and Media Coverage. B. R. Publishing Corporation. • Daniels, P., Bradshaw, M., Shaw, D., & Sidaway, J. 2008. An Introduction to Human Geography: Issues for the 21st Century. Pearson.	

T.Y. B.Sc. Geography (Major)
Semester-V
GEO-DSC-352: Geography of Rural Settlement

Total Hours: 30 **Credits: 2**

Course Objectives	• To impart the knowledge related definition, concepts, development and paradigm shift. • To developed the ability of classifying rural settlement on different basis along with types, patterns. • To enable the students to critically understand the development of amenities and infrastructure of rural settlement geography. • To comprehend the knowledge of spatial distribution, changing morphology and segregation, rural dwellings and house types.	
Course Outcomes	After successful completion of this course, students are expected to: • Tracing the changing human and cultural landscape at different levels with reference to rural settlement. • Analyze the types and patterns of rural settlements and related issues. • To Explain the patterns and processes of settlement growth and its implications. • Be able to discover and understand spatial distribution and changing forms with the help of critical appraisal of segregation, rural dwellings and house types.	
Unit	**Contents**	**Hours**
Unit I	**Introduction to Geography of rural settlement.** • Geography of Rural Settlement: Concept. Nature, scope and importance • Characteristics and differences: Rural urban dichotomy • Factors influencing growth and distribution of rural settlements **i.** Geographical factors **ii.** Social Factors **iii.** Economic Factors • Importance of rural settlement studies in geography	**08**
Unit II	**Evolution and classification.** • Evolution of rural settlements • Hierarchy of rural settlement • Classification of rural settlements on the basis of population and patterns • Classification of rural settlements on the basis of spacing and functions	**08**
Unit III	**Theories and Dynamism** • Central Place Theory - Christaller and Losch • Hudson rural settlement theory • Rural-Urban Fringe- Structure,characteristics, and functions	**06**

Unit IV	**Indian scenario of Ruralization** • Rural dwelling and house types in India: Factors, Regional patterns • Development of amenities and infrastructure in rural India • Land use pattern in rural area – case studies(any local village) • Role of GIS and RS in rural Settlements	**08**
Study Resources	• Alam, M. and Gopi, K. N. (1982): Settlement System of India, Oxford and IBH Publication, New Delhi. • Haggett, P. (1965): Locational Analysis in Geography, Edward Arnold, London • Mandal, R. B. (2001): Introduction to Rural Settlement, Concept Publishing Company, New Delhi • Singh, R.Y. (1994): Geography of Settlements, Rawat Publications, Jaipur • Woods, M. (2005): Rural Geography, Sage Publication, London. • Leong, Goh-Cheng and Morgan, G. (1994): "Human and Economic Geography", Oxford University Press, Oxford. • Ghosh. S. (2015): "Introduction to Settlement Geography", Orient Blackswan Private Limited, Hyderabad.	

T.Y. B.Sc. Geography (Major)
Semester-V
GEO-DSC-353: Research Methodology in Geography

Total Hours: 30 **Credits: 2**

Course Objectives	• To introduce students to the fundamental concepts of research methodology in geography. • To develop an understanding of different research approaches and data collection techniques in geographical studies. • To enhance students' ability to analyze and interpret geographical data effectively. • To enable students to design and conduct independent geographical research projects.	
Course Outcomes	After successful completion of this course, students are expected to: • Understand the key concepts, methods, and ethical aspects of research in geography. • Identify and formulate a research problem, objectives, and hypothesis. • Apply appropriate data collection and analysis techniques for geographical research. • Write and present a well-structured research report based on geographic investigations.	
Unit	**Contents**	**Hours**
Unit I	**Fundamentals of Research in Geography** • Meaning, Definition, and Scope of Research in Geography • Types of Research: Descriptive, Analytical, Applied, and Theoretical • Research Process: Identification of Research Problem, Objectives, and Hypothesis Formulation • Ethical Considerations in Geographical Research	**08**
Unit II	**Research Design and Data Collection** • Research Design: Exploratory, Experimental, and Survey-Based Research • Types and Sources of Data: Primary and Secondary • Methods of Data Collection: Observation, Questionnaire, Interview, and Case Study • Sampling Techniques: Probability and Non-Probability Sampling	**08**
Unit III	**Data Analysis and Interpretation** • Methods of Data Processing: Editing, Classification, and Tabulation • Statistical Techniques for Data Analysis in Geography (Mean, Median, Mode, Standard Deviation) • Graphical Representation of Data: Diagrams, Graphs, and Maps • Interpretation of Results and Drawing Conclusions	**06**
Unit IV	**Research Report Writing and Presentation** • Structure and Components of a Research Report • Referencing and Citation Styles (APA, MLA, Chicago) • Plagiarism and Academic Integrity • Preparing a Research Proposal and Presentation Techniques	**08**

Study Resources	• Kothari, C. R. (2004). Research methodology: Methods and techniques (2nd ed.). New Age International. • Montello, D. R., & Sutton, P. C. (2013). An introduction to scientific research methods in geography and environmental studies (2nd ed.). SAGE Publications. • Kumar, R. (2019). Research methodology: A step-by-step guide for beginners (5th ed.). SAGE Publications. • Creswell, J. W. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). SAGE Publications. • Gomez, B., & Jones, J. P. (2010). Research methods in geography: A critical introduction. Wiley-Blackwell.	

T.Y. B.Sc. Geography (Major)
Semester-V
GEO-DSC-354: Practical in Prismatic Compass

Total Hours: 60 **Credits: 2**

Course Objectives	• To Master prismatic compass setup and usage for accurate surveys. • To earn bearing measurement methods and analysis. • To understand the various survey techniques using prismatic compass. • To learn methods for bearing correction and survey plotting.	
Course Outcomes	After successful completion of this course, students are expected to: • Proficiency in prismatic compass handling and survey application. • Identify and mitigate sources of errors in prismatic compass surveys. • Implement diverse survey methods for precise location determination. • Competence in using Bowditch methods for accurate survey data correction and plotting.	
Sr. No.	**Contents**	**Hours**
	Introduction	
1	Introduction Prismatic Compass Survey	**4**
2	Instrument use in Prismatic Compass Survey	**4**
	Measuring bearing by prismatic compass	
3	Whole circle bearing method	**4**
4	Quardrantal reduced bearing method	**4**
5	Forward and back bearing method	**4**
6	Sources of errors in Prismatic compass survey	**4**
7	Field survey and plotting	
	Surveying method of Prismatic compass	
8	Radiation method	**4**
9	Intersection method	**4**
10	Travers method	**4**
11	Field survey and plotting	
	Bowditch method	
12	Graphic Method Mathematical Method	**4**
13	Correction bearing and plotting of Prismatic compass survey	**4**
14	Field survey and plotting	**4**
15	Field survey and plotting(out of campus)	**4**
Study Resources	• Bygott, j.1955.Map work and practicalGeography.5 the Edition. • Davis, R.E.and Foote, F.s.1953.surveying, McGraw-HillBook Co.New York. • Deshpande, G.B.1991.surveying, Evrest publishing house, pune. • Kale.R.G.andWalvekar, G.V.1980survying parts I.	

	• Kanatkar T.P. and Kulkarni S.V. surveying and leveling, part I. Pune vidyarthiGrihaPrakashan, Pune. • Khan M.Z.1998, Text book of Practical Geography, concept publishing company, New Delhi. • Sing & Dutta. Map work and Practical Geography. • Sing R.L. & Singh R.P.B, 1993 Elements of Practical Geography Kalyani publisher, New Delhi. • Steers J, A.1993, A study of Map Projections.	

T.Y. B.Sc. Geography (Major)
Semester-V
GEO-DSC-355: Practical in IMD weather maps

Total Hours: 60 **Credits: 2**

Course Objectives	• To learn the basic concepts of IMD Weather Maps. • To study the functions and uses of weather instruments. • To study the dawning of isobaric patterns and associated weather • To learn about the IMD weather map reading techniques.	
Course Outcomes	After successful completion of this course, students are expected to: • Understand the basic concepts of IMD Weather Maps. • Appreciate the functions and uses of weather instruments. • Understand the dawning of isobaric patterns and associated weather • Aware of interpretation of IMD weather maps.	
Unit	**Contents**	**Hours**
1	Weather instruments (Mechanism, Functions and Usages)	**4**
2	Measurement of temperature • Simple thermometer • Maximum and minimum thermometer • Thermograph	**4**
3	Measurement of humidity • Dry and wet bulb thermometer • Hygrograph	**4**
4	Measurement of precipitation • Rain gauge	**4**
5	Measurement of air pressure • Aneroid barometer • Barograph	**4**
6	Measurement of wind direction and velocity • Wind vane • Cup anemometer	**4**
7	Weather maps • Introduction to weather maps • Symbols in Daily weather report used by India Meteorological Department (IMD)	**4**
8	Isobaric patterns • Drawing of isobaric patterns and associated weather- cyclone, anticyclone, ridge, trough, wedge, secondarydepression, col	**4**
9	Introduction to traditional IMD Weather map reading and Satellite imageries reading	**4**
10	Reading of weather map of Summer Season	**4**
11	Reading of weather map of Summer Season	**4**
12	Reading of weather map of Monsoon Season	**4**
13	Reading of weather map of Monsoon Season	**4**
14	Reading of weather map of Winter Season	**4**
15	Reading of weather map of Winter Season	**4**
Study	• Arjun,K. (2000). PratyakshikBhugolSumeruPrakashan, Dombivali.	

Resources	• Ahirrao, D. Y &Karanjkhele, E. K. (2002).PratyakshikBhugolSudhershanPrakashan, Nashik. • Singh, G. (2008). Map work and practical geography. Vikas Publishing House pvt.ltd,New Delhi. • Mishra, R. P. and Ramesh, A. (1986). Fundamental of Geography. Concept publication, New Delhi. • Singh, R. L. and Kanauja, (1970).Map work and practical geography. Central book depot, Alahabad.	

T.Y. B.Sc. Geography (Elective)
Semester-V
GEO-DSE-351 A: Regional Planning

Total Hours: 30 **Credits:02**

Course Objectives	• To understand and evaluate the concept of region in geography and its role and relevance in regional planning, • To identify the issues relating to the development of the region through the process of spatial organization of various attributes and their interrelationships. • To identify the causes of regional disparities • To suggest the measures for the development of the region.	
Course Outcomes	After successful completion of this course, students are expected to: • Analyze and evaluate the processes and factors influencing regional development. • Identify and explain the spatial patterns and variations in regional development. • Apply various tools and techniques for regional planning and development. • Evaluate the social, economic, and environmental impacts of regional development projects.	
Unit	**Contents**	**Hours**
Unit I	**Regional Planning:** • Definition of Region • The Concept, Need & Objectives of Regional Planning. • Role of Geography in Regional Planning. • Role of Regional Planning in Development • Types of Regional Planning: Short Term, Long Term, Physical and Economic, Developmental & Imperative. • Types of region:-i. Homogeneous, ii. Nodal, iii. Functional, iv. Programming, v. Administrative, vi. Urban areas. Characteristics of Planning Regions	**08**
Unit II	**Choice of Region:** • Characteristics of an Ideal Planning Region • Delineation of Planning Region (Variables for Delineation, Land use Characteristics, Demographic, Transport Infrastructure, Social Services and Public Utilities, Socio-Economic Structures) • Regionalization of India for Planning • Agro-ecological Zones	**08**
Unit III	**Theories and Models for Regional Planning:** • Rostow's Model of Economic Development • Growth Pole Theory in Indian Context.	**06**
Unit IV	**Measuring of Development and Regional Planning & Development in India:** A) Economic Planning: Introduction to 12th five-year plan, • Role NITI Aayog in Development, • Damodhar Valley Corporation- The Success Story • Backward Regions and Regional Planning B) Nature of regional inequalities and disparities in India	**08**

	• Regional and Local Development Programmes: MGNREGA, PMGSY, JJM, JNNURM 3.4 SEZ and EEZ: Methods of Delineation, Policies and Problems	
Study Resources	• Dickinson R.E.(1964) City and Region; A Geographical Interpretation Routledge and Keagan Paul. • Friedman J.&Alonson W.(1964) Regional Development and Planning. MIT Press. Cambridge mass. • Galasson John (1974) An Introduction to Regional Planning Hutchinson Educational London • Misra R.P. Sundaram K.V.& V.L. S. Prakasa Rao (1974) Regional Development Planning In India. • Misra R.P. (1992) Regional planning, Concept Publishing company, New Delhi. • Mahesh Chand &VinaykumarPuri(1983) Regional Planning in India, Allied publishers Ltd., New Delhi. • Whynnes Charles &Hammand (1979) Element of Human Geography, George Aflen& Unwin, London. • Bhat L. S.(1972) Aspects of Regional Planning in India.Statistical Publishing Society • Blij H. J. De,(1971) Geography: Regions and Concepts, John Wiley and Sons.	

T.Y. B.Sc. Geography (Elective)
Semester-V
GEO-DSE-351 B: Biogeography

Total Hours: 30 **Credits: 2**

Course Objectives	• To understand the basic concepts and approaches of biogeography. • To learn components and types of ecosystems. • To acquire knowledge of marine biogeography and types of ocean habitats. • To study the basics of biodiversity and biosphere.	
Course Outcomes	After successful completion of this course, students are expected to: • Understand the structure and composition of ecosystem. • Evaluate various approaches and branches of biogeography. • Explore the concept of marine and island biogeography. • Acquire a comprehensive understanding of biodiversity and biosphere reserves in India.	
Unit	**Contents**	**Hours**
Unit I	**Introduction to Biogeography** • Biogeography-Concept, definition, nature and scope. • Importance of Biogeographic studies. • Approaches in Biogeography. • Historical Development and Branches of Biogeography.	**08**
Unit II	**Ecosystem and Biosphere** • Ecosystem: Concept, meaning and types. • Components of ecosystem and ecosystem productivity. • Biosphere: Concept, meaning and components.	**06**
Unit III	**Marine Biogeography** • Marine Biogeography meaning and concept • Types of ocean habitats • Biogeography of estuaries • Island biogeography	**08**
Unit IV	**Biogeographical regions and Biodiversity** • Meaning and types of Biodiversity. • Importance of Biodiversity. • Biodiversity loss and Conservation. • Biosphere reserves and Biodiversity hotspots in India	**08**
Study Resources	• Flannery, T. 2015. The Eternal Frontier: An Ecological History of North America and Its Peoples. Grove/Atlantic, Inc. • Gavin, D. G. 2012. Biogeography. Pages 77â€“89 in J. P. Stoltman, editor. 21st Century Geography: A Reference Handbook. SAGE Publications, Thousand Oaks, CA. • Jackson, S. T. 2004. Quaternary biogeography: Linking biotic responses to environmental variability across timescales. Pages 47â€“65 in M. V. Lomolino and L. R. Heaney, editors. Frontiers of Biogeography: New Directions in the Geography of Nature. Sinauer, Sunderland, MA.	

	• Lomolino, M. V., B. R. Riddle, J. H. Brown, and R. J. Whittaker. 2010. Biogeography. Fourth Edition. Sinauer Associates, Sunderland, MA. • MacDonald, G. M. 2003. Biogeography: Space, Time and Life. Wiley, New York. • McCarthy, D. 2011. Here Be Dragons: How the study of animal and plant distributions revolutionized our views of life and Earth. OUP Oxford. • Molles, M. C. 1999. Ecology: Concepts and Applications. WCB/McGraw-Hill. • Perry, D. A., R. Oren, and S. C. Hart. 2013. Forest Ecosystems. JHU Press	

T.Y. B.Sc. Geography (Elective)
Semester-V
GEO-DSE-352 A: Practical on Morphometric Analysis

Total Hours: 60 **Credits: 2**

Course Objectives	• To study the nature of river basin. • To study three-dimensional feature of the basin. • To study the relationship between basin parameter and basin morphometry. • To Learn the river profiles.	
Course Outcomes	After successful completion of this course, students are expected to: • Understand description and comparison of different forms of drainage basin. • Understand geometry of basin. • Understand the importance of relief aspect. • Understand the idea of the basin relief.	
Unit	**Contents**	**Hours**
1	Introduction to basin morphometry	**4**
2	Liner aspects of basin	**4**
3	A stream ordering by basin	**4**
4	Length ratio and low of stream length	**4**
5	Sinuosity index	**4**
6	Geometry of basin slope	**4**
7	Horton`s farm factor	**4**
8	Law of basin area	**4**
9	Stream frequency	**4**
10	Drainage Density	**4**
11	Hypsometric Curve	**4**
12	Relative relief	**4**
13	Dissection index	**4**
14	Cross profile	**4**
15	Longitudinal profile	**4**
Study Resources	• Gregary K.G. and Walling D. (1973); Drainage Basin Forms and Processes, Edward Arnold • Khullar,(2015): Essentials of Practical Geography, New Academic Publishing Co, India. • P. Saha and P. Basu (2006): Advanced Practical Geography, Books and Allied Publication, Kolkata, India. • Richards K. (1982) River; form and processes in alluvial channels Matheu London • Savindra Singh (2005): Geomorphology, Prayag Pustak Bhawan, Allahabad, India. • Schumm S.A. (1977) Fluvial system John Wiley & Co. • Singh Gopal (Rep. 2010): Map Work and Practical Geography • Singh L R (2011): Fundamentals of Practical Geography, Kalyani Publishers	

T.Y. B.Sc. Geography (Elective)
Semester-V
GEO-DSE-352 B: Practical on Aerial Photography

Total Hours: 60 **Credits: 2**

Course Objectives	• To understand the definition, history, and significance of aerial photographs in mapping and geographical analysis. • To explore the importance of aerial photography and its application in various fields, particularly in India. • To introduce the different types of aerial photographs, including stereoscopic coverage and equipment used for interpretation. • To develop skills in interpreting aerial photographs, including geometric calculations, photo scale, and identification of geographical features.
Course Outcomes	• Students will be able to define and describe the significance of aerial photographs and their historical development. • Students will understand the importance of aerial photography and its diverse applications in India and globally. • Students will gain proficiency in geometric calculations related to aerial photography, such as photo scale, focal length, and flight height. • Students will develop the ability to interpret aerial photographs, including identifying features and transforming points for geographical analysis.

Unit	Contents	Hours
1	Introduction to remote sensing	**4**
2	Platform of remote sensing	**4**
3	Definition, History, significance of Aerial Photographs. Importance of Aerial photograph	**4**
4	Types of Aerial photographs	**4**
5	Pocket stereoscope	**4**
6	Mirror stereoscope	**4**
7	Photo Scale , Focal length	**4**
8	Flying Height, Height from object	**4**
9	Flight line, overlap region	**4**
10	Elements of Aerial Photo Interpretation	**4**
11	Transformation of points	**4**
12	Calculation of scale.	**4**
13	Identification of features	**4**
14	Interpretation of photographs (at least two pairs of aerial photographs).	**4**

15	Prepare journals and assignment	**4**
Study Resources	▪ Lueder, D.R., (1959): Aerial photographic interpretation, McGraw Hill Book Co. ▪ Paul R. Wolf (2000): Elements of Photogrammetry, McGraw-Hill. ▪ Joseph, G. (2004): Fundamentals of Remote Sensing, Universities Press, Hyderabad, India ▪ Lillesand, T. M., Kiefer, R. W. and Chipman, J. W. (2008): Remote Sensing and Image Interpretation, John Wiley & Sons, New Delhi ▪ Sabins, F. F. (1996): Remote Sensing: Principles and Interpretation, W. H. Freeman and Company, San Francisco ▪ Jensen, J. R. (2005): Introductory Digital Image Processing, Prentice Hall, New Jersey ▪ Drury, S. A. (2001): Image Interpretation in Geology, Blackwell, Oxford ▪ Campbell, J. (2002): Introduction to Remote Sensing, Taylor & Francis, London ▪ Anji Reddy, M. (2008): Textbook of Remote Sensing and Geographic Information System, B.S. Publication Hyderabad ▪ Wolf, P .R. (1974): Elements of Photogrammetry, McGraw Hill Inc., Kogaknscha	

T.Y. B.Sc. Geography (Vocational)
Semester-V
GEO-VSC-351: Introduction to DBMS

Total Hours: 30 **Credits: 2**

Course Objectives	• To introduce the students to the basic concepts and principles of DBMS • To understand the techniques of DBMS. • To apply the techniques in different fields • To learn various database security concepts.	
Course Outcomes	After successful completion of this course, students are expected to: • Understand the DBMS and Database Security Concept • Know the applications of DBMS in GIS • Evaluate the methodologies for Database management. • Students understand various operators of DBMS	
Unit	**Contents**	**Hours**
Unit I	**Introduction and Relational Data Models** • Introduction to database systems, • Various components of a DBMS; ER Model • Conceptual data modeling - entities, entity types, various types of attributes, relationships, relationship types,various types of joins,	**06**
Unit II	**Controlling User Access of DBMS** • Control Database Access • Privileges, Creating User • Concept of Role, Creating • Granting Privileges to Role • Revoking Privileges.	**08**
Unit III	**Comprehensive Management of Schema Objects** • Managing Schema Object: Data Types, DDL, DML, DCL • Constraints: Types of Constraints, Primary Key, Foreign Key, Check Constraint, Not Null, Altering Constraint, Concept of Backup Recovery. Overview of Index.	**08**
Unit IV	**Manipulating of Datasets** • Manipulating Dataset using SQL Statement: Basic Select Statement, Selecting Specific Column, Using Arithmetic Expressions, Defining Column Alias, using Where Clause • Restricting & Sorting Data: using Comparison Condition (=,<=,>=Etc), • Using Logical Operator: AND, OR, NOT, using BETWEEN, LIKE Conditions	**08**
Study Resources	• SPRS Technical Commission VII 2002: Symposium on Resource Environmental Monitoring, ISRS Annual Convention, IIRS, Dehradun • Deekshatulu, B. L. 1990: Description and use of Land use/Landcover, NRSA, Hyderabad • Sudershana, R. Mitra, D. Mishra, Roy, P.S., Rao, D. P. 2000: Subtle Issues in Coastal Management, IIRS,Dehradun	

	• Lal, D. S. 1998: Climatology, Chaitanya Publishing House, Allahabad • Escalante, R. B. 2012: Remote Sensing- Advances techniques and Platforms, Intech, Rijeka Croatia • Escalante, R. B. 2012: Remote Sensing Application, Intech, Rijeka Croatia • Harris, J. E. 1990: Earthwatch – The Climate from space, Ellishorwood Ltd., Midsower Norton	

T.Y. B.Sc. Geography (Vocational)
Semester-V
GEO-VSC-352: Practical on Open Source GIS

Total Hours: 60 **Credits: 2**

Course Objectives	• To introduce students to the fundamentals of Open Source GIS software and its applications in geography. • To develop practical skills in spatial data acquisition, processing, and visualization using Open Source GIS. • To apply geospatial techniques for spatial analysis and mapping in geographical studies. • To encourage the use of Open Source GIS for solving real-world geographical problems.	
Course Outcomes	After successful completion of this course, students are expected to: • Understand the basic principles and functionalities of Open-Source GIS software. • Efficiently handle spatial data input, processing, and management using QGIS. • Perform spatial analysis and create thematic maps for various geographical applications. • Apply Open-Source GIS tools to real-world geographic and environmental problems.	
Unit	**Contents**	**Hours**
1	**Introduction to Open-Source GIS** • Definition and Importance of GIS	**4**
2	• Overview of Open-Source GIS: QGIS, GRASS GIS, gvSIG	**4**
3	• Installation and Interface of QGIS	**4**
4	• Data Types in GIS: Raster and Vector	**4**
5	**Spatial Data Input and Management** • Importing and Managing Spatial Data in QGIS	**4**
6	• Georeferencing: Concept, Importance, and Practical Implementation	**4**
7	• Attribute Table Management and Editing Spatial Data	**4**
8	• Data Format Conversion and Exporting GIS Data	**4**
9	**Spatial Analysis and Thematic Mapping** • Basics of Spatial Analysis: Buffer, Overlay, and Spatial Query	**4**
10	• Creating Thematic Maps: Choropleth, Dot Density, and Proportional Symbols	**4**
11	• Working with DEM (Digital Elevation Model) for Terrain Analysis	**4**
12	• Introduction to Remote Sensing Data in Open Source GIS	**4**
13	**Unit 4: Applications of Open Source GIS in Geography** • Land Use and Land Cover (LULC) Mapping	**4**
14	• Hydrological Analysis using QGIS	**4**
15	• Urban and Rural Planning with Open Source GIS • Case Studies on GIS Applications in Environmental Management	**4**

Study Resources	• Neteler, M., &Mitasova, H. (2008). Open Source GIS: A GRASS GIS approach (3rd ed.). Springer. • Sutton, T., Dassau, O., & Sutton, M. (2009). A gentle introduction to GIS: Using QGIS. Spatial Thoughts. • Steiniger, S., & Hunter, A. J. S. (2013). Free and open-source GIS software for building a spatial data infrastructure. Future Internet, 5(1), 39-66. • Graser, A. (2016). Learning QGIS – Second Edition. Packt Publishing. • Sherman, G. (2012). The PyQGIS programmer's guide. Locate Press.	

T.Y. B.Sc. Geography (On Job Training)
Semester-V
GEO-OJT-351: On Job Training / Internship

Hours: 120 **Credits: 4**

Course objectives	• To provide the students with actual work experience • To make aware prescribe standards and guidelines at work • To develop the employability of participating student • To avail an opportunity to eventually acquire job experiences
Course outcomes	After successful completion of this course, students are expected to: • Get actual work experience with office and virtual exposure to various management styles, technical, industrial, and procedural systems • Acquaint the knowledge related to working hours, work protocols and guidelines • Understand the roles and responsibilities of employee as well as team work • Justify job experiences that match their potentials, skills, and competencies

Internship

An internship is a professional learning experience that offers meaningful, practical work related to a student's field of study or career interest. An internship gives a student the opportunity for career exploration and development, and to learn new skills.

On the job training

On the job training is a form of training provided at the workplace. During the training, employees are familiarized with the working environment they will become part of. Employees also get a hands-on experience using machinery, equipment, tools, materials, etc.

Internship / OJT Process:

1. **Pre-Approval**: Students should seek approval from the college before starting the Internship / OJT. This ensures that the Internship / OJT aligns with the curriculum and meets the necessary criteria.
2. **Mentor and Supervisor**: Each student should have an assigned mentor at the organization/industry where they are interning. Additionally, an Internship / OJT supervisor from the college will be appointed to guide and monitor the progress.
3. **Regular Reporting:** Students should maintain regular communication with their supervisor and mentor, providing progress reports and seeking feedback.
4. **Professional Conduct**: Students must adhere to professional conduct throughout the Internship / OJT, including punctuality, respect for colleagues, and adherence to the organization's/industry's policies and guidelines.
5. **Student Diary**: Students should maintain a diary to document their experiences, challenges faced, and lessons learned during the Internship / OJT.
6. **Final Report**: At the end of the Internship / OJT, students should submit a comprehensive final report, summarizing their accomplishments, contributions, and key takeaways.
7. **Evaluation**: The Internship / OJT is worth 4 credits (equivalent to 100 marks), and the evaluation will be divided into two categories: one by the mentor and the other by the Internship / OJT supervisor. The mentor's evaluation (internal examination) will carry 40 marks, and it will be based on the student's performance during the Internship / OJT. External examination will be conducted by mentor and supervisor which will be based on the student's diary, the final report prepared by the student, and their performance in the

final viva voce, and will carry 60 marks. The total marks obtained by the students in both evaluations will be added together for the purpose of final evaluation. The evaluation of the students will be conducted by the mentor using the evaluation sheet provided by the college.

Internal Evaluation Criteria for Students by the Mentor:

1. **Quality of Work** (10 marks): How well did the student perform their assigned tasks during the Internship / OJT? Evaluate the accuracy, thoroughness, and attention to detail in their work.
2. **Initiative and Proactiveness** (10 marks): Did the student show initiative in taking on additional responsibilities or tasks beyond their assigned role? Did they demonstrate a proactive attitude towards problem-solving?
3. **Communication Skills** (10 marks): Assess the student's ability to communicate effectively with colleagues, superiors, and clients (if applicable). Consider both written and verbal communication.
4. **Problem-Solving SkillsandTime Management** (10 marks): Evaluate the student's ability to analyze problems, propose solutions, and implement effective strategies to overcome challenges. How well did the student manage their time during the Internship / OJT? Were they able to meet project deadlines and handle multiple tasks efficiently?

External Evaluation Criteria for Students by the Supervisor and Mentor:

1. **Student Diary** (15 marks): Review the student's diary to understand their reflections, insights gained, and self-assessment of their performance during the Internship / OJT.
2. **Final Report** (15 marks): Evaluate the quality and comprehensiveness of the student's final report, including the clarity of their achievements and contributions.
3. **Presentation of Student in Viva Voce** (30 marks): Evaluate the responses given by the student to the questions asked by the faculty in the Viva Voce.

Evaluation Criteria for Final Viva Voce:

1. Presentation Skills
2. Knowledge of the Internship / OJT Project
3. Practical Application and Work Experience
4. Problem-Solving and Critical Thinking
5. Communication and Professionalism

SEMESTER-VI

T.Y. B.Sc. Geography (Major)
Semester-VI
GEO-DSC-361: Geographical Thoughts

Total Hours: 30 **Credits: 2**

Course Objectives	• To understand the historical development and evolution of geographical thought. • To explore the contributions of different schools of thought in geography. • To analyze the impact of philosophical and methodological shifts in geography. • To critically evaluate contemporary debates and emerging trends in geographical thought.	
Course Outcomes	After successful completion of this course, students are expected to: • Explain the historical evolution and key contributions to geographical thought. • Differentiate between various schools of thought and their impact on modern geography. • Apply philosophical and methodological approaches to geographical research. • Critically assess contemporary trends and debates in geography.	
Unit	**Contents**	**Hours**
Unit I	**Evolution of Geographical Thought** • Meaning, Nature, and Scope of Geographical Thought • Ancient and Classical Geography: Contributions of Greek and Roman Geographers (Eratosthenes, Ptolemy, Strabo) • Medieval Geography: Arabian and European Contributions • Renaissance and Age of Exploration: Developments in Cartography and Regional Studies	**08**
Unit II	**Development of Modern Geography** • Impact of Scientific Revolution on Geography • German School: Contributions of Humboldt and Ritter • French School: Contributions of Vidal de la Blache and Possibilism • British and American Schools of Geography: Hartshorne, Sauer, and Areal Differentiation	**08**
Unit III	**Philosophical and Methodological Approaches in Geography** • Environmental Determinism vs. Possibilism • Regional vs. Systematic Geography • Quantitative Revolution and Spatial Analysis • Behavioral, Humanistic, and Radical Approaches in Geography	**08**
Unit IV	**Contemporary Trends and Emerging Paradigms** • Postmodernism and Critical Geography • Feminist Geography and Social Justice • GIS and Technological Advancements in Geographical Research • Future Perspectives in Geographical Thought	**06**

Study Resources	• Dickinson, R. E. (1969). The makers of modern geography. Routledge. • Hartshorne, R. (1959). Perspective on the nature of geography. Rand McNally. • Peet, R. (1998). Modern geographical thought. Blackwell Publishers. • Holt-Jensen, A. (2018). Geography: History and concepts (5th ed.). SAGE Publications. • Johnston, R. J. (1997). Geographical thought: A contextual history of ideas. Routledge.	

T.Y. B.Sc. Geography (Major)
Semester-VI
GEO-DSC-362: Geography of Urban Settlement

Total Hours: 30 **Credits: 2**

Course Objectives	• To impart the knowledge related definition, concepts, development. • To developed the ability of classifying urban settlement on different basis along with types, patterns. • To enable the students to critically understand the development of amenities and infrastructure of urban settlement geography. • To comprehend the knowledge of spatial distribution, changing morphology.	
Course Outcomes	After successful completion of this course, students are expected to: • Tracing the changing human and cultural landscape at different levels with reference to urban settlement. • To Explain the patterns and processes of settlement growth and its implications. • Analyze the types and patterns of urban settlements and related issues • Be able to discover and understand spatial distribution and changing forms.	
Unit	**Contents**	**Hours**
Unit I	**Introduction to Geography of Urban settlement** • Nature of Urban Geography • Scope of Urban Geography • Significance of Urban Geography • Factors influencing growth and distribution of urban settlements-Site and Situation.	**08**
Unit II	**Classification.** • Hierarchy of urban settlement,Rank Size rule and Primate cities. • Classification of urban settlements on the basis of functions. • Classification of urban settlements on the basis of culture.	**06**
Unit III	**Theories** • Park and Burgess Model. • Homer Hoyet Model. • Harris and Ullman Model. • City region and Urban Sprawl -Concept,Criteria and characteristics.	**08**
Unit IV	**Urban Settlements in India** • Urbanization in India: Trends, patterns and types of towns. • Contemporary urban issues in India. • Urban development policy in India. • Smart cities – Concept,Need and Implementation.	**08**
Study Resources	• Bhattacharya: Urban Development in India, Shree publication. • Brian, R.K. (1996): Landscape of Settlement Prehistory to present, Routledge, London. • Careter (1972): Fourth edition: The study of Urban Geography, Arnold, London. • Gadakh B.L. and Jaybhaye R. G. (2017): Urban Sprawal Analysis of	

	Nashik City. Scholar press. • Hall P. (1992): Urban and Regional Planning, Routedge, London. • K. Siddharth and S. Mukherji : Cities, Urbanization and Urban Systems. • Kundu, A. (1992): Urban Development and Urban Research in India, Khanna Publication. • R.B Mandal-V.G A Textbook Concept publishing Company • Shah ManzooorAlam: Urbanization in Developing Countries. • Singh.K.andSteinberg.F. (eds)(1998): Urban India in Crisis. New Age Interns • Verma L. N. (2006): Urban Geography, JaipurRawat Publications.	

T.Y. B.Sc. Geography (Major)
Semester-VI
GEO-DSC-363: Oceanography

Total Hours: 30 **Credits: 2**

Course Objectives	• To introduce the general structure of ocean. • To understand the ocean water properties. • To understand the ocean water movement. • To understand the marine deposition.	
Course Outcomes	After successful completion of this course, students are expected to: • know the importance of properties oceans. • Will able to understand the terminology of the Tsunami disaster. • Will able oceans navigation • Know about marine deposition and coral reefs.	
Unit	**Contents**	**Hours**
Unit I	**Introduction to ocean and Submarine Relief** • Meaning and concept • Importance of the study of oceanography in modern time • Surface configuration of ocean floor. • Submarine relief of major oceans	**06**
Unit II	**Properties of ocean water** • Salinity o Definitions o Composition of salinity of ocean water according to Ditmar's research. o Factors affecting the distribution of salinity of ocean water. o Distribution of salinity- open ocean, partially enclosed sea, inland sea & lakes • Temperature o Distribution of Ocean water temperature: a) Horizontal b) Vertical. • Density o Definitions and characteristics of density of ocean water. o Factors controlling the density of ocean	**08**
Unit III	**Movement of Ocean Water** • Oceanic Waves o Definitions, Nature and Characteristics of Waves. o Breaking of waves o Tsunami waves: Definitions, characteristics and effects of Tsunami. • Ocean Currents o Definition and types. o Characteristics. o Causes of origin. • Ocean currents in following oceans. a) Atlantic Ocean b) Indian Ocean v) Effects of ocean currents.	**08**

Unit IV	**Marine Deposits and Coral Reefs** • Marine Deposits. o Meaning of marine deposit. o Classification based on the Sources of Origin. a) Terrigenous b) Biogenous c) Hydrogenous d) Cosmogenous (Only Meaning and examples) o Types of Ooze a) Calcareous Ooze b) Siliceous Ooze. o Coral Reefs a) Definition and formation of Coral Reefs. b)Types of Coral Reef: 1) Fringing Reef 2) Barrier Reef 3) Atolls 4) Table Reef 5) Patch Reef.	**08**
Study Resources	• Bhadwaj K, Physical Geography-Oceanography, Discovery publishing house New Delhi. • Davis Richard J.A., (1987): Oceanography- An introduction to the marine Environment, W.M.C.,Brooth Flow. • Garison T. (1998): Oceanography, Wards worth Company, USA • K. Siddhartha (2001): Oceanography A Brief Introduction, Kisalaya Publication Pvt. Ltd. Padma Apartment New Delhi. • Khan Nizamuddin (2001): An Introduction to Physical Geography, Concept Publication Company, New Delhi. • Majid Husain (2001): Fundamental of Physical Geography, Ravat Publication, Jaipur • Negi B.S., Climatology and oceanography, Kedarnath and Ramnath Publishing , Meerut. • Padey, P.N. (2002): Physical Geography, NiraliPrakashan, Pune • Ross D.A. (1988): Introduction to Oceanography, Prentice Hall, New Jersey. • Savindar Sing, Physical Geography, Prayag pustak bhavan, Alahabad • Sharma R.C. and Vatal,(1970): Oceanography for Geographers, Chaitanya Delhi. • Tikha R.N**.,** Physical Geography, kedarnath and ramnath and co. Merrut	

T.Y. B.Sc. Geography (Major)
Semester-VI
GEO-DSC-364: Sustainable Development

Total Hours: 30 **Credits: 2**

Course Objectives	• To understand the concept and evolution of sustainable development. • To explore environmental challenges and solutions for sustainability. • To examine the social and economic dimensions of sustainability. • To analyze global and local strategies for achieving sustainable development goals (SDGs).	
Course Outcomes	After successful completion of this course, students are expected to: • Define sustainable development and explain its importance. • Understand the environmental challenges and approaches to conservation and resource management. • Assess the social and economic factors contributing to sustainability. • Gain knowledge of the SDGs and strategies for implementing sustainable development at global and local levels.	
Unit	**Contents**	**Hours**
Unit I	**Introduction to Sustainable Development** • Definition and concept of Sustainable Development • Historical background and evolution of Sustainable Development • The pillars of Sustainable Development: Environmental, Social, and Economic • The role of sustainable development in addressing global challenges	**08**
Unit II	**Environmental Sustainability** • Environmental challenges: Climate change, biodiversity loss, pollution • Ecosystem services and their role in sustainable development • Conservation and sustainable use of natural resources • Renewable vs. non-renewable resources and their implications	**07**
Unit III	**Social and Economic Dimensions of Sustainability** • Social sustainability: Poverty reduction, gender equality, and access to basic services • Economic sustainability: Inclusive growth, green economies, and sustainable livelihoods • The role of education, health, and social inclusion in achieving sustainability • Sustainable urban development and community engagement	**08**
Unit IV	**Global and Local Strategies for Sustainable Development** • Sustainable Development Goals (SDGs) and their global importance • International policies and agreements: Paris Agreement, Agenda 21 • Local and national strategies for implementing sustainable development • Role of technology, innovation, and sustainable business practices in achieving SD	**07**

Study Resources	• Rogers, P. P. (2012). Sustainable development: An introduction. Routledge.ISBN: 978-0415777580 • World Commission on Environment and Development. (1987). Our common future (The Brundtland Report). Oxford University Press. ISBN: 978-0192820808 • Pope, J. (2016). Introduction to sustainable development. Routledge. ISBN: 978-0415718071 • Agyeman, Julian, Robert D. Bullard and Bob Evans (Eds.) (2003) Just Sustainabilities: Development in an Unequal World. London: Earthscan. (Introduction and conclusion.). • Ayers, Jessica and David Dodman (2010) "Climate change adaptation and development I: the state of the debate". Progress in Development Studies 10 (2): 161-168. • Baker, Susan (2006) Sustainable Development. Milton Park, Abingdon, Oxon; New York, N.Y.: Routledge. (Chapter 2, "The concept of sustainable development"). • Brosius, Peter (1997) "Endangered forest, endangered people: Environmentalist representations of indigenous knowledge", Human Ecology 25: 47-69. • Lohman, Larry (2003) "Re-imagining the population debate". Corner House Briefing 28. • Martínez-Alier, Joan et al (2010) "Sustainable de-growth: Mapping the context, criticisms and future prospects of an emergent paradigm" Ecological Economics 69: 1741-1747. • Merchant, Carolyn (Ed.) (1994) Ecology. Atlantic Highlands, N.J: Humanities Press. (Introduction, pp 125.)	

T.Y. B.Sc. Geography (Major)
Semester-VI
GEO-DSC-365: IKS Geography

Total Hours: 30 **Credits: 2**

Course objectives	• To understand the fundamental concepts of the Indian Knowledge System (IKS) in geography. • To explore ancient Indian texts and their geographical interpretations. • To analyze the contributions of Indian scholars to geographical thought. • To examine the relevance of traditional geographical knowledge in contemporary studies.	
Course outcomes	After completing this course, students will be able to: • Explain the core principles of the Indian Knowledge System in geography. • Identify and interpret geographical concepts from ancient Indian texts. • Evaluate the contributions of Indian scholars to geographical thought. • Apply traditional geographical knowledge to modern environmental and spatial studies.	
Unit		**Hours**
Unit I	**Introduction to Indian Knowledge System (IKS) in Geography** • Concept and scope of the Indian Knowledge System • Geographical knowledge in ancient Indian texts: Vedas, Puranas, and Epics • Traditional Indian worldview of land, water, and environment • Philosophical perspectives on nature and human interaction	**08**
Unit II	**Ancient Indian Geographical Thought** • Contributions of ancient Indian scholars: Aryabhata, Varahamihira, and Bhaskaracharya • Geographic concepts in ancient texts: Desha, Bhumi, JambuDweepa • Mapping and cartographic traditions in ancient India • Ancient Indian approaches to environmental sustainability	**06**
Unit III	**Traditional Environmental and Spatial Knowledge** • Indigenous knowledge of land use and agriculture • Water management systems: step wells, tanks, and canals • Sacred geography: pilgrimage routes and spiritual landscapes • Traditional weather forecasting methods	**08**
Unit IV	**Relevance of IKS in Modern Geography** • Role of GIS and Remote Sensing • Application of traditional geographical knowledge in sustainable development • Role of IKS in disaster management and climate resilience • Reviving traditional agricultural and water management practices • Case studies of IKS-based environmental conservation initiatives	**08**

References	• Agarwal, D. P. (2009). The History of Indian Science and Technology. Rupa Publications. • Bhattacharya, P. (2019). Indian Knowledge Systems. Pearson India. • Dikshit, R. D. (2001). Geographical Thought: A Contextual History of Ideas. Prentice-Hall of India. • Iyengar, P. T. S. (2008). History of Indian Astronomy. Asia Publishing House. • Majumdar, R. C. (2016). Ancient India. MotilalBanarsidass Publishers. • Mukherjee, S. (2017). Indian Cartography: Past, Present, and Future. Concept Publishing Company. • Sharma, P. R. (2018). Traditional Knowledge Systems and Geographical Perspectives. Rawat Publications. • Srivastava, V. K. (2020). Indigenous Knowledge and Sustainable Development. Sage Publications.

T.Y. B.Sc. Geography (Major)
Semester-VI
GEO-DSC-366: Practical on Digital Skills in Geography

Total Hours: 60 **Credits: 2**

Course Objectives	• To introduce students to essential digital tools and technologies used in geography. • To develop skills in handling and analysing spatial and non-spatial data using digital platforms. • To enhance knowledge of digital mapping, visualization, and geospatial applications. • To equip students with digital communication and data presentation skills for geographic research.	
Course Outcomes	After successful completion of this course, students are expected to: • Utilize digital tools for data collection, storage, and analysis in geography. • Process and visualize geographic data using spreadsheet and visualization software. • Apply digital mapping and geospatial technologies for geographic analysis. • Develop professional reports, presentations, and interactive storytelling for geographic studies.	
Unit	**Contents**	**Hours**
1	**Introduction to Digital Tools in Geography** Overview of Digital Skills in Geography	**4**
2	Introduction to Cloud-Based Storage and File Management	**4**
3	Basics of Digital Research: Online Data Repositories and Open-Source GIS Data	**4**
4	Digital Collaboration Tools (Google Drive, Dropbox, OneDrive)	**4**
5	**Data Processing and Visualization Tools** Basics of Spreadsheet Software (MS Excel, Google Sheets) for Geographic Data. Data Cleaning and Processing Techniques	**4**
6	Graphical Representation of Data (Charts, Graphs, and Diagrams)	**4**
7	Creating Interactive Data Visualizations	**4**
8	**Digital Mapping and Geospatial Technologies** Introduction to Web-Based GIS (Google Earth, Open Street Map, ArcGIS Online)	**4**
9	Georeferencing and Digitization Techniques	**4**
10	Interactive Mapping Using Open-Source GIS Software (QGIS)	**4**
11	Basics of Remote Sensing and Digital Image Processing	**4**

12	**Digital Communication and Report Presentation** Creating Effective Presentations Using Digital Tools (MS PowerPoint, Canva)	**4**
13	Report Writing and Document Formatting (MS Word, LaTeX, Google Docs)	**4**
14	Digital Storytelling in Geography (Story Maps, Web Applications)	**4**
15	Final Project: Practical Application of Digital Skills in a Geographical Study	**4**
Study Resources	• Law, M., & Collins, A. (2021). Getting to know ArcGIS Pro (2nd ed.). Esri Press. • Chang, K. (2019). Introduction to geographic information systems (9th ed.). McGraw-Hill. • de Smith, M. J., Goodchild, M. F., & Longley, P. A. (2020). Geospatial analysis: A comprehensive guide to principles, techniques, and software tools (6th ed.). Winchelsea Press. • Few, S. (2012). Show me the numbers: Designing tables and graphs to enlighten (2nd ed.). Analytics Press. • Kraak, M. J., &Ormeling, F. (2020). Cartography: Visualization of geospatial data (4th ed.). CRC Press.	

T.Y. B.Sc. Geography (Major)
Semester-VI
GEO-DSC-367: Practical on Geo-statistics

Total Hours: 60 **Credits: 2**

Course Objectives	• To introduce students to the fundamental concepts of statistical methods in geography. • To develop skills in applying statistical techniques for spatial and non-spatial data analysis. • To enhance students' ability to interpret statistical results in geographical research. • To apply statistical software tools for geographical data analysis.	
Course Outcomes	After successful completion of this course, students are expected to: • Understand the fundamental principles of geo-statistics and their applications in geography. • Apply statistical techniques to analyse spatial and non-spatial geographical data. • Use statistical software for processing and interpreting geographical data. • Conduct hypothesis testing and interpret statistical results in geographical research.	
Unit	**Contents**	**Hours**
1	**Introduction to Geo-Statistics** • Meaning, Scope, and Importance of Geo-Statistics	**2**
2	• Types of Data: Spatial and Non-Spatial	**3**
3	• Levels of Measurement: Nominal, Ordinal, Interval, and Ratio	**3**
4	• Collection, Classification, and Tabulation of Geographical Data	**4**
5	**Measures of Central Tendency and Dispersion** • Mean, Median, and Mode with Geographical Applications	**4**
6	• Range, Standard Deviation, and Coefficient of Variation	**4**
7	• Measures of Skewness and Kurtosis	**4**
8	• Application of Measures of Dispersion in Geographical Analysis	**4**
9	**Correlation and Regression Analysis** • Concept and Types of Correlation: Pearson's and Spearman's Rank Correlation	**4**
10	• Simple and Multiple Linear Regression Analysis	**4**
11	• Application of Correlation and Regression in Geographical Studies	**4**
12	• Interpretation of Statistical Outputs in GIS and Remote Sensing	**4**

13	**: Hypothesis Testing and Spatial Data Analysis** • Formulation of Hypothesis in Geography	**4**
14	• Parametric and Non-Parametric Tests: t-test, Chi-square test.	**4**
15	• Spatial Data Analysis: Nearest Neighbor Analysis, Standard Distance, and Spatial Autocorrelation	**4**
16	• Application of Geo-Statistics in GIS Using Software (Excel, SPSS or QGIS,)	**4**
Study Resources	• Gregory, S. (2000). Statistical methods and the geographer. Longman. • Hammond, R., & McCullagh, P. (1978). Quantitative techniques in geography: An introduction. Clarendon Press. • Rogerson, P. A. (2019). Statistical methods for geography: A student's guide (5th ed.). SAGE Publications. • Burt, J. E., Barber, G. M., & Rigby, D. L. (2009). Elementary statistics for geographers (3rd ed.). Guilford Press. • Griffith, D. A., & Chun, Y. (2016). Spatial statistics and geostatistics: Theory and applications for geographic information science and technology. SAGE Publications.	

T.Y. B.Sc. Geography (Elective)
Semester-VI
GEO-DSE-361 A: Political Geography

Total Hours: 30 **Credits: 2**

Course Objectives	• Students will be able to understand the basic concepts and political issues in different parts of the globe. • To enable the pupils with the political conditions of different parts of the globe. • To enable the pupils to acquire a knowledge of political geography • Students will be able to understand the significance Geo-political aspects.	
Course Outcomes	On completion of this course, students are able to: • Develop an idea about Geo-politics • Acquire knowledge about how to state and nation form. • Acquire knowledge about state –nation relationship. • This course will provide insight to students to use this knowledge in building their career.	
Unit	**Contents**	**Hours**
Unit I	**Introduction to Political Geography** • Definition of Political Geography • History and Development of Political Geography. • Nature and scope of Political Geography • Elements of Political Geography.	**07**
Unit II	**Evolution of State & Nation** ▪ Concept of State ▪ Centrifugal and Centripetal Forces in the State ▪ Factors affecting the State. ▪ Concept of Nation ▪ Difference between State and Nation	**08**
Unit III	**Geopolitics** • Origin and Concept of Geopolitics • Mackinder's Heartland Theory • SpykmanRimland Theory • Mahan Theory • Geostrategic views after Second World War (USA, China, India))	**07**
Unit IV	**Frontiers and Boundaries and Geo-Political Problems and disputes** • Definition of Frontiers and Boundaries • Classification of International Boundaries • Boundaries of India. • Kashmir Problem / Conflict • Mc Mahon Line	**08**
Study Resources	▪ Sukhawal, Modern Political Geography of India, Sterling Publishers, New Delhi (1968) ▪ Adhikari S., 1997: Political Geography, Rawat Pub. Jaipur. ▪ Blij De H.J., 1972: Systematic Political Geography. Wiley, New York. ▪ Cohen S.B., 1973: Geography and Politics in a divided world. Oxford, New	

	York. ▪ Cox K. (): Political geography: Territory, State and Society, Blackwell Publishers ltd, 108, Cowely Road, Oxford, UK. ▪ Dixit R. D., 1982: Political Geography. Tata McGraw Hill New Delhi. ▪ Dwivedi R.L., 1996: Political Geography. Chaitanya Prakashan Allahabad. ▪ Fahrer C., Glassner M. (2001): Political geography, Wiley. ▪ Moor R., 1981: Modern Political Geography. McMillan, London. ▪ Pounds N.G., 1972: Political Geography. McGraw Hill, London. ▪ Taylor P. (1998): Political Geography, Prentice Hall. ▪ Valkenberg S.U. &Stoz C., 1963: Elements of Political Geography. Prentice Hall of India, New Delhi.

T.Y. B.Sc. Geography (Elective)
Semester-VI
GEO-DSE-361 B: Remote Sensing and GIS for Rural Development
(SWAYAM – NPTEL: Course ID- noc25-ce46)

Total Hours: 30 **Credits: 2**

Learning objectives	• To understand rural development concepts and linkages to water and food security. • To learn the basics of RS & GIS and their role in rural development. • To develop skills in GIS operations and image processing. • To apply RS & GIS for rural water, agriculture, and impact assessment.	
Course outcomes	After completing this course, students will be able to: • Explain the role of geospatial technology in addressing rural development challenges. • Perform basic operations on vector and raster datasets using GIS software. • Apply RS & GIS techniques for water resource management, agricultural mapping, and rural infrastructure planning. • Analyze and interpret case studies on the impact assessment of rural development schemes using RS & GIS tools.	
Unit		**Hours**
Unit I	• Introduction to rural development; concepts, issues, and linkages to water and food security • Introduction to geospatial technology (RS&GIS) and its importance in rural development • Introduction to open-source software for RS& GIS applications • Introduction to GIS Part -I (Operations on vector data sets) • Introduction to GIS Part -II (Operations on raster data sets)	**08**
Unit II	• Digital remote sensing image processing Part -I (Georeferencing of map data, cartographic maps, shape file creation) • Digital remote sensing image processing Part -II (Digital elevation model, land use land cover change analysis) • RS & GIS for rural water resources management – (surface water management, groundwater management)	**06**
Unit III	• RS & GIS for agriculture and soil management (farm linkages, irrigation, crop management, and mapping of storage infrastructure) • RS & GIS application for rural healthcare, education, connectivity, and communication	**08**
Unit IV	• RS & GIS for impact assessment of government rural development schemes • Applications and examples of RS & GIS for rural development: Selected case studies	**08**

References	• Bhatta, B. (2011). *Remote Sensing and GIS*. Oxford University Press. • Choudhury, S., & Jansen, L. J. M. (2019). *Geospatial Technologies for Land Degradation Assessment and Management*. Springer. • Lillesand, T., Kiefer, R., & Chipman, J. (2015). *Remote Sensing and Image Interpretation* (7th ed.). Wiley. • Kumar, S. (2019). *Basics of Remote Sensing and GIS*. New India Publishing Agency. • Roy, P. S., Dwivedi, R. S., & Vijayan, D. (2010). *Remote Sensing Applications*. National Remote Sensing Centre (NRSC), Indian Space Research Organisation (ISRO). • Jensen, J. R. (2013). *Remote Sensing of the Environment: An Earth Resource Perspective* (2nd ed.). Pearson Education. • Gupta, R. P. (2018). *Remote Sensing Geology* (2nd ed.). Springer. • Mather, P. M., & Koch, M. (2011). *Computer Processing of Remotely Sensed Images: An Introduction* (4th ed.). Wiley-Blackwell.

T.Y. B.Sc. Geography (Elective)
Semester-VI
GEO-DSE-362A: Practical on Thematic Maps

Total Hours: 60 **Credits: 2**

Course Objectives	• To understand the concept of thematic maps. • To acquaints the students with elements of thematic mapping. • To learn various thematic mapping techniques for presentation of data. • To aware the students about new technique of thematic mapping.	
Course Outcomes	After successful completion of this course, students are expected to: • Develop the mapping skill of students • Know the modern technique of map making • It increased speed and accuracy of map making. • Aware of different elements of thematic maps.	
Sr. No.	**Contents**	**Hours**
1	Introduction and Purpose of Thematic Mapping	**4**
2	Elements of Thematic mapping	**4**
3	Types: Qualitative and Quantitative Thematic Maps	**4**
4	Quantitative Thematic Maps: Dot-distribution maps.	**4**
5	Quantitative Thematic Maps: Choropleth maps.	**4**
6	Quantitative Thematic Maps: Flow-line maps.	**4**
7	Quantitative Thematic Maps: Isoline maps.	**4**
8	Maps Employing Proportional Symbols, Graphs and Statistical Summaries.	**4**
9	Introduction to GIS Data analysis.	**4**
10	Data input and Georeferencing.	**4**
11	Data Editing, Output, Query.	**4**
12	Physiographic Map using GIS software.	**4**
13	Drainage Analysis Map using GIS software.	**4**
14	Agricultural Map using GIS software.	**4**
15	Application of Thematic Mapping.	**4**
Study Resources	• Cuff J. D. and Mattson M. T., 1982: Thematic Maps: Their Design and Production, Methuen Young Books • Dent B. D., Torguson J. S., and Holder T. W., 2008: Cartography: Thematic Map Design (6th Edition), Mcgraw-Hill Higher Education • Gupta K. K. and Tyagi V. C., 1992: Working with Maps, Survey of India, DST, New Delhi. • Kraak M.-J. and Ormeling F., 2003: Cartography: Visualization of Geo-Spatial Data, Prentice-Hall. • Mishra R. P. and Ramesh A., 1989: Fundamentals of Cartography, Concept, New Delhi. • Sharma J. P., 2010: PrayogicBhugol, Rastogi Publishers, Meerut. • Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.	

	• Slocum T. A., Mcmaster R. B. and Kessler F. C., 2008: Thematic Cartography and Geovisualization (3rd Edition), Prentice Hall. • Tyner J. A., 2010: Principles of Map Design, The Guilford Press. • Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi • Singh, L R & Singh R (1977): Manchitra or PryaogatamekBhugol , Central Book, Depot, Allahabad • Bhopal Singh R L and Duttta P K (2012) PrayogatamaBhugol, Central Book Depot, Allahabad	

T.Y. B.Sc. Geography (Elective)
Semester-VI
GEO-DSE-362 B: Practical on Theodolite

Total Hours: 60 **Credits: 2**

Course Objectives	• To study the nature of river basin. • To study three-dimensional feature of the basin. • To study the relationship between basin parameter and basin morphometry. • To Learn the river profiles.	
Course Outcomes	After successful completion of this course, students are expected to: • Understand description and comparison of different forms of drainage basin. • Understand geometry of basin. • Understand the importance of relief aspect. • Understand the idea of the basin relief.	
Unit	**Contents**	**Hours**
1	Introduction to Theodolite Surveying: Definition and importance	4
2	Historical development of Theodolite Surveying	4
3	**Components of a Theodolite** • Optical plummets • Spirit level • Graduated circles • Tripod stand	8
4	**Types of Theodolites** • Transit theodolite • Non-transit theodolite	8
5	**Basic Operations of Theodolite** • Setting up the theodolite • Taking horizontal and vertical angle measurements • Measuring distances	8
6	**Advanced Techniques** • Traversing • Tacheometric surveying	4
7	• Finding differences in elevation • Ranging curves	4
8	**Practical Applications** • Fieldwork exercises	8
9	• Real-world surveying projects	4
10	Classification of theodolites	4
11	Theodolite uses in various types of surveys	4
Study Resources	• Bygoot, J,1964: An Introduction to Mapwork and Practical Geography, University Tutorial, London. • Khan MD. Zulfequar Ahmad, 1998: Text Book of Practical Geography, Concept Publishing Company, New Delhi. • Robinson, A.H. and Sale, S.D.,1969: Elements of Cartography, John Witey and Sons, Inc, New York. • Saha, Pijushkanti and BasuPartha, 2010: Advanced Practical	

	Geography – A Laboratory Manual Books and Allied (P) Ltd, Kolkata. • P. Saha and P. Basu (2006): Advanced Practical Geography, Books and Allied Publication, Kolkata, India. • Khullar, 2015: Essentials of Practical Geography, New Academic Publishing Co, India.	

T.Y. B.Sc. Geography (Vocational)
Semester-V
GEO-VSC-361: GIS Data Visualization

Total Hours: 30 **Credits: 2**

Course Objectives	• To understand the principles and techniques of GIS data visualization. • To learn various methods of representing spatial and non-spatial data in GIS. • To develop skills in thematic mapping, cartographic representation, and geospatial data interpretation. • To explore emerging trends in GIS visualization, including web mapping and 3D visualization.	
Course Outcomes	After successful completion of this course, students are expected to: • Understand the fundamental principles of GIS data visualization and its importance. • Apply different mapping and symbolization techniques to represent spatial data. • Use advanced GIS tools for interactive and 3D visualization of geospatial data. • Evaluate real-world applications and emerging trends in GIS data visualization.	
Sr. No.	**Contents**	**Hours**
Unit I	**Introduction to GIS Data Visualization** • Concept and Importance of GIS Data Visualization • Types of Spatial and Non-Spatial Data • Data Input, Processing, and Storage in GIS • Role of Cartography in GIS Visualization	**06**
Unit II	**Thematic Mapping and Symbolization** • Types of Thematic Maps: Choropleth, Isopleth, Dot Density, and Proportional Symbol Maps • Representation of Qualitative and Quantitative Data • Symbolization: Point, Line, and Area Symbols • Map Layout, Scale, and Generalization Techniques	**08**
Unit III	**Advanced Visualization Techniques** • 3D Visualization and Terrain Representation • Geo-visualization of Remote Sensing and Raster Data • Interactive and Dynamic Mapping Techniques • Visualization in Web-Based GIS Applications	**08**

Unit IV	**Applications and Trends in GIS Data Visualization** • Real-World Applications of GIS Visualization in Geography • Big Data and GIS: Handling Large Spatial Datasets • Augmented Reality and Virtual Reality in GIS • Ethical and Aesthetic Considerations in GIS Cartography	**08**
Study Resources	• Slocum, T. A., McMaster, R. B., Kessler, F. C., & Howard, H. H. (2022). *Thematic cartography and geovisualization* (4th ed.). Pearson. • Dent, B. D., Torguson, J. S., &Hodler, T. W. (2009). *Cartography: Thematic map design* (6th ed.). McGraw-Hill. • Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic information science and systems* (4th ed.). Wiley. • Kraak, M. J., &Ormeling, F. (2020). *Cartography: Visualization of geospatial data* (4th ed.). CRC Press. • Peterson, M. P. (2014). *Mapping in the cloud* (1st ed.). Guilford Press.	

T.Y. B.Sc. Geography (Vocational)
Semester-V
GEO-VSC-362: Practical in GIS Data Visualization

Total Hours: 60 **Credits: 2**

Course Objectives	• To develop practical skills in GIS software for visualizing spatial and non-spatial data. • To apply thematic mapping techniques for geographic data representation. • To enhance proficiency in interactive, 3D, and web-based GIS visualization tools. • To explore advanced techniques for real-world GIS applications and geovisualization.	
Course Outcomes	After successful completion of this course, students are expected to: • Apply GIS software tools for data visualization and spatial representation. • Create high-quality thematic maps and apply advanced symbolization techniques. • Utilize 3D and web-based mapping techniques for interactive visualization. • Develop GIS-based visualization projects for real-world geographic applications.	
Sr. No.	**Contents**	**Hours**
1	**Introduction to GIS Software and Data Handling** Introduction to GIS Software (QGIS, ArcGIS, etc.)	**4**
2	Data Input: Importing Spatial and Attribute Data	**4**
3	Data Preprocessing: Cleaning, Editing, and Managing Geospatial Data	**4**
4	Understanding Coordinate Systems and Map Projections	**4**
5	**Thematic Mapping and Symbolization** Creating Thematic Maps: Choropleth, Dot Density, and Graduated Symbol Maps	**4**
6	Raster and Vector Data Visualization Techniques	**4**
7	Symbolization: Point, Line, and Polygon Features	**4**
8	Layout Design and Map Presentation Techniques	**4**
9	**Advanced GIS Visualization Techniques** 3D Mapping and Terrain Visualization Using DEM (Digital Elevation Models)	**4**
10	Time-Series and Animation-Based Visualization	**4**
11	Web-Based Mapping with GIS Tools (Google Earth, and Open	**4**

	Layers)	
12	Interactive Dashboard and Story Maps for GIS Data Representation	**4**
13	**Applications and Project Work in GIS Data Visualization** Case Study-Based GIS Visualization Projects	**4**
14	Real-World Applications of GIS Visualization	**4**
15	Visualization of Remote Sensing Data in GIS	**3**
16	Final Project: Creating and Presenting a GIS Visualization Report	**3**
Study Resources	• Pearson.Cartography and geovisualization (4th ed.). • Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). Geographic information science and systems (4th ed.). Wiley. • Kraak, M. J., &Ormeling, F. (2020). Cartography: Visualization of geospatial data (4th ed.). CRC Press. • Peterson, M. P. (2014). Mapping in the cloud. Guilford Press. • De Smith, M. J., Goodchild, M. F., & Longley, P. A. (2020). Geospatial analysis: A comprehensive guide to principles, techniques, and software tools (6th ed.). Winchelsea Press.	