॥ सा विद्या या विमुक्तये ॥

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

'ज्ञानतीर्थ', विष्णुपुरी, नांदेड – ४३१ ६०६ (महाराष्ट्र राज्य) भारत

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

'Dnyanteerth', Vishnupuri, Nanded - 431 606 (Maharashtra State) INDIA

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

Established on 17th September, 1994, Recognized By the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'B++' grade

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विज्ञान व तंत्रज्ञान विद्याशाखे अंतर्गत राष्ट्रीय शैक्षणिक धोरण २०२० नुसार पदव्यूत्तर द्वितीय वर्षाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२४–२५ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, या विद्यापीठा अंतर्गत येणा–या सर्व संलग्नित महाविद्यालयामध्ये शैक्षणिक वर्ष २०२४–२५ पासून राष्ट्रीय शैक्षणिक धोरणानुसार पदव्यूत्तर द्वितीय वर्षाचे अभ्यासक्रम लागू करण्याच्या दृष्टीकोनातून विज्ञान व तंत्रज्ञान विद्याशाखे अंतर्गत येणा–या अभ्यासमंडळांनी तयार केलेल्या पदव्यूत्तर द्वितीय वर्षाच्या अभ्यासक्रमांना मा. विद्यापरिषदेने दिनांक १५ मे २०२४ रोजी संपन्न झालेल्या बैठकीतील विषय क्रमांक १५/५९–२०२४ च्या ठरावाअन्वये मान्यता प्रदान केली आहे. त्यानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील खालील एम. एस्सी द्वितीय वर्षाचे अभ्यासक्रम (Syllabus) लागू करण्यात येत आहेत.

1) M. Sc. II year Biotechnology (Affiliated College)
2) M. Sc. II year Biotechnology (Campus)
3) M. Sc. II year Bioinformatics (Sub Campus Latur)
4) M. Sc. II year Bioinformatics (Affiliated College)
5) M. Sc. II year Clinical Research (Affiliated College)
6) M. Sc. II year Botany (Campus)
7) M. Sc. II year Herbal Medicine
8) M. Sc. II year Boany (Affiliated College)
9) M. Sc. II year Geology (Campus)
10) M. Sc. II year Dairy Science
11) M. Sc. II year Electronics
12) M. Sc. II year Environmental Science
13) M. Sc. II year Environmental Science (Campus)
14) M. Sc. II year Geography (Campus)
15) M. Sc. II year Applied Mathematics
16) M. Sc. II year Mathematics
17) M. Sc. II year Mathematics (Campus)
18) M. Sc. II year Microbiology
19) M. Sc. II year Microbiology (Campus)
20) M. Sc. II year Statistics
21) M. Sc. II year Statistics (Campus)

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या **www.srtmun.ac.in** या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी, ही विनंती.

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.:शै–१/एनइपी/विवत्रंविपदवी/२०२४–२५/१०९
दिनांक १२.०६.२०२४

डॉ. सरिता लोसरवार
सहा.कुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत : १) मा. आधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मुंल्यमापन मंडळ, प्रस्तुत विद्यापीठ.
३) मा. प्राचार्य, सर्व संबधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
४) मा. संचालक, सर्व संकुले परिसर व उपपरिसर, प्रस्तुत विद्यापीठ
५) सिस्टीम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. याना देवून कळविण्यात येते की, सदर परिपत्रक संकेतस्थळावर प्रसिध्द करण्यात यावे.

Swami Ramanand Teerth Marathwada University

Nanded 431 606 Maharashtra

Structure and Syllabus of Two Years Multidisciplinary Degree Program with Multiple Entry and Exit Option

TWO YEAR MASTERS PROGRAMME

Major in Geography (DSC)

(University Campus)

Under the Faculty of Science and Technology

Effective from Academic Year 2023-2024
(As per NEP-2020)

Forward by the Dean, Faculty of Science and Technology

From the Desk of the Dean:

To meet the challenge of ensuring excellence in post graduate programme of Science and Technology education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited. In line with this Faculty of Science and Technology of Swami Ramanand Teerth Marathwada University Nanded has taken a lead in incorporating philosophy of outcome-based education in the process of curriculum development.

Faculty of Science and Technology, Swami Ramanand Teerth Marathwada University Nanded, in one of its meetings unanimously resolved that, each Board of Studies shall prepare some Programme Educational Objectives (PEO's) and give freedom to affiliated Institutes to add few (PEO's) and course objectives and course outcomes to be clearly defined for each course, so that all faculty members in affiliated colleges understand the depth and approach of course to be taught, which will enhance learner's learning process. It was also resolved that, maximum senior faculty from colleges and experts from industry to be involved while revising the curriculum. We are happy to state that, each Board of studies has adhered to the resolutions passed by Faculty of Science and Technology, and developed curriculum accordingly. In addition to outcome-based education, semester-based credit and grading system is also introduced to ensure quality of education.

Semester based Credit and grading system enables a much-required shift in focus from teacher- centric to learner-centric education since the workload estimated is based on the investment of time in learning and not in teaching. It also focuses on continuous evaluation which will enhance the quality of education. Swami Ramanand Teerth Marathwada University Nanded has taken a lead in implementing the system through its affiliated Institutes and Faculty of Technology has devised a transparent credit assignment policy and adopted ten points scale to grade learner's performance. Credit assignment for courses is based on 15 weeks teaching learning process, however content of courses is to be taught in 12-13 weeks and remaining 3-2 weeks to be utilized for revision, guest lectures, coverage of content beyond syllabus etc.

Credit and grading based system will be implemented for First Year of Science and Technology from the academic year 2023-2024. Subsequently this system will be carried forward for Second Year Science and Technology in the academic year 2024-2025, for Third Year and Final Year Science and Technology in the academic years 2025-2026and 2026-2027 respectively.

Dr. M. K. Patil, I/c Dean, Faculty of Science & Technology,
Swami Ramanand Teerth Marathwada University, Nanded

NOTE: Need to be modified following guidelines of NEP-2020 and its outcome and Overall improvement in Education system.

From Desk of Chairman, Board of Studies of the Subject, Geography

Preamble:

Geography is the study of places on the Earth and their relationships with each other. Often the study of geography begins with one's home community and expands as a person gains greater experience. Thus, geography provides a conceptual link for children between home, school, and the world beyond.

Geography is one of the oldest earth sciences and its roots date back in the works of the early Greek scholars. The word 'geography' was first used by the Greek scholar Eratosthenes in the third century B.C. Geo "Earth" and Graphy "to describe" literal meaning of geography is to describe about the earth's surfaces. In other words, "Geography is largely the study of the interaction of all physical and human phenomena and landscapes created by such interactions." It is about how, why, and where human and natural activities occur and how these activities are interconnected.

Today the discipline is not only concerned with descriptions but also with analysis as well as prediction. Geographers study how people interact with the environment and with each other from place to place and they classify Earth into regions in order to draw generalizations about the complex world in which we live. Because it deals with where and how people live, geography is rich in material that relates to international understanding, multi-cultural concerns, and environmental education. The tools of geography help us understand places. To teach this subject at graduate and undergraduate level has become challenge for al lthe geography teachers due emerging new trends in this field. Geography helps student learn about the world knowing something about where places are and what they are like is important.

Geography contributes to international understanding the world's economies are increasingly linked into an international network of trade and exchange. If our competitors know more about us than we do about them, they have an advantage in serving our markets and negotiating trade agreements, and we are placed at a disadvantage in reaching their markets. Well - planned geography education at all grade levels will help to make us more aware of other countries and cultures and prepare our students to take their place in the world. Geography and citizenship Knowledge of geography helps us be better citizens. Through geography, we learn to locate important events. We can understand the relationship between geography and national or international policies and we can use geographical knowledge to make informed decisions regarding the best use of the nation's resources.

Finally, geographically informed students will be effective leaders for our country.

As the Chairman Board of Studies of the subject of Geography and Applied Geography, Swami Ramanand Teerth Marathwada University, Nanded happy to state here that the programme objectives have been finalized in the meeting of all the members Board of Studies.

- To meet need and Importance of Geography at the present time.
- To prepare the students to enhance their abilities to develop the innovative approach.
- To cultivate the life skills with the help of Geography.
- To enable the students for the better understanding of Geography.
- To generate the interest of students to contribute to expand their research skills.

Apart from the above objectives, the affiliated institute can add their own. As the Chairman of the Board of Studies, I strongly believe that, the framed syllabus will definitely meet the need of the students at present.

Dr. A. A. Kalgapure, Chairman,
Board of Studies of the subject of Geography and Applied Geography
Swami Ramanand Teerth Marathwada University, Nanded.

Swami Ramanand Teerth Marathwada University, Nanded
Members of the Board of Studies in the subject of
Geography and Applied Geography
Under the Faculty of Science and Technology

Sr. No.	Name of the Member	Designation	Address with E-mail ID	Contact No.
1	Dr. Apparao Annarao Kalgapure	Chairman	Shri.HavgiswamiCollege, Udgir	9420215804
2	Dr. Avinash Sopanrao Kadam	Member	School of Earth Science (Campus) askadam505@gmail.com	9975834724
3	Dr.Parag Arun Khadke	Member	School of Earth Science (Campus) pakhadke@gmail.com	9028774190
4	Dr.Bhagwat Namdev Pastapure	Member	Indira Gandhi Sr.College,Cidco, Nanded	9403512340
5	Dr.Hanmant Dadarao Wagalgave	Member	Shivneri Mahavidyalaya, Shirur Anantpal	9673656114
6	Dr.Sadanand Hariba Gone	Member	Ujwal Gramin Mahavidyalaya,Ghonsi	9822145010
7	Dr.Bhagwan Prabhakarrao Shendge	Member	B.Raghunath Mahavidyalaya,Parbhani	9158443555
8	Dr.Nitin Trimbakrao Deshmukh	Member	Mahatma Gandhi Mahavidyalaya, Ahmadpur	9423705446
9	Dr.Suresh Jyotiram Phule	Member	R.S. Mahavidyalaya, Latur (Autonomous)	9028666874
10	Dr.Vishnudas Ram Rathod	Member	Vasantrao NaikCollege,Vasarani, Nanded	9423139319
11	Dr.B.Shrinaesh	Member	Osmania University, Hyderabad	9849269355
12	Dr. Anand Vijaykumar Walankikar	Member	V.D.M.College, Degloor	9422185102
13	Dr. Rajeshwar Balaji Kotalwar	Member	Rajiv GandhiMahavidyalaya, Mudkhed	9404760581
Invited Member				
14	Dr. Rajaram Dnyanoba Davankar	Member	Dr. B.A.Mahavidyalaya, Latur	7350393163
15	Dr. Manjunath.P. Mankari	Member	Udyagiri Mahavidyalaya, Udgir	7588874988
As per MUPA u/s 40(2) (d) (E) Invited Member				
16	Khase Mahesh Trambak (UG students)	Member	Dayanand Arts College, Latur	
17	Shaikh Masira Sadad (PG students)	Member	Indira Gandhi Sr. College, Cidco Nanded	

Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology, Major in Geography (DSC): University Campus
Credit Framework of Two-Year PG Program for the Science and Technology

Year & Level	Sem.	Major Subject		RM	OJT / FP	Research Project	Practicals	Credits	Total Credits
		(DSC)	(DSE)						
1	2	3	4	5	6	7	8	9	10
2	3	SGEO-C501 Climatology (4 Cr) Theory SGEO-C502 Urban Geography (4 Cr) Theory SGEO-C503 Geographical Information System (4 Cr) Theory	SGEO-E501 Global Positioning System (2 Cr) Theory SPGEO-E501: Global Positioning System (1 Cr) Practical **OR** SGEO-E502 Regional Planning (2 Cr) Theory SPGEO-E502 : Computer Applications (1 Cr) Practical	-----	-----	SGEORP 501 Research Project (4 Cr)	SPGEO-P501 Climatology (1 Cr) Practical SPGEO-P502 Surveying (1 Cr) Practical SPGEO-P503 Geographical Information System (1 Cr) Practical	**22**	**44**
	4	SGEO-C551 Oceanography (4 Cr) Theory SGEO-C552 Settlement Geography (4 Cr) Theory	SGEO-E551: Tourism (3 Cr) Theory SPGEO-E551: Tourism (1 Cr) Practical **OR** SGEO-E552 Watershed Management (3 Cr) Theory SPGEO-E552: Watershed Management (1 Cr) Practical	SGEOPE 551 Publication Ethics (2 Cr)		SGEORP 551 Research Project (6 Cr)	SPGEO-P551 Statistical Methods in Geography (1Cr) Practical SPGEO-P552 Settlement Geography (1 Cr) Practical	**22**	
Total Credits		**44**	**15**	**05**	**03**	**10**	**11**	**88**	

Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science and Technology, Major in Geography (DSC): University Campus

Credit Framework of Two-Year PG Program for the Faculty of Science and Technology

Post Graduate Second Year Programme of Semester III (Level 6.0): Teaching Scheme

Subject / Course	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours /Week)	
			Theory	Practical	Total	Theory	Practical
Major (DSC)	SGEO-C501	Climatology	04	--	**04**	04	--
	SGEO-C502	Urban Geography	04	--	**04**	04	--
	SGEO-C503	Geographical Information System	04	--	**04**	04	--
Elective (DSE) (any one)	SGEO-E501	Global Positioning System	02	--	**02**	02	--
	SGEO-E502	Regional Planning	02	--	**02**	02	--
Research Project	SGEORP 501	Research Project	04	--	**04**	04	
DSC Practical	SPGEO-P501	Climatology	--	01	**01**	--	02
	SPGEO-P502	Surveying	--	01	**01**	--	02
	SPGEO-P503	Geographical Information System	--	01	**01**	--	02
DSE Practical (concerned any one)	SPGEO-E501	Global Positioning System	--	01	**01**	--	02
	SPGEO-E502	Computer Applications	--	01	**01**	--	02
Total Credits			**18**	**04**	**22**	**18**	**08**

Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science and Technology, Major in Geography (DSC): University Campus

Credit Framework of Two-Year PG Program for the Faculty of Science and Technology

Post Graduate Second Year Programme of Semester III (Level 6): Examination Scheme

[20% Continuous Assessment (**CA**) and 80% End Semester Examination (**ESE**)]

(For illustration we have considered a paper of 02 credits, 50 marks, needs to be modified depending on credits of individual paper)

Subject / Course	Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
			Continuous Assessment (CA)			ESE			
			Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Major (DSC)	SGEO-C501	Climatology	20	20	20	80	--	--	100
	SGEO-C502	Urban Geography	20	20	20	80	--	--	100
	SGEO-C503	Geographical Information System	20	20	20	80	--	--	100
Elective (DSE) (any one)	SGEO-E501	Global Positioning System	10	10	10	40	--	--	50
	SGEO-E502	Regional Planning	10	10	10	40	--	--	50
Research Project	SGEORP 501	Research Project	20	20	20	80	--	--	100
DSC Practical	SPGEO-P501	Climatology	--	--	--	--	05	20	25
	SPGEO-P502	Surveying	--	--	--	--	05	20	25
	SPGEO-P503	Geographical Information System	--	--	--	--	05	20	25
DSE Practical (concerned any One)	SPGEO-E501	Global Positioning System	--	--	--	--	05	20	25
	SPGEO-E502	Computer Applications	--	--	--	--	05	20	25

Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science and Technology, Major in Geography (DSC): University Campus

Credit Framework of Two-Year PG Program for the Faculty of Science and Technology

Post Graduate Second Year Programme of Semester IV (Level 6.0): Teaching Scheme

Subject / Course	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
			Theory	Practical	Total	Theory	Practical
Major (DSC)	**SGEO-C551**	Oceanography	04	--	**04**	04	--
	SGEO-C552	Settlement Geography	04	--	**04**	04	--
Elective (DSE) (any one)	**SGEO-E551**	Tourism	03	--	**03**	03	--
	SGEO-E552	Watershed Management	03	--	**03**	03	--
Research Methodology	**SGEOPE 551**	Publication Ethics	02	--	**02**	02	--
Research Project	**SGEORP 551**	Research Project	06	--	**06**	06	--
DSC Practical	**SPGEO-P551**	Statistical Methods in Geography	--	01	**01**	--	02
	SPGEO-P552	Settlement Geography	--	01	**01**	--	02
DSE Practical (concerned any One)	**SPGEO-E551**	Tourism	--	01	**01**	--	02
	SPGEO-E552	Watershed Management	--	01	**01**	--	02
Total Credits			**19**	**03**	**22**	**19**	**06**

Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science and Technology, Major in Geography (DSC): University Campus

Credit Framework of Two-Year PG Program for the Faculty of Science and Technology

Post Graduate Second Year Programme of Semester IV (Level 6): Examination Scheme

[20% Continuous Assessment (**CA**) and 80% End Semester Examination (**ESE**)]

(For illustration we have considered a paper of 02 credits, 50 marks, needs to be modified depending on credits of individual paper)

Subject / Course	Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
			Continuous Assessment (CA)			ESE			
			Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Major (DSC)	**SGEO-C551**	Oceanography	**20**	**20**	**20**	**80**	**--**	**--**	**100**
	SGEO-C552	Settlement Geography	**20**	**20**	**20**	**80**	**--**	**--**	**100**
Elective (DSE) (any one)	**SGEO-E551**	Tourism	**15**	**15**	**15**	**60**	**--**	**--**	**75**
	SGEO-E552	Watershed Management	**15**	**15**	**15**	**60**	**--**	**--**	**75**
Research Methodology	**SGEOPE 551**	Publication Ethics	**10**	**10**	**10**	**40**	**--**	**--**	**50**
Research Project	**SGEORP 551**	Research Project	**30**	**30**	**30**	**120**	**--**	**--**	**150**
DSC Practical	**SPGEO-P551**	Statistical Methods in Geography	**--**	**--**	**--**	**--**	**05**	**20**	**25**
	SPGEO-P552	Settlement Geography	**--**	**--**	**--**	**--**	**05**	**20**	**25**
DSE Practical (concerned any One)	**SPGEO-E551**	Tourism	**--**	**--**	**--**	**--**	**05**	**20**	**25**
	SPGEO-E552	Watershed Management	**--**	**--**	**--**	**--**	**05**	**20**	**25**

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Semester III

%%%%% %%%%% %%%%% %%%%% %%%%% %%%%% %%%%% %%%%% %%%%%

SGEO-C501 Climatology

Course Structure: Major (DSC) 1 – Teaching Scheme

Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SGEO-C501	Climatology	04	--	**04**	04	--

Course Structure: Major (DSC) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SGEO-C501	Climatology	20	20	20	80	--	--	100

SGEO- C501 Climatology: Curriculum Details

Course Pre-requisite:

- The candidate should know the basic concepts of weather and climate elements.
- The candidate should know geographic factors and their relationship with climatic activities

Course Objectives:

The objectives of this paper are,

- To get knowledge about the climatic activities and their relation to geographical factors.
- To explain the climate change and their effect on human being.

Course Outcomes:

- After completion of the paper / course, the students will get capabilities and skills to understand the basics of weather and climate.
- In short, the candidate will assess the cause-n-effect relationships, which will be helpful for answering reasoning types of questions asked in competitive examinations.

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	Nature and Scope of Climatology	15
	1.2	Development of Modern Climatology	
	1.3	Importance of Climatology	
	1.4	Composition and vertical structure of atmosphere	
2.0	2.1	Insolation and Heat Budget of the Earth	15
	2.2	Temperature Variations: Vertical and Horizontal	
	2.3	Inversion of temperature	
	2.4	Clouds and its types	
3.0	3.1	Atmospheric pressure - Vertical and Horizontal Distribution	15
	3.2	General Circulation of Atmosphere	
	3.3	Types of Winds - Geotropic, Gradient and Local winds	
	3.4	Monsoon Wind	
4.0	4.1	Air mass: Origin and Classification	15
	4.2	Fronts: formation and types	
	4.3	Cyclones formation	
	4.4	Types of Cyclones	
Total Hours (1 hour = 60 minutes)			**60**

Text Books & Reference Books:

In English

- Fredrick k. Lutgen, Edward Tar buck: The Atmosphere an Introduction to Meteorology Englewood Cliffs, New Jersey 0762, 1998
- Pettersons: ―Introduction to Meteorology 1969
- Savindra Singh (2000): Physical geography, Prayag Pustak Bhawan, Allahabad
- RichlH: ―Introduction to Atmosphere 1972
- Mather JR (1975): Climatology: Fundamentals & Applications. Mc Gray Hills Book, New York
- Hobbs J.E. (1980): Applied Climatology, Butterworth, London
- Crist Field: Principles of Climatology; Prentice Hall, London.

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SGEO-C502 Urban Geography

Course Structure: Major (DSC) 1 – Teaching Scheme

Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SGEO-C501	Urban Geography	04	--	**04**	04	--

Course Structure: Major (DSC) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SGEO-C502	Urban Geography	**20**	**20**	**20**	**80**	--	--	**100**

SGEO-C502Urban Geography: Curriculum Details

Course Pre-requisite:

- Basic knowledge about elements of population and physical, culture and social geographical factors.

Course Objectives:

- The objectives of this course is to understand urban growth, urban development in world and India, town planning and urban problems in India.

Course Outcomes:

- After completion of the course, the students get capabilities and skills on urban geographical techniques, concepts, model and theories related to urban geography. Also understand the various factor are affected of the urban growth and urban problems.

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	**1.1**	Definition, Nature, Scope and Significance	**15**
	1.2	Trends of Urbanization - World and India	
	1.3	Difference between Rural and Urban settlements.	
	1.4	Urban Settlements - Types and Pattern, Site and Situation	

2.0	**2.1**	Concept of Urbanization, factors affecting on the urban growth	**15**
	2.2	Urban growth in India and world	
	2.3	Functional Classification of Towns with reference to Indian cities	
	2.4	Urban Problems in Indian.	
3.0	**3.1**	Urban Sprawl, Ribbon corridor, Megalopolis, Satellite Town, Suburbs	**15**
	3.2	Conurbation, City Region, Rural-Urban Fringe, Rank size rule, Primate City,	
	3.3	Nodality Centrality, Range Threshold & Hierarchy	
	3.4	Central Business District (CBD) and its Characteristics	
4.0	**4.1**	Concentric Zone Model by E.W. Burgess	**15**
	4.2	Sector Model by Homer Hoyt	
	4.3	Multiple Nuclei Model by Harris and Ullman	
	4.4	Central Place Theory by Walter Christaller	
Total Hours (1 hour = 60 minutes)			**60**

Text Books & Reference Books:

- Carter H. (1975): The study of urban geography. Edward Arnold, London.
- David Peter & Hopkinson M. (1983): the geography of settlements, Oliver &Boyot, Edinburgh
- Haggett Peter (1991): Geography a modern synthesis, Harper & Row, New York
- Johnston J.H. (1974): Urban Geography, Pergoman Press, Oxford.
- Johnston R.J. (1984): City & Society. Unwin hyman, London.
- King L.J.&Golledge R.G. (1978): Cities, space & Behavior, Prentice Hall, engle wood cliff, New Jersey
- Mandal R.B. (2000): Urban Geography, Concept Publishing Co., New Delhi.
- Mayer H.M. & Cohen (1967): Readings in Urban Geography, Central Book Depot. Allahabad.
- Northam ray M. (1975): Urban Geography, John Willey & Sons, New York.
- Ramachandran R. (1991): Urbanization and Urban Systems in India, Oxford Uty. Press. Delhi.
- Robinson, Brian T. (1973): Urban growth, Mathuen& Company, London.
- Singh R. L. – Readings in Settlement Geography. TheNational Geographical Society of India.
- Sidhartha K. and Mukherjee. S. (2000): cities-Urbanizations & Urban Systems. Kisalaya pub. Pvt.Ltd.,New Delhi.
- Yeates & Garner (1971): Readings in Urban Geography. The North American City. Harper & Row. New York.

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SGEO-C503 Geographical Information system

Course Structure: Major (DSC) 1 – Teaching Scheme

Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SGEO-C503	Geographical Information System	04	--	**04**	04	--

Course Structure: Major (DSC) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SGEO-C503	Geographical Information System	**20**	**20**	**20**	**80**	--	--	**100**

SGEO-C503 Geographical Information System: Curriculum Details

Course Pre-requisite:

- The candidate should have knowledge about elements of maps and having the knowledge of basics of computer handling.

Course Objectives:

The objectives of this paper are,

- The objectives of this course is to develop the skill of the geographical information system and global positioning system, and their use in the geography.

Course Outcomes:

- After completion of the course, the students get capabilities and skills on geographical information system and global positioning system and their application in geography and map making.

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	Definition of GIS.	15
	1.2	History and Development of GIS.	
	1.3	Component of GIS.	
	1.4	Types of Data: Raster and Vector.	
2.0	2.1	Spatial Data Input: Digitization and conversion.	15
	2.2	Point, Line, Polygon, Arc, Node, Vertices etc.	
	2.3	Digitization Error.	
	2.4	Topology and Topological Relationship.	
3.0	3.1	Spatial Data Analysis & Non-spatial Data Analysis	15
	3.2	Interpolation Techniques in GIS Terrain Analysis	
	3.3	Database Management system (DBMS).	
	3.4	Non-spatial Data: Data quality Issues.	
4.0	4.1	Applications of GIS in Surveying, Mapping, LULC etc	15
	4.2	Applications of GIS in Urban and Regional Planning	
	4.3	Applications of GIS in Forestry and Environment	
	4.4	Applications of GIS in Agriculture and Disasters	
Total Hours (1 hour = 60 minutes)			**60**

Text Books & Reference Books:

- Elliott Kaplanand Christopher J. Hegarty (2017) Understanding GPS/GNSS: Principles and Applications, Third Edition (Gnss Technology and Applications Series) 3rd Edition, Published by Artech House
- Peter Teunissen and Oliver Montenbruck (2017) Springer Handbook of Global Navigation Satellite Systems Springer International Publishing, Switzerland.
- Monmonier, M.S. (1982): Computer Assisted Cartography: Principles and Prospects, Prentice Hall, Inc. London.
- Peuquet, D.J. & Marble, D.F.: Introductory Readings in Geographic information Systems Taylor & Francis, Washington, 1990
- C.P. Lo and Albert K. W. Yeung, Concepts and Techniques of Geographic Information System, 2002Prentice –Hall, India.
- Maguire D.J. & good Child M.F. &Rhindd. (Eds)(1991): Geographic Information System: Principles & Applications, Vol. II

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SGEO-E501 Global Positioning System

Course Structure: Major (DSE) 1 – Teaching Scheme

Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SGEO-E501	Global Positioning System	02	--	**02**	02	--

Course Structure: Major (DSEC) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SGEO-E501	Global Positioning System	**10**	**10**	**10**	**40**	**--**	**--**	**50**

SGEO-E501 Global Positioning System: Curriculum Details

Course Pre-requisite:

- Must have knowledge about elements of maps and having the knowledge of basics of computer handling.

Course Objectives:

- The objectives of this course is to develop the skill of the geographical information system and global positioning system, and their use in the geography.

Course Outcomes:

- After completion of the course, the students get capabilities and skills on geographical information system and global positioning system and their application in geography and map making

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	Meaning and Definition of GPS	7
	1.2	Nature and Scope of GPS	
	1.3	History of GPS	
	1.4	Importance and development of GPS technology	
2.0	2.1	Component of GPS	7
	2.2	Space Segment, Control Segment, User Segment	
	2.3	GPS Signal and Operation Carriers	
	2.4	GPS codes: C/A, P, Binary codes Navigational Message	
3.0	3.1	Operation of the GPS	8
	3.2	Satellite Visibility and Availability	
	3.3	GPS Receivers	
	3.4	Types of Receiver, Types of Units, GPS Tracker	
4.0	4.1	Applications of Global Positioning System	8
	4.2	Surveying and Mapping with GPS	
	4.3	Applications of GPS in Landform Analysis & Disasters	
	4.4	Application in Quick Response System	
Total Hours (1 hour = 60 minutes)			**30**

Text Books & Reference Books:

- Elliott Kaplanand Christopher J. Hegarty (2017) Understanding GPS/GNSS: Principles and Applications, Third Edition (Gnss Technology and Applications Series) 3rd Edition, Published by Artech House
- Peter Teunissen and Oliver Montenbruck(2017)Springer Handbook of Global Navigation Satellite Systems Springer International Publishing, Switzerland
- Tor Bemuandsen (1992) Geographic Information System VIAKIT & Norwegian Mapping Authorities, Arendal Norway
- Peuquet, D.J. & Marble, D.F.: Introductory Readings in Geographic information Systems Taylor &Francis, Washington, 1990

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SGEO-E502 Regional Planning

Course Structure: Major (DSE) 1 – Teaching Scheme

Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SGEO-E502	Regional Planning	02	--	**02**	02	--

Course Structure: Major (DSC) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SGEO-C553	Regional Planning	**10**	**10**	**10**	**40**	--	--	**50**

SGEO-C553 Regional Planning: Curriculum Details

Course Pre-requisite:

- The candidate should know the basic concepts from physical as well as human geography, particularly with reference to Indian geographical set up

Course Objectives:

- The objectives of this paper are, to understand the basic concepts of Regional Geography, to study the principles of natural resources and depending developmental activities with regional limitations and prospectuses. Its prime aim is to understand and be capable to observe and note the imbalances in planning and development of the region

Course Outcomes:

- After completion of the paper / course, the students will get capabilities and skills to correlate the natural cycles and manmade activities at primary level. In short, the candidate will assess the cause-n-effect relationships, which will be helpful for answering reasoning types of questions asked in competitive examinations

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	Basic Concepts of Region	7
	1.2	Planning	
	1.3	Regional Planning	
	1.4	Need of Regional Planning	
2.0	2.1	Geographical Indication	7
	2.2	Types of Region	
	2.3	Types of planning	
	2.4	Approaches to Regional planning	
3.0	3.1	Concept of growth	8
	3.2	Indicators of development	
	3.3	Measures of regional development	
	3.4	Rastows stages of economic growth	
4.0	4.1	Regional imbalances in India	9
	4.2	Industrial, Agricultural, Rural-Urban ratio	
	4.3	Metropolitan planning, Rural development planning	
	4.4	Tribal area development planning	
Total Hours (1 hour = 60 minutes)			**30**

Text Books & Reference Books:

- Chandana, RC, 2000, Regional Planning, Kalyani Publications, Ludhiyana.
- Friedmann, JAW, 1967, Regional Development and Planning, MIT Press Mass.
- Mishra RP, 1992, Regional Planning, Concepts, Techniques, Policies and Case Studies,
- (Edited Book) Concept Publications, New Delhi.
- Dube KN, 1990, Planning and Development in India, (Edited Book), Asia Publishing
- House, New Delhi.
- Govt. of India, 1986, Regional Plan 2001 – National Capital Region, NCRPB, Ministry of
- Urban Development, New Delhi.
- Bhat LS, 1973, Regional Planning in India, Statistical Publishing Society, Kolkata.
- Cand&Puri, 2013, Regional Planning in India, Allied Publishers, New Delhi

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SPGEO-P501 Climatology

Course Structure: Major (DSC) 1 – Teaching Scheme

Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SPGEO-P501	Climatology	--	01	01	--	02

Course Structure: Major (DSC) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SPGEO-P501	Climatology	--	--	--	--	5	20	25

SPGEO- P501: Climatology Curriculum Details

Course Pre-requisite:

- Pre-requisite: Basic knowledge about weather and climate elements, geographical factors and their relationship with climatic activities.

Course Objectives

- This course is useful in understanding about basics of weather and climate. This will be useful for application in their daily activates related to climate. Knowledge of this course will used for interpretation of climatic data, maps and diagrams, and classification of world climate understanding.

Course Outcomes

- After completion of the course the student gets knowledge about the climatic activities are their relation to geographical factors. On successful completion of the module, students should be capable of explaining the weather report, maps and diagrams.

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	To Draw Temperature Dispersion diagram	7
	1.2	To Draw Rainfall Dispersion Diagram	
	1.3	To Draw Height Temperature diagram (Tephigram)	
	1.4	To draw Wind Rose Diagram	
2.0	2.1	To Understand Map	7
	2.2	To prepare Isothermal Map	
	2.3	To prepare Isobaric Map	
	2.4	To prepare Isohyets Map	
3.0	3.1	Signs and symbols of Weather Map	8
	3.2	Reading of weather maps of representative seasons	
	3.3	Line graph, Bar graph	
	3.4	Trend graphs- moving averages and semi-Average	
4.0	4.1	Weather Instruments: To Study of Thermograph	8
	4.2	To study Barograph	
	4.3	To Study Rain gauge	
	4.4	To Study Anemometer	
Total Hours (1 hour = 60 minutes)			**30**

Text Books & Reference Books:

In English

- Ashish Sarakar: Practical Geography A systematic approach. Orient Longman Limited, Kolkatta.
- Critchifield: Principles of Climatology Lawrence,
- Lawrence, G.R.P.: Cartographic Methods. Mathur co., London
- Mather JR (1974) Climatology, Fundamentals and applications. Mc Grew Hill Book Co, New York
- R.L. Singh &Rana P.B. Singh: Element of Practical Geography. Kalyani Pub. New Delhi (1999).
- Trewartha G.T.: An Introduction to climate McGraw – Hill Book Co. New York
- Monkhouse, F. J. and Wilkinson, H. R., (1976). Maps and Diagrams, Methuen & Co. London
- Ramashatri: Weather & Weather forecasting, Ministry of Information & Broadcasting.

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SPGEO-P502 Surveying

Course Structure: Major (DSC) 1 – Teaching Scheme

Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SPGEO-P502	Surveying	--	01	01	--	02

Course Structure: Major (DSC) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SPGEO-P502	Surveying	--	--	--	--	5	20	25

SPGEO-P502Surveying: Curriculum Details

Course Pre-requisite:

- The candidate should know the basic concepts of maps, SOI Toposheet maps, various types of geographical field studies and surveying.

Course Objectives:

- The objective of this course is, to understand the basic concepts of Surveying and Levelling, to study the principles of surveying and land / height / distance measurements. Its prime aim is to understand and be capable to observe and note the field measurements and handle the instruments with skills

Course Outcomes:

- After completion of the course the student, get capabilities and skills to measure the height, distance, land etc. with perfection by using instruments.

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	To understand the concept of Surveying	7
	1.2	To enlist the various types of Surveys	
	1.3	To understand the concepts of Geodetic Surveying	
	1.4	Horizontal Positioning	
2.0	2.1	To understand the Triangulation method	7
	2.2	To understand the vertical poisoning and levelling	
	2.3	To elaborate the concepts Benchmarks, Spot Heights	
	2.4	Contouring with diagrams	
3.0	3.1	To understand of Dumpy Level instrument	8
	3.2	To understand the methods of Dumpy Level Surveys	
	3.3	Centring, levelling, Focusing	
	3.4	To draw a road profile by using Dumpy Level Survey	
4.0	4.1	Rise and Fall Method	8
	4.2	Taking Foresight (FS) and backsight (BS) reading	
	4.3	Preparation of field observation book	
	4.4	Plotting the graph	
Total Hours (1 hour = 60 minutes)			**30**

Text Books & Reference Books:

- Archer J. E and Dalton T. H. (1968), Field work in Geography B.T. Batsford Limited Dehradun
- Gupta, K. K. andTyagi, V. C. (1992): Working with maps, Survey of India Publication,
- Jones P. A. (1968), Fieldwork in Geography. Longmans, Green and Company Limited
- Kanetakar T.P. &Kukarni S.V. 1986. Surveying & leveling, Pune VidyarthiGrihaPrakshan, London.
- Maslov A.V. Gordeev A.V., Batrakov Yu. G. Geodetic surveying,1984, Mir Publishers, Moscow
- N.N. Basak, 2017, Surveying and Leveling, Publisher: McGraw Hill Education; Pune
- R. Subramanian, 2014, Fundamentals of Surveying and Leveling, Publisher: Oxford University Press; First edition (28 July 2014), ISBN-10: 0199454728
- V. Natarajan P., Adler Ron K. Advanced Surveying, B.1 Publ. Bombay.

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SPGEO-P503 Geographical Information System

Course Structure: Major (DSC) 1 – Teaching Scheme

Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SPGEO-P503	Geographical Information System	--	01	**01**	--	02

Course Structure: Major (DSC) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SPGEO-P503	Geographical Information System	--	--	--	--	5	20	25

SPGEO-P503 Geographical Information System Curriculum Details

Course Pre-requisite:

- Students should have knowledge about elements of maps and having the knowledge of basics of computer handling

Course Objectives:

- The objectives of this course is to develop the skill of the geographical information system and global positioning system, and their use in the geography

Course Outcomes:

- After completion of the course, the students get capabilities and skills on geographical information system and global positioning system and their application in geography and map making.

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	Introduction to GIS - Definition	7
	1.2	Component of GIS	
	1.3	Spatial Data Modelling - Raster Data and Vector Data	
	1.4	Data Base Management System - Component	
2.0	2.1	GIS Software's - Introduction	7
	2.2	Georeferencing of Map and Satellite Image	
	2.3	Designing and Creation of Geodatabase	
	2.4	Creating the feature data set Geodatabase Annotations	
3.0	3.1	Data Input and Editing.	8
	3.2	Creation of Data set (Digitization)	
	3.3	To Create Attribute Table	
	3.4	To Create Map and Map Export	
4.0	4.1	Introduction to GPS Software	8
	4.2	Point data collection using GPS and measurements	
	4.3	GPS data collection for area calculation	
	4.4	Transfusion of GPS data set to computer	
Total Hours (1 hour = 60 minutes)			**30**

Text Books & Reference Books:

- Elliott Kaplanand Christopher J. Hearty(2017) Understanding GPS/GNSS: Principles and Applications, Third Edition (Gnss Technology and Applications Series) 3rd Edition, Published by Artech House C. P. Lo and AlbertK. W. Yeung, 2002, Concepts and Techniques of Geographic Information System, Prentice –Hall, India.
- Burrongh P.A. & Rachael A.M. (1998): Principles of Geographic Information System for land Resources Assessment. Oxford University press.
- Maguire D.J. & good Child M.F. &Rhindd(Eds)(1991): Geographic Information System: Principles and Applications, Vol. II Longman London I.
- Tor Bernuandsen (1992): Geographic Information System VIAKIT & Norwegian Mapping Authorities, Arendal,Norway.
- Chang Kang-tsung. (2002): Introduction to GIS, TataMcGraw Hill, New Delhi.
- M.Anjji Reddy(2015): Remote Sensing & Geographical information system, BS-Publication, Hyderabad

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SPGEO-E501 Global Positioning System

Course Structure: Major (DSE) 1 – Teaching Scheme

Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SPGEO-E501	Global Positioning System	--	01	01	--	02

Course Structure: Major (DSE) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SPGEO-E501	Global Positioning System	--	--	--	--	5	20	25

SPGEO-E501 Global Positioning System: Curriculum Details

Course Pre-requisite:

- The candidate should know the basic knowledge about elements of maps and having the knowledge of basics of computer handling

Course Objectives:

- The objectives of this course is to develop the skill of the geographical information system and global positioning system, and their use in the geography

Course Outcomes:

- After completion of the course, the students get capabilities and skills on geographical information system and global positioning system and their application in geography and map making.

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	Initial Setting of GPS instrument	7
	1.2	Field observation	
	1.3	GPS Reading	
	1.4	Object reading- Point, Line, Polyline, Polygon	
2.0	2.1	Latitude, Longitude, Height	7
	2.2	GPS Route Tracking	
	2.3	GPS Receivers - Types of receiver	
	2.4	Types of Units, GPS Tracker	
3.0	3.1	GPS Data Acquisition	8
	3.2	Point data collection using GPS and measurements	
	3.3	GPS data collection for area calculation	
	3.4	Transfusion of GPS data set to computer	
4.0	4.1	Applications of Global Positioning System	8
	4.2	Forestry and Environment, Disaster Management	
	4.3	Land use Land cover mapping	
	4.4	GPS Software	
Total Hours (1 hour = 60 minutes)			**30**

Text Books & Reference Books:

- Monkhouse F.X.J. and Wilkinson H. R. (1971), Maps and Diagrams, London
- Elliott Kaplanand Christopher J. Hearty (2017)Understanding GPS/GNSS: Principles and Applications, Third Edition (Gnss Technology and Applications Series) 3rd Edition, Published by Artech House
- Peter Teunissen and Oliver Montenbruck(2017)Springer Handbook of Global Navigation Satellite Systems Springer International Publishing, Switzerland
- Ramamurthy, K. (1982): Map interpretation, Madras
- Singh R. L. (1997), Elements of Practical Geography, Kalyan Publishing, New Delhi
- Meux A. H. (1960), Reading Topographical Maps.University of London Press Limited
- Archer J. E and Dalton T. H. (1968), Fieldwork in Geography B.T. Batsford Limited London
- Wheeler K.S. Ed (1970), Geography in the field. Blond Educational, London.
- R.P. Mishra - Fundamentals of Cartography.
- Leicka. A: GPS Satellite Surveying, John Wiley and Sons, New York.
- N. K. Agarwal (2002) Essentials of GPS, Spatial Network Pvt. Ltd

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SPGEO-P502 Computer Applications

Course Structure: Major (DSE) 1 – Teaching Scheme

Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SPGEO-P502	Computer Application	--	01	**01**	--	02

Course Structure: Major (DSE) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SPGEO-P502	Computer Application	--	--	--	--	5	20	25

SPGEO-P502 Computer Applications: Curriculum Details

Course Pre-requisite:

- Must have knowledge about of basics of computer and having the knowledge of computer handling

Course Objectives:

- The objectives of this course is to develop the skill of the computer applications in the geography

Course Outcomes:

- After completion of the course, the students get capabilities and skills on computer applications in geography and, maps and graphs making

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	Computers: definition, characteristic	7
	1.2	Hardware & software, Input Devices and Out Put Devices	
	1.3	Introduction to MS WORDS	
	1.4	Introduction to MS EXCEL	
2.0	2.1	Computer and Geographic data	7
	2.2	Scale of measurement	
	2.3	Location data, and Data structure	
	2.4	Graphical tools	
3.0	3.1	Cartography: Hardware & Software for Computer Mapping	8
	3.2	Exercises for Representation of Geographic data	
	3.3	Histogram, Bar Graphs, Line Graph, Multiple Line Graph	
	3.4	Scatter Diagram, and Pie Diagram	
4.0	4.1	Importance of IT in Geographical Studies	8
	4.2	Google Maps	
	4.3	Browsing & Surfing the geographical sites	
	4.4	Web Pages, Portals & Down Loading files	
Total Hours (1 hour = 60 minutes)			**30**

Text Books & Reference Books:

- D.J.Unnwin& J.A. Dawson (1987): Computer Programming for Geographers, Longman, London.
- Monmonier, M.S.(1982): Computer Assisted cartography, Prentice Hall.
- David J. Maguire (1989): Computers in Geography, Longman scientific & Technical,London.
- Paul Mmather (1993): Computer application in geography John Wiley & Sons, New York U.S.A.
- Hagget Peter (1990): Geography a modern synthesis Harper international, New York.
- R.L.singh&Rana P.B.Singh: Element of Practical Geography. Kalyani Pub. New Delhi (1999).
- Lawrence,G.R.P.: Cartographic Methods. Mathur co., London

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Semester IV

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SGEO-C551 Oceanography

Course Structure: Major (DSC) 1 – Teaching Scheme

Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SGEO-C551	Oceanography	04	--	04	04	--

Course Structure: Major (DSC) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SGEO-C551	Oceanography	20	20	20	80	--	--	100

SGEO-C551 Oceanography: Curriculum Details

Course Pre-requisite:

- Basic knowledge about ocean water elements, geographical factors and their relationship with oceanic activities

Course Objectives

- After completion of the course the student gets knowledge about the oceanic activities are their relation to geographical factors. On successful completion of the module, students should be capable of explaining the ocean floor, submarine relief, ocean circulation and their effect on human activities

Course Outcomes

- This course is useful in understanding about basics of weather and ocean circulation. This will be useful for application in their daily activities related to elements of ocean. Knowledge of this course will used for understanding the ocean floor, submarine relief, ocean circulation and their effect on human activities

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	Introduction of Oceanography	15
	1.2	Definition, Nature and Scope of Oceanography,	
	1.3	Foundation of Modern Oceanography	
	1.4	Submarine Relief	
2.0	2.1	General idea of the submarine relief,	15
	2.2	Continental shelf, continental slope,	
	2.3	Abyssal plains, oceanic trenches and deeps,	
	2.4	Relief of Atlantic, Pacific & Indian Ocean	
3.0	3.1	Salinity and Temperature of Oceanic Water	15
	3.2	Factors and distribution	
	3.3	Oceanic Deposition- Types of deposition,	
	3.4	Types of Coral	
4.0	4.1	Ocean Circulation: Types of Tides,	15
	4.2	Factors affecting ocean currents	
	4.3	EL. Nino, La Nino.	
	4.4	Man and Oceans: resources.	
Total Hours (1 hour = 60 minutes)			**60**

Text Books & Reference Books:

- Negi, S.S. (1994): Geographical Science and water resource management; Printwell Jaipur (India)
- Joseph, w. & Howard, P: Introductory oceanography, McGraw Hill. Kogakusha, Ltd., New Delhi. (International Student Education)
- Peter K.W. (1970): Oceanography: An Introduction to the marine Environment, John Wiley & Sons Inc, New York.
- Sharma R.C. (1970): Oceanography for Geographers, Chaitanya publishing house, Allahabad.
- Negi B.S (1994-95): Climatology and oceanography Kedarnath, Ramanath Meerat, New Delhi.
- Michael A.M. (1978): Irrigation; theory and practices, Vikas Pub.House, New Delhi.
- Savinder Singh (1999) Physical Geography, Prayag Pustak Bhavan, Allahabad.
- Strahler A. (1996) physical Geography; science and system of the Human Environment, New York, Jahu Wiley
- Siddhartha K. (1999): Oceanography A Brief Introduction. Kaisalya Pub Pvt. Ltd. New Delhi
- Basu S.K. (2003) (ed): Handbook of Oceanography, Global Vision, Delhi
- Davis Richard A. (1972): Oceanography, Addition Wesley Publishing Co.
- Garrison Tom (2004): Essentials of Oceanography. Thompson, Australia
- Grant Gross M. (1982): Oceanography, Prentice hall, Ince, New Jersey
- King Cuchlain A. M (1962): Oceanography for Geographers (ED) Edward Arnold
- Thurman Harold V. (1985): Introductory Oceanography. Bell & Howell Co. London

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SGEO-C552 Settlement Geography

Course Structure: Major (DSC) 1 – Teaching Scheme

Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SGEO-C552	Settlement Geography	04	--	**04**	04	--

Course Structure: Major (DSC) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SGEO-C552	Settlement Geography	**20**	**20**	**20**	**80**	--	--	**100**

SGEO-C552 Settlement Geography: Curriculum Details

Course Pre-requisite:

- Basic knowledge about elements of population and physical, culture and social geographical factors.

Course Objectives:

- The objective of this course is to understand rural settlement growth, rural development in world and India, planning and problems of rural settlements in India

Course Outcome:

- After completion of the course, the students get capabilities and skills on rural settlement geographical techniques, concepts, model and theories related to rural settlement geography. Also understand the various factor are affected on the growth and problems of rural settlements

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	Settlement Geography: Definition, Nature, Scope	15
	1.2	Development of Settlement;	
	1.3	Approaches to Settlement Geography	
	1.4	Difference between Rural and Urban settlements	
2.0	2.1	Types and Pattern of Settlements	15
	2.2	Site and Situation of Settlements	
	2.3	Size and Spacing of Settlement	
	2.4	Functional classification of Settlement	
3.0	3.1	Rural-Urban Transformation:	15
	3.2	Spatio-Temporal Dimensions	
	3.3	Morphogenesis of Settlement	
	3.4	City Region,	
4.0	4.1	Rural-Urban Fringe	15
	4.2	Cause of Rural Urban Nexus	
	4.3	Service Centres and Planning of Settlement.	
	4.4	Problems of Indian Settlement	
Total Hours (1 hour = 60 minutes)			**60**

Text Books & Reference Books:

- Alam S.M. et. al.: Settlement System of India Oxford and IBH PublicationCo., New Delhi 1982.
- Chisholm M.: Rural Settlement and Land use. John Wiley, New York, 1967
- Clout H.D.: Rural Geography, Pergamon, Oxford, 1977.
- Doniel P and Hopkinson M: The Geography of settlement Oliver & Byod, Edinburgh, 1986.
- Grover N. Rural Settlement – A Cultural Geographical Analysis. Inter India Publication, Delhi,
- Hudson F.S.: A Geography of Settlements. Macdonald and Evans, New York, 1976.
- Ramchandran H.: Village clusters and Rural Development. Concept Publication, New Delhi, 1985
- Rao R. N. Strategy for Integrated Rural Development. B.R. Publication, Delhi, 1986.
- Rapoport A. House Form and Culture, Prentice Hall, New Jersey, 1969
- Sen L.K. (ed) Readings in Micro-level Planning and Rural Growth Centers, National Institute of
- Community Development, Hyderabad. 1972
- Srinivas M.N: Village India, Asia Publication House, Bombay, 1968.
- Wanmati S.: Service Centers in Rural India, B.R. Publication Corporation, Delhi, 1983.
- Singh R. L. Reading in Rural Settlement Geography.
- Mandal R.B: Rural Settlement Geography, Concept Publishing Co., New Delhi

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SGEO-E551 TOURISM

Course Structure: Major (DSE) 1 – Teaching Scheme

Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SGEO-E551	Tourism	03	--	**03**	03	--

Course Structure: Major (DSE) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SGEO-E551	Tourism	15	15	15	60	--	--	75

SGEO-E551 Tourism: Curriculum Details

Course Pre-requisite:

- The candidate should know the basics about tourism and tourism activities. He / She should take an interest in mapping and global study.

Course Objectives:

- The objectives of this paper are, to explain the interrelationship and complexity of industry sectors, travel motivation factors, significance and impact of tourism industry to the economy and geographical scenario, to demonstrate understanding to the importance of employability skills, excellent attitude and values and to demonstrate familiarity to the career and entrepreneurial opportunities in tourism and hospitality business.

Course Outcomes:

- Upon completion of this course, students will able to describe the profile, organization and characteristics of tourism as well as hospitality with the geographical points of view.

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	Definition and Nature of Tourism	11
	1.2	Scope of Tourism	
	1.3	Significance of tourism	
	1.4	Factors Influencing tourism	
2.0	2.1	Motivating Factors of tourism	11
	2.2	Infrastructure and support system of tourism	
	2.3	Study and research	
	2.4	Impact of tourism: physical, economic, social	
3.0	3.1	Ecotourism Potentials in India	11
	3.2	Gangetic plain	
	3.3	Peninsular region	
	3.4	Tourism in coastal regions and islands	
4.0	4.1	Environmental Laws and tourism	12
	4.2	Government policies for tourism development	
	4.3	Impact of Globalisation and foreign capital on tourism	
	4.4	Career and entrepreneur Opportunity in tourism	
Total Hours (1 hour = 60 minutes)			**45**

Text Books & Reference Books:

- Sampad Kumar Swain and Jitendra Mohan Mishra, 2011, Tourism: Principles and Practices, Oxford Higher Education, Publisher: Oxford University Press
- SunetraRoday, ArchanaBiwalandJoshi Vandana, 2009, Tourism Operations and Management 1st Edition, Publisher: Oxford University Press
- M.R Dileep, 2018, Tourism:Concept, Theory and Practice, ISBN, 9789385909672 Pulished by Indian Books and Periodicals
- Charles R. Goeldner and J. R.Brent Ritchie, 2008, Tourism:Principles, Practices, Philosophies, Publisher: John Wiley and Sons, 11th Revised eiti.

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SGEO-E553 Watershed Management

Course Structure: Major (DSE) 1 – Teaching Scheme

Course Code	Course Name	CreditsAssigned			TeachingScheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SGEO-E553	Watershed Management	03	--	**03**	03	--

Course Structure: Major (DSE) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SGEO-E553	Watershed Management	15	15	15	60	--	--	75

HGEO-E553 Watershed Management: Curriculum Details

Course Pre-requisite:

- The candidate should know the basic concepts from physical set-up, topographical structure and the hydrological concept.

Course Objectives:

- The objectives of this paper are to understand the basic concepts of Watershed Managements.

Course Outcomes:

- After completion of the paper / course, the students will get capabilities and skill to understand the basics watershed harvesting and management techniques. Students will able to understand the farming techniques helpful in watershed management.

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	Watershed development Concept	11
	1.2	Objectives of Watershed development	
	1.3	Factors affecting Watershed development	
	1.4	Concept of Integrated watershed management	
2.0	2.1	Hydrological Data for watershed planning	11
	2.2	Water Budgeting in a watershed	
	2.3	Watershed Codification	
	2.4	Delineation and Prioritization of Watersheds	
3.0	3.1	Rainwater Conservation Technologies	11
	3.2	Water Harvesting and recycling.	
	3.3	Dry farming Techniques	
	3.4	Effects of cropping systems on watershed hydrology	
4.0	4.1	Participatory Watershed Management	12
	4.2	Role of watershed Associations	
	4.3	Role of Self-help group	
	4.4	Planning and Formulations of Project Proposal for Watershed Management Programme	
Total Hours (1 hour = 60 minutes)			**45**

Text Books & Reference Books:

- Soil Conservation and Land Management. S.K. Datta, InternationalBook Distributors, Dehradun, 1985
- Soil and Water Conservation Engg. R. Suresh, Standard Publishers Distributors, Delhi-6, Repeint edition 2006.
- Watershed Planning and management. Rajvir Sing, Yash Publication House, Bikaner.2000
- Hydrology and soil Conservation Engineering: Including Watershed Management. Ghanshyam Das, 208.Prentice hall of learning Pvt altd,New Delhi.
- Watershed Management Guideline's for Indian conditions. Tideman E.M. Omega Scientific Publishers, New Delhi ,1996
- Wheeler K.S. Ed (1970), Geography in the field. Blond Educational, London
- Watershed Management; Designe and Practice. P.K Singh 2000.E media Publications Udaipur.

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SPGEO-P551 Statistical Methods in Geography

Course Structure: Major (DSC) 1 – Teaching Scheme

Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SPGEO-P551	Statistical Methods in Geography	--	01	01	--	02

Course Structure: Major (DSC) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SPGEO-P551	Statistical Methods in Geography	--	--	--	--	5	20	25

SPGEO-P551 Statistical Methods in Geography: Curriculum Details

Course Pre-requisite:

- The candidate should know the basic concepts of statistical methods. He /She should aware about the different types of geographical variables and their numerical information

Course Objectives:

- The objectives of this practical paper are, to understand the basic concepts of statistical methods, particularly for geographical studies, to understand and practice for calculations for geographical reasoning studies and analytical base.

Course Outcomes:

- After completion of the practical paper / course, the students will get capabilities and skills to handle geographical data, for analysis and concluding remarks.

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	To define Data and Data types in Geography.	7
	1.2	To describe and summarize Spatial Data.	
	1.3	To understand the Ungrouped Data Set	
	1.4	To understand the Grouped Data Set	
2.0	2.1	To measure Mean, Median and Mode of ungrouped data	7
	2.2	To prepare a frequency table.	
	2.3	To measure Mean and Median of given grouped data.	
	2.4	To measure Mode of given grouped data.	
3.0	3.1	To understand ranking method	8
	3.2	To understand Skewness of Data	
	3.3	To understand Kurtosis of Data	
	3.4	To understand Correlation	
4.0	4.1	To understand Standard Deviation	8
	4.2	To calculate SD by using Actual Mean Method	
	4.3	To calculate SD by using Assumed Mean Method	
	4.4	To calculate SD by using Common Factor Method	
Total Hours (1 hour = 60 minutes)			**30**

Text Books & Reference Books:

- Peter A. Rogerson Statistical Methods for Geography - A Student' S Guide, SAGE Publications, W.D.C. 2. Peter A. Rogerson, 2001.
- Peter A. Rogerson, 2001, Statistical Methods for Geography, SAGE Publications Ltd; First edition (2 January 2001)
- Aslam Mahmood, 1999, Statistical Methods in Geographical Studies: Student Edition Paperback – Jan 1999, Publisher: Rajesh; New Delhi.
- S. P. Gupta, 2014, Statistical Methods 43rd Edition Publisher: Sultan Chand, ISBN: 9788180549892, 8180549895
- N Das, 2017, Statistical Methods (Combined edition volume 1 & 2), Publisher: McGraw Hill. London.

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SPGEO-P552 Settlement Geography

Course Structure: Major (DSC) 1 – Teaching Scheme

Course Code	Course Name	CreditsAssigned			TeachingScheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SPGEO-P552	Settlement Geography	--	01	**01**	--	02

Course Structure: Major (DSC) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SPGEO-P552	Settlement Geography	--	--	--	--	5	20	25

SPGEO-P552 Settlement Geography: Curriculum Details

Course Pre-requisite:

- Basic knowledge about population, geographical factors and their relationship with human habitat

Course Objectives:

- After completion of the course the student gets knowledge about the human settlements analysis with their relation to geographical factors. On successful completion of the module, students should be capable of explaining the settlements analysis with maps and diagrams

Course Outcomes:

- This course is useful in understanding about basics of human settlements analysis. Knowledge of this course will used for interpretation of settlements analysis with maps and diagrams

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	Methods for calculation of Urban data and Dispersion	7
	1.2	Rank size rule	
	1.3	Nearest Neighbour Technique	
	1.4	Functional classification of towns- H.J. Nelson's method	
2.0	2.1	Calculation of centrality	7
	2.2	Methods: To calculate degree of dispersion by Demangeon	
	2.3	By Bernard, Debouverie Methods	
	2.4	Identification of Settlement Pattern from Toposheet	
3.0	3.1	Toposheet Reading	8
	3.2	Identification of settlement pattern	
	3.3	Site and situation of the settlement	
	3.4	Find out rural and urban settlement and their services	
4.0	4.1	Measures of Network Structure	8
	4.2	Network indices1. Ratio Measure	
	4.3	Alpha, Beta, Gamma	
	4.4	Associated Number and Cyclomatric Number	
Total Hours (1 hour = 60 minutes)			**30**

Text Books & Reference Books:

- Aslam Mahmood (1977): Statistical methods in geographical studies Rajesh Pub. New Delhi.
- Gregory s. (1963): statistical methods and the Geographer, Longman's London.
- Hammond R. & Mc Cullagh P. (1974): Quantitative Techniques in Geography Clarendon Press, Oxford.
- Haring, Lloved (1975): Scientific Geographic Research. W.C. Brow Company, U.S.A.
- Hagget Peter (1990): Geography a modern synthesis. Harper International, New York.
- Kothari, C.R. (1996): Research methodology. Vishwas Prakashan, New Delhi.
- Mishra, R.P. (1991): Research methodology in Geography. Concept Publishing, New Delhi.
- Carter Harold (1977): The study of Urban Geography
- Singh, R. L. Reading in Rural Settlement Geography
- Yeats, M. H. (1974). An introduction to Quantitative Analysis in Human Geography
- Michael E. and E. Hurse: Transportation Geography

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SPGEO-E551 Tourism

Course Structure: Major (DSE) 1 – Teaching Scheme

Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SPGEO-E551	Tourism	--	01	01	--	02

Course Structure: Major (DSE) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SPGEO-E551	Tourism	--	--	--	--	5	20	25

SPGEO-E551 Tourism: Curriculum Details

Course Pre-requisite:

- The candidate should know the basics about tourism and tourism activities. He / She should take an interest in mapping and global study.

Course Objectives:

- The objectives of this paper are, to explain the interrelationship and complexity of industry sectors, travel motivation factors, significance and impact of tourism industry to the economy and geographical scenario, to demonstrate understanding to the importance of employability skills, excellent attitude and values and to demonstrate familiarity to the career and entrepreneurial opportunities in tourism and hospitality business.

Course Outcomes:

- After completion of the paper / course, the students will get capabilities and skills to understand the basics of tourism

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	Role of computers in travel and tourism	7
	1.2	Preparation of tour maps	
	1.3	Maps and toposheet reading	
	1.4	Use of GPS	
2.0	2.1	Calculating distance on map	7
	2.2	Preparation of charts of the country's information	
	2.3	Preparation of Broachers and advertisement for tour	
	2.4	Preparation of itinerary	
3.0	3.1	Communication skill and English speaking	8
	3.2	Ticketing: Rail ticket procedure and air ticketing	
	3.3	Procedure for domestic and international hotel reservation	
	3.4	Passport and visa	
4.0	4.1	Visits to different sectors	8
	4.2	Travel, Advertisement agencies & other sectors of tourism	
	4.3	To prepare a report on it	
	4.4	Study of fairs and festivals and report on it	
Total Hours (1 hour = 60 minutes)			**30**

Text Books & Reference Books:

- Sampad Kumar Swain and Jitendra Mohan Mishra, 2011, Tourism: Principles and Practices, Oxford Higher Education, Publisher: Oxford University Press
- Sunetra Roday, Archana Biwal and Joshi Vandana, 2009, Tourism Operations and Management 1st Edition, Publisher: Oxford University Press
- M.R Dileep, 2018, Tourism:Concept, Theory and Practice, ISBN, 9789385909672 Pulished by Indian Books and Periodicals
- Charles R. Goeldner and J. R.Brent Ritchie, 2008, Tourism: Principles, Practices, Philosophies, Publisher: John Wiley and Sons, 11th Revised eiti.

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SPGEO-E552 Watershed Management

Course Structure: Major (DSE) 1 – Teaching Scheme

Course Code	Course Name	Credits Assigned			Teaching Scheme (Hours / Week)	
		Theory	Practical	Total	Theory	Practical
SPGEO-E552	Watershed Management	--	01	**01**	--	02

Course Structure: Major (DSE) 1 – Assessment Scheme

Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
		Continuous Assessment (CA)			ESE			
		Test 1	Test 2	Avg of (T1+T2)/2	Total	CA	ESE	
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SPGEO-E552	Watershed Management	--	--	--	--	5	20	25

SPGEO-E552 Watershed Management: Curriculum Details

Course Pre-requisite:

- The candidate should know the basic concepts from physical set-up, topography and watershed, underground water, water harvesting basics.

Course Objectives

- The objective of this paper is to understand and be capable to observe and note the importance of watershed management. In addition, the objectives of this practical paper are to understand the available techniques of water harvesting .and basic work on computer.

Course Outcomes

- After completion of the paper / course, the students will get capabilities and skills to understand the watershed management techniques.

Curriculum Details (Four Modules with Units & Topics)

Module No.	Unit No.	Topic	Hours required to cover the contents
1.0	1.1	To delineate the Watersheds using SOI toposheet	7
	1.2	Surveying and preparation of watershed map	
	1.3	Quantitative analysis of watershed	
	1.4	Parameters of quantitative analysis	
2.0	2.1	Watershed investigation for planning and development	7
	2.2	Water budgeting of watersheds	
	2.3	Prioritisation of watersheds based on sediment yield index	
	2.4	Study of functional requirement of watershed development	
3.0	3.1	Study of watershed Management technologies	8
	3.2	Practice on Software for analysis of hydrologic parameters	
	3.3	To study the role of various functionaries in watershed	
	3.4	To locate areas of watershed programs	
4.0	4.1	To visit a watershed development project areas	8
	4.2	Cost benefit analysis of the project to surrounding areas	
	4.3	To study the important technologies used in watershed	
	4.4	To prepare a report	
Total Hours (1 hour = 60 minutes)			**30**

Text Books & Reference Books:

- Soil Conservation and Land Management.S.K. Datta, InternationalBook Distributors, Dehradun, 1985
- Soil and Water Conservation Engg. R. Suresh, Standard Publishers Distributors, Delhi-6, Repeint edition 2006.
- Watershed Planning and management. Rajvir Sing, Yash Publication House, Bikaner.2000
- Hydrology and soil Conservation Engineering: Including Watershed Management. Ghanshyam Das, 208.Prentice hall of learning Pvt altd,New Delhi.
- Watershed Management Guideline's for Indian conditions. Tideman E.M. Omega Scientific Publishers, New Delhi ,1996
- Watershed Management; Designe and Practice. P.K Singh 2000.E media Publications Udaipur.

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Guidelines for Course Assessment:

A. Continuous Assessment (CA) (20% of the Maximum Marks):

This will form 20% of the Maximum Marks and will be carried out throughout the semester. It may be done by conducting Two Tests (Test I on 40% curriculum) and Test II on remaining 40% syllabus). Average of the marks scored by a student in these two tests of the theory paper will make his CA score (col. 6).

B. End Semester Examination / Assessment (80% of the Maximum Marks):

(For illustration we have considered a paper of 04 credits, 100 marks and need to be modified depending upon credits of an individual paper)

1. **ESA Question paper will consists of 6 questions, each of 20 marks.**
2. **Students are required to solve a total of 4 Questions.**
3. **Question No.1 will be compulsory and shall be based on entire syllabus.**
4. Students need to solve **ANY THREE** of the remaining Five Questions (Q.2 to Q.6) andshall be based on entire syllabus.

Note:

Number of lectures required to cover syllabus of a course depends on the number of credits assigned to a particular course. One credit of theory corresponds to 15 Hours lecturing and for practical course one credit corresponds to 30 Hours. For example, for a course of two credits 30 lectures of one-hour duration are assigned, while that for a three-credit course45lectures.

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