

Structure & Detailed Syllabus  
NEP-2020 & CBCS

**B.A. / B.Sc. Geography Degree (Basic/Honours)**

in the Universities and Colleges of under Mangalore University

**Department of Geography**

Effective from 2021 - 2022

Members of BOS. UG. Geography, Mangalore University

1	Dr. Dasharatha P. Angadi Associate Professor, Mangalore University.	Chairman
2	Sri. Murali K.N. Lecture, Cauvery College Gonikoppal	Member
3	Dr. G.N. Kummur Associate Professor, Karnatak Science College, Dharwad	Member
4	Dr. K.N. Amarendra Associate Professor, Shri Siddaganga First Grade College Nelamangala.	Member

Chairman BOS

## Model Curriculum

Name of the Degree Program:	B.A. / B.Sc. (Basic / Honours) Degree in Geography
Discipline Core:	Geography
Total Credits for the Program:	180
Starting year of implementation:	2021-2022

### **Program Outcomes:**

By the end of the program the students will be able to:

(Refer to literature on outcome-based education (OBE) for details on Program Outcomes)

### **PO1: Relating to Knowledge**

By the end of the program the students will be able to:

- 1.1 give explanation of relevant terms and concept of geography including definitions.
- 1.2 give better explanation about relevant principles, theories and models in geography.
- 1.3 show clear knowledge relating to man and environmental process and factors.

### **PO2: Understanding and application**

By the end of the program the students will be able to:

- 2.1 Identify the importance of spatial scale and time scale.
- 2.2 Know the complex and interactive nature of physical and human environments.
- 2.3 Identify the importance of the resemblances and variance between places, environments and people.
- 2.4 Comprehend how processes bring changes in systems, distributions and environments.

### **PO3: Students Skills**

By the end of the program the students will be able to:

- 3.1 Interpret a variety of types of geographical data and sources and recognize their limitations.
- 3.2 Communicate geographical evidence, ideas and arguments.
- 3.3 Use geographical data to identify trends and patterns.
- 3.4 Use diagrams and sketch maps to demonstrate geographical aspects.
- 3.5 Demonstrate skill of analysis and synthesis of geographical information

## **PO4: Students Evaluation**

By the end of the program the students will be able to:

- 4.1 Critically evaluate geographical principles, theories and models
- 4.2 Assess the effects of geographical processes and change on physical and human environments.
- 4.3 Assess how the viewpoints of different groups of people, potential conflicts of interest and other factors interact in the management of physical and human environments.
- 4.4 Evaluate the relative success of failure of initiatives.

### **Syllabus Aims:**

The aims of the syllabus describe the B.A. / B.Sc. program in geography at 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup> & 8<sup>th</sup> Level. These aims outline the educational context in which syllabus content should be viewed. Many of these aims may be delivered by the use of suitable case-studies, through application of geographical skills and through practical field visits.

The B.A./B.Sc. Geography syllabus aims to enable students to:

- Know the significance of scale in studying geography
- Know the processes functioning at various scales within physical and human environments
- Improve a sense of space, place and location
- Develop consciousness of the relevance of geography to understanding and solving contemporary environmental problems
- Realization of the main fundamentals of physical geography and human geography and the interconnectedness between them
- Explain the causes and effects of change over space and time on physical and human environments
- Develop an gratefulness of the nature, value, limitations and importance of different approaches to analyses and explanation in geography
- Increase the knowledge of, and ability to use and apply, appropriate skills and techniques including fieldwork
- Improve a logical approach in order to present a structured, coherent and evidence-based argument
- Develop a concern for accuracy and objectivity in extracting, recording, processing, presenting, analyzing and interpreting geographical data.

## B.A. / B.Sc. Geography Degree (Basic/Honours)

Name of the Degree Program: B.A./B.Sc.	Total Credits for the Program: 180
Discipline/Subject: Geography	Starting year of implementation: 2021-2022

### Program Articulation Matrix for Core Courses:

Semester	Title /Name of the course	Program outcomes that the course addresses	Pre-requisite course(s)	Pedagogy	Assessment
I	Principles of Geomorphology	PO-1, PO-2, PO-4	No Pre-requisite course(s)	Interactive Lectures, Case Studies	In-course & End Course Assessment
II	Introduction to Climatology	PO-1, PO-2, PO-4	No Pre-requisite course(s)	Interactive Lectures, Case Studies	In-course & End Course Assessment
III	Fundamentals of Human Geography	PO-1, PO-3, PO-4	No Pre-requisite course(s)	Interactive Lectures, Case Studies, Seminar	In-course & End Course Assessment
IV	Regional Geography of India	PO-2, PO-3	No Pre-requisite course(s)	Interactive Lectures, Case Studies, Quiz	In-course & End Course Assessment
V	Population Resource & Dynamics	PO-1, PO-2, PO-4	No Pre-requisite course(s)	Inquiry-based learning, Interactive Lectures	In-course & End Course Assessment
	Fundamentals of Remote Sensing	PO-1, PO-3	Cartography & Spatial Statistics	Blended learning, Interactive Lectures, MOOCs	In-course & End Course Assessment
VI	Environmental Geography	PO-1, PO-2, PO-4	No Pre-requisite course(s)	Investigative Case-Based Learning, Seminar	In-course & End Course Assessment
	Fundamentals of Geographic Information System	PO-1, PO-3	Basics of Cartography	Blended learning, Interactive Lectures, MOOCs	In-course & End Course Assessment
VII	Advanced Geomorphology	PO-2, PO-4	Principles of Geomorphology	Blended learning, Interactive Lectures, MOOCs	In-course & End Course Assessment
	Advanced Climatology	PO-2, PO-4	Introduction to Climatology	Blended learning, Interactive Lectures, MOOCs	In-course & End Course Assessment
	Development of Geographical Thought	PO-2, PO-3, PO-4	Basics of Cartography	Interactive Lectures, Group Activity	In-course & End Course Assessment
VIII	Sustainable Soil & Water Resource Management	PO-1, PO-2, PO-4	Principles of Geomorphology	Cooperative Learning, Interactive Lectures, MOOCs	In-course & End Course Assessment
	Agriculture & Food Security	PO-1, PO-2, PO-4	No Pre-requisite course(s)	Blended learning, Interactive Lectures, MOOCs	In-course & End Course Assessment
	Climate Change: Vulnerability and Adaptation	PO-1, PO-2, PO-4	Introduction to Climatology	Blended learning, Interactive Lectures, MOOCs	In-course & End Course Assessment
	Research Project / Internship (6)	PO-2, PO-3, PO-4	Research Methodology	Process-Oriented Guided Inquiry Learning (POGIL), Problem or Project Based	In-course & End Course Assessment, Final report

### Program Articulation Matrix for Open Elective (OE)

Semester	Title of the course	PO that the course addresses	Pre-requisite course(s)	Pedagogy	Assessment
I	Earth System Dynamics	PO-1, PO-2	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Course Assessment
	Introduction to Natural Resources	PO-1, PO-2	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Course Assessment
	Introduction Physical Geography	PO-1, PO-2, PO-3	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Course Assessment
	Fundamentals of Remote Sensing	PO-1, PO-2, PO-3	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Course Assessment
II	Introduction to Human Geography	PO-1, PO-2	No Pre-requisite course(s)	Inquiry-based learning, Interactive Lectures	In-course & End Course Assessment
	Fundamentals of Natural Disasters	PO-1, PO-2	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Course Assessment
	Climate Change: Vulnerability & Adaptation	PO-1, PO-2, PO-4	No Pre-requisite course(s)	Blended learning, Case-Based Learning	In-course & End Course Assessment
	Basics of Geographic Information Systems	PO-1, PO-2, PO-3	Fundamentals of Remote Sensing	Interactive lectures, Blended learning	In-course & End Course Assessment
III	Geography of India	PO-1, PO-2	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Course Assessment
	Geography of Tourism	PO-1, PO-2	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Course Assessment
	Disaster Risk Reduction	PO-1, PO-2	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Course Assessment
	Application of GIS & Remote Sensing	PO-1, PO-2, PO-4	Fundamentals of Remote Sensing, Basics of GIS	Interactive lectures, Blended learning	In-course & End Course Assessment
IV	Geography of Karnataka	PO-1, PO-2	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Course Assessment
	Biogeography	PO-1, PO-2	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Course Assessment
	Population & Settlement Geography	PO-1, PO-2	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Course Assessment
	Regional Planning & Development	PO-1, PO-2, PO-4	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Course Assessment

### Program Articulation Matrix for Vocational Courses

Semester	Title of the course	PO that the course addresses	Pre-requisite course(s)	Pedagogy	Assessment
V	Basics Map Making	PO-1, PO-3	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Courses assessment
	Mobile Asset Mapping	PO-1, PO-3	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Courses assessment
VI	Open-Source GIS	PO-1, PO-3	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Courses assessment
	Landscaping & Layout Mapping	PO-1, PO-3	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Courses assessment

### Program Articulation Matrix for Discipline Specific Elective (DSE)

Semester	Title Of the course	PO that the course addresses	Pre-requisite course(s)	Pedagogy	Assessment
V	Geo-surveying	PO-1, PO3	Cartography	Interactive Lectures, case studies	In-course & End Courses Assessment
	Settlement Geography	PO-1, PO3	No Pre-requisite course(s)	Interactive Lectures, case studies	In-course & End Courses Assessment
	Introduction to Oceanography	PO-1	Introduction to Climatology	Interactive Lectures, case studies	In-course & End Courses Assessment
VII	Regional Planning and Development	PO-1	No Pre-requisite course(s)	Interactive Lectures, case studies	In-course & End Courses Assessment
	Physical Geography	PO-1	Introduction Physical Geography	Interactive Lectures, case studies	In-course & End Courses Assessment
	Trade & Transport Geography	PO-1	Settlement Geography	Interactive Lectures, case studies	In-course & End Courses Assessment
	Economic Geography	PO-1	No Pre-requisite course(s)	Interactive Lectures, case studies	In-course & End Courses Assessment
	Urban Geography	PO-1	Settlement Geography	Inquiry-based learning, Interactive Lectures, case studies	In-course & End Courses Assessment
	Tourism Geography	PO-1	Fundamentals of Human Geography	Blended learning, Investigative Case-Based Learning, Seminar	In-course & End Courses Assessment

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VIII	Bio-geography	PO-1	No Pre-requisite course(s)	Blended learning, Interactive Lectures, MOOCs	In-course & End Courses assessment
	Geography of Health & Wellbeing	PO-1, PO-2, PO-4	No Pre-requisite course(s)	Blended learning, Interactive Lectures, MOOCs	In-course & End Courses assessment
	Regional Geography of Karnataka	PO-2, PO-4	Regional Planning and Development Geography of Karnataka	Blended learning, Investigative Case-Based Learning, Seminar	In-course & End Courses assessment
	Disaster Risk Reduction	PO-1, PO-2, PO-4	Fundamentals of Natural Disasters	Blended learning, Interactive Lectures, MOOCs	In-course & End Courses assessment
	Sustainable Rural Development	PO-1, PO-2, PO-4	Settlement Geography	Inquiry-based learning, Interactive Lectures, case studies	In-course & End Courses assessment
	Cultural Geography	PO-1, PO-2	Fundamentals of Human Geography	Blended learning, Interactive Lectures, MOOCs	In-course & End Courses assessment
	Alternative Energy Sources	PO-1, PO-2, PO-4	No Pre-requisite course(s)	Blended learning, Interactive Lectures, MOOCs	In-course & End Courses assessment
	Forest Resource Management	PO-2, PO-4	Biogeography	Blended learning, Interactive Lectures, MOOCs	In-course & End Courses assessment
	World Geography	PO-1, PO-2, PO-4	Regional Planning and Development	Blended learning, Interactive Lectures, MOOCs	In-course & End Courses assessment

Program Articulation Matrix for Skill Enhancement Course (SEC)

Semester	Title of the course	PO that the course addresses	Pre-requisite course(s)	Pedagogy	Assessment
I	Cartographic Mapping	PO-1, PO-3	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Courses assessment
II	Utility Mapping	PO-1, PO-3	No Pre-requisite course(s)	Interactive lectures, Blended learning, Case Studies	In-course & End Courses assessment
V	Drone Mapping	PO-1, PO-3	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Courses assessment
VI	Programming R for Mapping	PO-1, PO-3	No Pre-requisite course(s)	Interactive lectures, Blended learning	In-course & End Courses assessment



**Program Structure for the B.A./B.Sc. Geography (Basic / Honours) Degree**

Semester	Discipline Specific Core (DSC) (Credits) (L+T+P)	Discipline Specific Elective (DSE) / Open Elective (OE) (Credits) (L+T+P)	Ability Enhancement Compulsory Courses (AECC), Languages (L+T+P)		Skill Enhancement Course (SEC)			Total Credits
					Skill-based (Credits) (L+T+P)	Value-based (Credits) (L+T+P)		
I	DSC-A1 Principles of Geomorphology (4+2) DSC-B1 (4+2)	OE-1.1 Earth System Dynamics / OE-1.2 Introduction to Natural Resources / OE-1.3 Introduction to Physical Geography / OE-1.4 Fundamentals of Remote Sensing (3)	L1-1 (3), L2-1 (3) (3+1+0 each)	Nil	SEC-1: Cartographic Mapping (2) (1+0+2)	Yoga (1) (0+0+2)	Health & Wellness (1) (0+0+2)	24
II	DSC-A2 Introduction to Climatology (4+2) DSC-B2 (4+2)	OE-2.1 Introduction to Human Geography / OE-2.2 Fundamentals of Natural Disasters / OE-2.3 Climate Change: Vulnerability & Adaptation / OE-2.4 Basics of Geographic Information Systems (3)	L1-2 (3), L2-2 (3) (3+1+0 each)	Environmental Studies (2)	Nil	Physical Education - Yoga (1) (0+0+2)	NCC/ NSS/R&R (S&G)/ Cultural(1) (0+0+2)	24
<b>Exit option with Certificate (48 Credits)</b>								
III	DSC-A 3 Fundamentals of Human Geography (4+2) DSC-B3 (4+2)	OE-3.1 Geography of India / OE-3.2 Geography of Tourism / OE-3.3 Disaster Risk Reduction / OE-3.4 Application of GIS & Remote Sensing (3)	L1-3 (3), L2-3 (3) (3+1+0 each)	Nil	SEC-2: Utility Mapping (2) (1+0+2)	Physical Education - Sports Skills (1) (0+0+2)	NCC/ NSS/R&R (S&G)/ Cultural (1) (0+0+2)	24
IV	DSC-A4 Regional Geography of India (4+2) DSC-B4 (4+2)	OE-4.1 Geography of Karnataka / OE-4.2 Biogeography / OE-4.3 Population & Settlement Geography / OE-4.4 Regional Planning & Development (3)	L1-4 (3), L2-4 (3) (3+1+0 each)	Constitution of India (2)	Nil	Physical Education – Games (1) (0+0+2)	NCC/ NSS/R&R (S&G)/ Cultural (1) (0+0+2)	24
<b>Exit option with Diploma (96 Credits)</b>								
Choose any one Discipline as Major, the other as the Minor								
V	DSC-A5 Population Resource & Dynamics (3+2) DSC-A6 Fundamentals of Remote Sensing (3+2) DSC-B5 (4)	DSE-A1.1 Geo- surveying / DSE-A1.2 Settlement Geography / DSE-A1.3 Introduction to Oceanography /(3) Vocational – 1 (3) Voc 1.1 Basics of Map Making / Voc 1.2 Mobile Asset Mapping	Nil	Nil	SEC-3: Drone Mapping (2) (1+0+2)	Physical Education – Games (1) (0+0+2)	NCC/ NSS/R&R (S&G)/ Cultural (1) (0+0+2)	24
VI	DSC-A7 Environmental Geography (3+2) DSC-A8 Fundamentals of Geographic Information Systems (3+2) DSC-B6 (4)	Vocational – 2 (3) Voc 2.1 Open-Source GIS / Voc 2.2 Landscaping & Layout Mapping  Internship (2)	Nil	Nil	SEC-4: Programming R for Mapping (2)	Physical Education – Games (1) (0+0+2)	NCC/ NSS/R&R (S&G)/ Cultural (1) (0+0+2)	23
<b>Exit option with Bachelor of Arts, B.A. / Bachelor of Science, B.Sc Basic Degree (143 Credits)</b>								

VII	<p>DSC-A9 Advanced Geomorphology (3+2)</p> <p>DSC-A10 Advanced Climatology (3+2)</p> <p>DSC-A11 Development of Geographical Thought (3)</p>	<p>DSE-A2.1 Regional Planning and Development / DSE-A2.2 Physical Geography / DSE-A2.3. Trade &amp; Transport Geography (3)</p> <p><i>(Student can select one from above and another from below pools for 3 credits each)</i></p> <p>DSE-A3.1 Economic Geography / DSE-A3.2 Urban Geography / DSE-A3.3 Tourism Geography (3)</p> <p>Research Methodology (3)</p>	Nil	Nil	Nil	Nil	Nil	22
VIII	<p>DSC-A12 Sustainable Soil &amp; Water Resource Management (3+2)</p> <p>DSC-A13 Agriculture &amp; Food Security (3+1)</p> <p>DSC-A14 Climate Change: Vulnerability and Adaptation (3)</p>	<p>DSE-A4.1 Bio-geography / DSE-A4.2 Geography of Health &amp; Wellbeing / DSE-A4.3 Regional Geography of Karnataka (3)</p> <p>Research Project / Internship (6)</p> <p><i>Note: If student is not willing to carry out Research Project or Internship, he /she may have to elect two DSE, one from DSE-5 pool and another from DSE-6 pool for 3 credits each.</i></p> <p>DSE-A5.1 Disaster Risk Reduction / DSE-A5.2 Sustainable Rural Development (3) DSE-A5.3 Cultural Geography</p> <p>DSE-A6.1 Affordable and Clean Energy / DSE-A6.2 Forest Resource Management / DSE-A6.3 World Geography (3)</p>	Nil	Nil	Nil	Nil	Nil	21

Award of Bachelor of Arts Honours, / Bachelor of Science Honours Degree (180 Credits)

**Note:** Students can earn credits by selecting open source like MOOCS, SWYAM, e-patasala, outreach program and other open e-learning platforms (20% of the total credit in the program)

**COURSE PATTERN AND SCHEME OF EXAMINATION FOR B.A. / B.Sc. PROGRAM**  
As Per NEP (2021-2022 and onwards)

**Semester - I**

Paper Code	Title of the Course / Paper	Type	Instruction Hour per Week	Total No. of Hours	Duration of Exam	IA Marks	Exam Marks	Total Marks	Total Credits
DSC-1	Principles of Geomorphology	Theory	4	52	2	40	60	100	4
		Practical	4	52	2	25	25	50	2
OE-1	1.1 Earth System Dynamics / 1.2 Introduction to Natural Resources / 1.3 Introduction to Physical Geography / 1.4 Fundamentals of Remote Sensing	Theory	3	42	2	40	60	100	3
SEC-1	Cartographic Mapping	Practical	4	52	2	25	25	50	2

**Semester - II**

Paper Code	Title of the Course / Paper	Type	Instruction Hour per Week	Total No. of Hours	Duration of Exam	IA Marks	Exam Marks	Total Marks	Total Credits
DSC-2	Introduction to Climatology	Theory	4	52	2	40	60	100	4
		Practical	4	52	2	25	25	50	2
OE-2	2.1 Introduction to Human Geography 2.2 Fundamentals of Natural Disasters / 2.3 Climate Change: Vulnerability & Adaptation 2.4 Basics of Geographic Information Systems	Theory	3	42	2	40	60	100	3

**Semester - III**

Paper Code	Title of the Course / Paper	Type	Instruction Hour per Week	Total No. of Hours	Duration of Exam	IA Marks	Exam Marks	Total Marks	Total Credits
DSC-3	Fundamentals of Human Geography	Theory	4	52	2	40	60	100	4
		Practical	4	52	2	25	25	50	2
OE-3	3.1 Geography of India / 3.2 Geography of Tourism / 3.3 Disaster Risk Reduction / 3.4 Application of GIS & Remote Sensing	Theory	3	42	2	40	60	100	3
SEC-2	Utility Mapping	Practical	4	52	2	25	25	50	2

**Semester - IV**

Paper Code	Title of the Course / Paper	Type	Instruction Hour per Week	Total No. of Hours	Duration of Exam	IA Marks	Exam Marks	Total Marks	Total Credits
DSC-4	Regional Geography of India	Theory	4	52	2	40	60	100	4
		Practical	4	52	2	25	25	50	2
OE-4	4.1 Geography of Karnataka / 4.2 Biogeography / 4.3 Population & Settlement Geography / 4.4 Regional Planning & Development	Theory	3	42	2	40	60	100	3

**Semester - V**

Paper Code	Title of the Course / Paper	Type	Instruction Hour per Week	Total No. of Hours	Duration of Exam	IA Marks	Exam Marks	Total Marks	Total Credits
DSC-5	Population Resource & Dynamics	Theory	3	42	2	40	60	100	3
		Practical	4	52	2	25	25	50	2
DSC-6	Fundamentals of Remote Sensing	Theory	3	42	2	40	60	100	3
		Practical	4	52	2	25	25	50	2
DSE-1	1.1 Geo-surveying / 1.2 Settlement Geography / 1.3 Introduction to Oceanography	Theory	3	42	2	40	60	100	3
VOC-1	Basics of Map Making / 1.2 Mobile Asset Mapping	Theory	3	42	2	40	60	100	3
SEC-3	Drone Mapping	Practical	4	52	2	25	25	50	2

## Semester - VI

Paper Code	Title of the Course / Paper	Type	Instruction Hour per Week	Total No. of Hours	Duration of Exam	IA Marks	Exam Marks	Total Marks	Total Credits
DSC-7	Environmental Geography	Theory	4	52	2	40	60	100	4
		Practical	4	52	2	25	25	50	2
DSC-8	Fundamentals of Geographic Information Systems	Theory	4	52	2	40	60	100	4
		Practical	4	52	2	25	25	50	2
VOC-2	2.1 Open-Source GIS / 2.2 Landscaping & Layout Mapping	Theory	3	42	2	40	60	100	3
INP	Internship	-	4	52	2	25	25	50	2
SEC-4	Programming R for Mapping	Practical	4	52	2	25	25	50	2

## Semester - VII

Paper Code	Title of the Course / Paper	Type	Instruction Hour per Week	Total No. of Hours	Duration of Exam	IA Marks	Exam Marks	Total Marks	Total Credits
DSC-9	Advanced Geomorphology	Theory	3	42	2	40	60	100	3
		Practical	4	52	2	25	25	50	2
DSC-10	Advanced Climatology	Theory	3	42	2	40	60	100	3
		Practical	4	52	2	25	25	50	2
DSC-11	Development of Geographic Thought	Theory	3	42	2	40	60	100	3
DSE-2	2.1 Regional Planning and Development/ 2.2 Physical Geography / 2.3. Trade & Transport Geography	Theory	3	42	2	40	60	100	3
DSE-3	3.1 Economic Geography / 3.2 Urban Geography / 3.3 Tourism Geography	Theory	3	42	2	40	60	100	3
RM-1	Research Methodology		3	42	2	40	60	100	3

## Semester - VIII

Paper Code	Title of the Course / Paper	Type	Instruction Hour per Week	Total No. of Hours	Duration of Exam	IA Marks	Exam Marks	Total Marks	Total Credits
DSC-12	Sustainable Soil and Water Resource Management	Theory	3	42	2	40	60	100	3
		Practical	4	52	2	25	25	50	2
DSC-13	Agriculture & Food Security	Theory	3	42	2	40	60	100	3
		Practical	4	52	2	25	25	50	1
DSC-14	Climate Change: Vulnerability and Adaptation	Theory	3	42	2	40	60	100	3
DSE-4	4.1 Bio-geography / 4.2 Geography of Health & Wellbeing / 4.3 Regional Geography of Karnataka	Theory	3	42	2	40	60	100	3
RP-1	Research Project / Internship		6	78	2	75	75	150	6
DSE-5	5.1 Disaster Risk Reduction/ 5.2 Sustainable Rural Development/ 5.3 Cultural Geography	Theory	3	42	2	40	60	100	3
DSE-6	6.1 Affordable and Clean Energy / 6.2 Forest Resource Management / 6.3 World Geography	Theory	3	42	2	40	60	100	3

*Note: If student is not willing to carry out Research Project or Internship he /she may have to elect two DSE, one from DSE-5 pool and another from DSE-6 pool for 3 credits each*

**Research Project / Internship:** 75 marks for IA, 30 Marks for Review Assessment; three review meetings will be conducted by staff-in-charge, each review assessment carries 10 marks. Review Assessment 1: at the beginning – Preparation made to start the work; Review Assessment 2: Middle - Progress done so far; Review Assessment 3: at the end – final outcome. 45 Marks for Viva Voce (language, communications, and expressions -15 marks, quality and skills of the research presentation -15 marks, question, and answers 15 marks. Remaining 75 marks for Project Report Submission (Review of Literature -10 marks; Statement of the Problems -10 marks, Research Methodology-flowchart -5 marks, use of Geospatial Technology -10 marks, Result & Discussion -10 marks, Conclusion & Recommendations -10 marks, Designing of the research framework -10 marks, References and citation -10 marks).

**Internship (1):** 25 marks for IA, 10 marks for Viva Voce (language, communications, and expressions -2 marks; quality and skills of the research presentation - 5 marks; question, and answers -3 marks), 10 marks for domain knowledge and 5 marks for presentation. 25 Marks for the successful completion of the Internship.

**Note:** The college / departments must identify and adopt some geographic areas falling within the jurisdiction. Such geographic areas can be, forest, dryland areas, Agriculture area, watershed region, village or city area, hinterland etc. Such adopted areas can continuously be used for research project work, primary data collection, for such activities document need to be maintained in the form of the report. Besides, co- curriculum activities like awareness programs, plantation, cleaning and greening, rallies, and camping etc. can also be conducted within such adopted areas.

Examples:

1. City with hinterland: **Bengaluru with its BMRDA Region,**
2. Watershed: **Arkavathi River,**
3. Village Adopted: \_\_\_\_\_,
4. Forest: **Western Ghats,**
5. Arid Regions with Rural Areas: **Tumkur District,**
6. Coastal Region: **Karnataka Coast.**

## B.A. /B.Sc. Geography Degree (Basic / Honours)

### Technical Skills and possible jobs after each exit during and after the program

Year	Objectives	Exit Level	Credits	Technical Skills	Possible Jobs
I	Understanding and exploration	Certificate	48	<ul style="list-style-type: none"> <li>• Map Interpretation</li> <li>• Geomorphic Analysis</li> <li>• Climate Data Analysis &amp; Interpretation</li> </ul>	<ul style="list-style-type: none"> <li>• Field Surveyor</li> <li>• Weather Data Analyst</li> </ul>
II	Focus and immersion	Diploma	96	<ul style="list-style-type: none"> <li>• Cartography</li> <li>• Statistics Analysis</li> </ul>	<ul style="list-style-type: none"> <li>• Field Surveyor</li> <li>• Cartographer</li> </ul>
III	Real Time Learning	Degree	140	<ul style="list-style-type: none"> <li>• Cartography</li> <li>• GIS and Image Analysis</li> <li>• Tourism Management</li> </ul>	<ul style="list-style-type: none"> <li>• GIS Field Surveyor</li> <li>• GIS Trainee</li> <li>• Nature Conservation Officer</li> <li>• School Teacher</li> </ul>
IV	Deeper Concentration	Degree with Honors	180	<ul style="list-style-type: none"> <li>• GIS &amp; Image Analysis</li> <li>• Resource Management</li> <li>• Town Planning</li> <li>• Tourism Management</li> </ul>	<ul style="list-style-type: none"> <li>• Sustainability Consultant</li> <li>• Tourism officer</li> <li>• Transport planner</li> <li>• Cartographer</li> <li>• GIS Engineer</li> <li>• Environmental consultant</li> <li>• Geography Teacher</li> <li>• Geography Researcher</li> </ul>

## B.A. / BSc Semester 1

### Title of the Course: DSC-A1 Principles of Geomorphology

Number of Theory Credits	Number of lecture hours/ semester	Number of practical Credits	Number of practical hours/ semesters
4	52	2	52
<b>Course Outcomes:</b> <ol style="list-style-type: none"> <li>1. After the completion of this course, students should be able to:</li> <li>2. Define the field of Geomorphology and to explain the essential principles of it.</li> <li>3. to outline the mechanism of dynamic nature of the Earth's surface and interior of the Earth.</li> <li>4. to illustrate and explain the forces affecting the crust of the earth and its effect on it.</li> <li>5. to understand the conceptual and dynamic aspects of landform development</li> </ol>			
<b>Course Objectives:</b> This course aims to: <ol style="list-style-type: none"> <li>1. to define the concepts in Geomorphology and Physical Geography</li> <li>2. to introduce various concept to understand cycles of the solid Earth surface</li> <li>3. to understand the dynamic nature of the Earth's surface, various processes, and landforms.</li> <li>4. to study the impact human on geomorphic system.</li> </ol>			

Content of Theory Course	52Hrs
<b>Unit – 1 Geomorphology</b>	13
Introduction to geography: physical and human geography	
Introduction to Geomorphology: meaning, nature, development, and scope	
Principles of Geomorphology	
Geological Time Scale	
Distribution of continents and oceans	
<b>Unit – 2 Systems and Cycles of the Solid Earth</b>	13
Internal structure of the earth	
Alfred Wegener's continental drift	
Theory of Isostasy: Views of Pratt and Airy	
Convectional current theory and concept of sea floor spreading	
Theory of Plate Tectonics: plate boundaries, subduction,	
Case Studies: Volcano, Earthquake: reporting of latest incidents	
Case Studies: Volcano, Earthquake: reporting of latest incidents	
<b>Unit – 3 The Dynamics of Earth</b>	13
Earth's Movements: Endogenetic and Exogenetic forces, Sudden and Diastrophic movements- Epeirogenetic and Orogenetic Movements-Process of folding and faulting	
Vulcanicity and earthquake	
Rocks: Characteristics, types, importance, and rock cycle	
Weathering: meaning, types and controlling factors	
Mass Movement: meaning, controlling factors, types-landslides, rock-falls	

<b>Unit – 4 Evolution of Landforms</b>	13
Evolution of Landforms	
Landforms: meaning, types and factors controlling landforms development	
Slope development: concept and types	
Concept of Cycle of Erosion–W.M. Davis and W. Penck	
Agents of Denudation: river; drainage patterns, groundwater, Sea waves, Wind and Glaciers and resultant landforms.	
Application of geomorphology in India and Karnataka: Regional planning, Urban planning and transportation, Mining, Hazard management, Agriculture and Environmental management.	
<b>Case Study:</b> Students must be taken to observe local land formation and degradation and write a report on their effectiveness.	

### **Geomorphology Practical**

**Content of Practical Course 1:** List of Experiments to be conducted

**Exercise-1:** Identification of Rocks and Minerals. Mineral samples: Iron ore, Bauxite ore and Manganese. Rock Samples: Granite, Basalt, Lime Stones, Sandstone, quartzite, and marble.

**Exercise-2:** Extraction and interpretation of Geomorphic information from Topographical maps

**Exercise-3:** Preparation of contour map from toposheet, Construction of Relief Profiles- serial, Super imposed, Projected & Composite.

**Exercise-4:** Slope Analysis - Slope Maps (Wentworth method) Slope (isotan and isosin) and aspect maps & Hypsometric curve and integral

**Exercise-5:** Drainage Morphometry: delineation of watershed, stream ordering and Morphometric analysis: mean stream length, drainage density and drainage frequency.

**Field based Activity:** Measurement of channel cross-sections in the field, Geomorphic map of channel bed, Study of erosional and depositional features in the field.

#### **Textbooks**

1. Ahmed E. (1985) Geomorphology, Kalyani Publishers, New Delhi.
2. P Mallappa, Physical Geography (Kannada Version)
3. Ranganath Principles of Physical Geography (Kannada Version)
4. Nanjannavar S S: Physical Geography (Kannada Version)
5. Hugar M R Physical Geography part 1(Kannada Version)
6. Goudar M B, Physical Geography (Kannada Version)
7. Kolhapure and S S Nanjan, Physical Geography (Kannada Version)
8. Mohan. K(2018), GES PERIODOS VOL 1, An Ultimate Guide to Physical Geography, OakBridge Publication, New Delhi



## References

1. Bloom A.L. (1978) *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms* Prentice – Hall of India, New Delhi.
2. Brunsdon D. (1985) *Geomorphology in the Service of Man: The Future of Geography*, Methuen, U.K.
3. Chorley, R.J., Schumm, S. A. and Sugden, D.E. 1984: *Geomorphology*, Methuen, London
4. Cooke, R.U. and Warren, 1973: *Geomorphology in Deserts*, Batsford, London
5. Dayal, P. 1996: *Textbook of Geomorphology*, Shukla Book Depot, Patna.
6. Goudie Anrew et.al. (1981) *Geomorphological Techniques*, George Allen & Unwin, London.
7. Homes A. (1965) *Principles of Physical Geology*, 3rd Edition, ELBSS Edn.
8. Strahler A.N. (1968) *The Earth Sciences*, Harper & Row Intl. Edn, New York
9. Thornberry W.D. (1969) *Principles of Geomorphology 2nd Edition*, Wiley Intl. Edn. & Wiley, 1984.
10. Verstappen H. (1983) *Applied Geomorphology, Geomorphological Surveys for Environmental Development*, Elsevier, Amsterdam

## Reference Websites

1. <http://www.solarviews.com/eng/earth.htm>
2. <http://www.moorlandschool.co.uk/earth/tectonic.htm>
3. <https://www.usgs.gov/>
4. <https://www.ksndmc.org/>

## Pedagogy

Formative Assessment	
Assessment Occasion/ type	Weightage in Marks
Case Studies	30%
Assignment	20%
CIA	50%
<b>Total</b>	<b>100%</b>

## B.A. / BSc Semester 1

### Title of the Course: OE-1.1 Earth System Dynamics

Number of Theory Credits	Number of lecture hours/ semester
3	42
<b>Course Outcomes:</b> <ol style="list-style-type: none"> <li>This course is to make understand the basic concepts of earth and to impart necessary skills of earth system, and dynamics to the students. So that, students acquire basic understanding of the mother earth</li> <li>To articulate the synergies and trade-offs of earth system and interconnected sub-systems to the students of interdisciplinary students.</li> </ol>	
<b>Course Objectives</b> This course aims to <ol style="list-style-type: none"> <li>Understand the concepts in Earth Sciences</li> <li>To study the global issues in the Earth system</li> <li>To study application of geoinformatics to solve the disaster and hazards</li> </ol>	
Content of Theory Course	42Hrs
<b>Unit – 1 Earth System Dynamics</b>	14
Origin of Earth and its forms, plate tectonics, layers of earth and composition, geological epochs, evolution of species, extinctions, ice ages, continental drift theory, Process of atmosphere, hydrosphere, biosphere, lithosphere, and their interaction. Trajectories of the Earth System in the Anthropocene.	
<b>Unit – 2 Issues in Earth System</b>	14
Global warming, greenhouse effect, carbon cycle, nitrogen cycle, water cycle, ozone depletion, floods, droughts, weather variations, sea level rise, changing ecosystems, snow / glaciers melting and impact of pollution.	
<b>Unit – 3 Climate Change &amp; Geoinformatics Applications</b>	14
The physical science of climate system and change, concepts, causes, effects, measures, climate change; Land – Climate interactions and climatic zones of world and India; Climate change and linkages with energy, emerging diseases, community response. Geoinformatics Applications - Concepts of hazards, risks and vulnerability; their analysis relating climate projections and their uncertainties; global warming, floods and droughts, and weather variations, ecosystems changes, and snow/glaciers melting, energy studies, health and diseases studies and other case studies.  Case study: Students have to study risk and vulnerability of local floods / disaster areas and prepare a report.	

### References

- The Dynamic Earth System (2012), Prentice Hall India Learning Private Limited; Third edition (2012) A.M. Patwardhan

2. Earth's Dynamic Systems (2003), Pearson; 10th edition (2003), W. Kenneth Hamblin & Eric H. Christiansen
3. Planet Earth: Cosmology, Geology, and the Evolution of Life and Environment (1992) Cesare Emiliani
4. Earth: Evolution of a Habitable World, 2nd edn., Cambridge, UK: Cambridge University Press (2013) Jonathan I. Lunine.
5. Evolution of the Earth, McGraw-Hill Education; 8th edition (2009) Donald Prothero, Robert Dott, Jr.
6. A Textbook of Climatology, Wisdom Press (2015) Tapas Bhattacharya

### **Pedagogy**

<b>Formative Assessment</b>	
<b>Assessment Occasion/ type</b>	<b>Weightage in Marks</b>
Case Studies	30%
Assignment	20%
CIA	50%
<b>Total</b>	100%

## B.A. / BSc Semester 1

### Title of the Course: OE: 1.2 Introduction to Natural Resources

Number of Theory Credits	Number of lecture hours/ semester
3	42
<p><b>Course Outcomes:</b> At the end of the course the students will:</p> <ol style="list-style-type: none"> <li>1. Understand concepts of different natural resources, its use, overuse, with its solution by natural resource management methods.</li> <li>2. Appreciate the need for managing land and water resources for sustainable growth and development, managerial skills such as land evaluation and land classification.</li> <li>3. Also, able to understand the causes and consequences of water stress and draw water conservation and management plans.</li> </ol>	
<p><b>Course Objectives:</b> This course aims to</p> <ol style="list-style-type: none"> <li>1. explain the types of natural resources that exist.</li> <li>2. Study the role of government and different agencies in the natural resource management</li> <li>3. Study the threat to the natural resources and the policies to solve it.</li> </ol>	
Content of Theory Course	42Hrs
<b>Unit – 1 Concept of Resources</b>	14
Meaning, Definition, importance and classification of Resources, Appraisal of Natural Resources, Natural Resources Economics, History of Conservation, need for conservation and Management of Natural Resources –Role of Government and NGO Agencies, Resource Creating Factors. Environmental Risk- types, wildlife, forest risk and its impact on environment and its management.	
<b>Unit – 2 Land Resources</b>	14
Land Evaluation Methods, Land classification Methods, Land use and Land cover Mapping changes. Issue related to land use change –Land use and population, Land use pattern in the world. Land source at stress, land use planning and development. Soil erosion, soil degradation, methods of conservation.	
<b>Unit – 3 Water Resources &amp; Minerals Resources</b>	14
Importance of water, Recent trends in water use in the world and in India, water crises, (stress) causes and consequences of water stress or crises, methods of water conservation, watershed management, coastal and ocean Resources management, Fisheries Management. Minerals Resources - Types of minerals, classifications of Major Minerals, their distribution and production. Such as Petroleum, Coal, Iron ore, Bauxite and Copper etc, and its uses. Mineral exploration methods, Mining, and its effects on environment. Mineral's conservation and mining policy.	
Case Study: Students will have to study a local area and prepare report about the natural resources available and their optimal utilization.	

## References

1. Dr.Alka Gautham: Geography of Resources: Exploitation, Conservation and Management, Sharada Pustak Bhavan, Allahabad.
2. Dr.P.S.Negi: Geography of Resources: Kedarnath Ramnath Publishers, New Delhi
3. Dr.Rajashekara Shetty(2009): An Analysis of World Resources with reference to India, Sarala Raj, Ria Publishers, Mysore
4. Khanna K.K and Gupta V.K.(1993): Economic and Commercial Geography, Sultan Chand, New Delhi
5. Prof. Zimmerwan – World Resources and Industries
6. Roy, P.R(2001) Economic Geography – A Study of Resources, New Central Book Agency, Calcutta.

## Pedagogy

<b>Formative Assessment</b>	
<b>Assessment Occasion/ type</b>	<b>Weightage in Marks</b>
Seminar	30%
Assignment	20%
CIA	50%
<b>Total</b>	<b>100%</b>

**B.A. / BSc Semester 1**

**Title of the Course: OE 1.3 Introduction to Physical Geography**

<b>Number of Theory Credits</b>	<b>Number of lecture hours/ semester</b>
<b>3</b>	<b>42</b>
<b>Course Outcomes:</b> 1. Students will be able to understand the fundamental concepts in Earth Sciences 2. understands basic terminology used to describe physical processes and landscape 3. Describe elements of the atmosphere and the oceans	
<b>Course Objectives:</b> This course aims to 1. Study basic principles of the Earth Sciences 2. Understand the landforms, atmospheric elements and structure and basics of oceanography	
<b>Content of Theory Course</b>	<b>42 Hrs</b>
<b>Unit – 1</b>	14
Origin, Shape and Size of the Earth, Movement of the Earth- Rotation and Revolution, Effects of the movement of Earth, Coordinates -Latitude, Longitude and Time. Structure of the Earth,	
<b>Unit – 2</b>	14
Rocks - types, significance, Weathering –types. Agents of Denudation - River, Glacier, Wind and Under Ground water. Volcanicity, Earthquakes and Tsunamis	
<b>Unit – 3</b>	14
Structure and Composition of Atmosphere, Weather and Climate. Atmospheric Temperature, Heat Budget of the atmosphere Atmospheric Pressure, Winds and Precipitation Distribution of Land and Sea, Submarine Relief of the Ocean, Temperature and Salinity of Sea Water. Ocean Tides, Waves and Deposits, Ocean currents - Atlantic, Pacific and Indian Oceans. Marine Resources: Biotic, mineral and energy resources. Case Study: Students will have to study a local stream and prepare report.	

## References

1. B.S. Negi (1993) Physical Geography. S.J. Publication, Meerut
2. D.S. Lal (1998) Climatology. Chaitnya publishing house, Allahabad
3. K. Siddhartha (2001) Atmosphere, Weather and Climate. Kosalaya publication, New Delhi
4. R.N. Tikka (2002) Physical Geography. Kedarnath Ramnath & co, Meerut
5. Willian D. Thornbury (1997) Principle of Geomorphology. New Age International (PvtLtd.) New Delhi.
6. Mohan. K (2018), GES PERIODOS VOL 1, An Ultimate Guide to Physical Geography, Oak Bridge Publication, New Delhi.

## Pedagogy

<b>Formative Assessment</b>	
<b>Assessment Occasion/ type</b>	<b>Weightage in Marks</b>
Quiz	30%
Assignment	20%
CIA	50%
<b>Total</b>	<b>100%</b>

## B.A. / BSc Semester 1

### Title of the Course: OE 1.4 Fundamentals of Remote Sensing

<b>Number of Theory Credits</b>	<b>Number of lecture hours/ semester</b>
3	42
<p><b>Course Outcomes:</b></p> <ol style="list-style-type: none"> <li>1. This course is to make understand the basic concepts of Remote Sensing and to impart necessary skills of remote sensing analysis, and image interpretation to the students. So that, students acquire employable skills in remote sensing.</li> <li>2. Students will learn how to handle and process the satellite images for understanding of biophysical phenomena of the earth system.</li> </ol>	
<p><b>Course Objectives:</b></p> <ol style="list-style-type: none"> <li>1. To congregate the basic concepts and fundamentals of physical principles of remote sensing</li> <li>2. To create a firm basis for successful integration of remote sensing in any field of application.</li> <li>3. To study basics of digital image processing and image interpretation techniques.</li> <li>4. To study the applications of the remote sensing to solve the real-world problems.</li> </ol>	
<b>Content of Theory Course</b>	<b>42Hrs</b>
<b>Unit – 1 Introduction</b>	14
Definition of Remote Sensing, developmental stages, Laws of Physics, electromagnetic waves, spectrum, regions, wavelength, frequencies, and applications. Types-Satellites, Sensors, Payloads, Orbits, telemetry of satellites.	
<b>Unit- 2 Process and types of Remote Sensing</b>	14
Process of remote sensing, interaction of radiation with atmosphere and targets, atmospheric noises, attenuation in radiance, resolutions of remote sensing, optical remote sensing, visible region of the spectrum, thermal remote sensing, microwave remote sensing, Hyperspectral remote sensing, LiDAR, and other remote sensing platforms.	
<b>Unit – 3 Image Classification and Interpretation &amp; Applications of Remote Sensing</b>	14
Satellite products and its spectral characteristics, composite images, band ratios; Land use land cover classification schemes-Anderson and NRSC; Visual image interpretation, elements, stages of interpretation and interpretation keys. Image classification- supervised, unsupervised, and principal component analysis (PCA) and accuracy assessment. Applications of Remote Sensing - Disaster Management, Meteorological Studies, Agricultural and Irrigation Studies, Forestry Studies, Hydrological Studies, Natural Resource, Oceanic and Coastal mapping, Soil resource mapping, Urban and Rural Mapping and Management.	
<b>Case Study:</b> Students will have to study visit nearby Remote Sensing Department and prepare report about how remote sensing mechanism works.	



## References

1. Remote Sensing of the Environment: An Earth Resource Perspective (Prentice Hall Series in Geographic Information Science) - Second Edition (2006), John Jensen
2. Remote Sensing and GIS, Second Edition (2011), Bhatta, B.
3. Introduction to Remote Sensing and Image Interpretation (2003); Lillesand T.M.
4. Remote sensing and image interpretation (2015); Chipman, Jonathan W., Kiefer, Ralph W., Lillesand
5. Introduction to Remote Sensing, Fifth Edition (2011); James B. Campbell, Randolph H. Wynne
6. Practical handbook of remote sensing, First Edition (2016) - Lavender, Andrew, Lavender, Samantha
7. Introductory Digital Image Processing: A Remote Sensing Perspective, Fourth Edition (2015) - John R. Jensen
8. Image processing and GIS for remote sensing: techniques and applications; Second Edition (2016) - Liu, Jian-Guo, Mason, Philippa J
1. [https://onlinecourses.nptel.ac.in/noc19\\_ce41/preview](https://onlinecourses.nptel.ac.in/noc19_ce41/preview)

## Pedagogy

<b>Formative Assessment</b>	
<b>Assessment Occasion/ type</b>	<b>Weightage in Marks</b>
Quiz	30%
Assignment	20%
CIA	50%
<b>Total</b>	<b>100%</b>

## B.A. / BSc Semester 2

### Title of the Course: Introduction to Climatology

Number of Theory Credits	Number of lecture hours/ semester	Number of practical Credits	Number of practical hours/ semesters
4	52	2	52
<p><b>Course Outcomes:</b></p> <p>After the completion of this course, students should be able to</p> <ol style="list-style-type: none"> <li>1. define the field of climatology and to understand the atmospheric composition and structure.</li> <li>2. to outline the mechanism and process of solar radiation transfer to earth surface and to explain the temperature distribution and variation according to time and space.</li> <li>3. to illustrate and explain the air pressure system, wind regulating forces and the formation of the Atmospheric Disturbance.</li> <li>4. to understand and compute the air humidity as well as to explain the process of Condensation and formation of precipitation and its types.</li> </ol>			
<p><b>Course Objectives:</b></p> <p>This course aims to:</p> <ol style="list-style-type: none"> <li>1. to define the field of climatology and components of the climate system</li> <li>2. to introduce various dimensions of climatology like structure and composition.</li> <li>3. to understand the global atmospheric pressure, temperature, and wind system.</li> <li>4. to study the concept of atmospheric moisture and its types</li> </ol>			
<b>Content of Theory Course</b>			<b>52Hrs</b>
<b>Unit – 1 Composition and Structure of the Atmosphere</b>			13
Nature and Scope of Climatology, Atmospheric Sciences; Climatology and Meteorology Origin and structure of the Atmosphere: Troposphere, Stratosphere, Mesosphere, Ionosphere, Exosphere and their characteristics. Composition of the atmosphere Weather and Climate			
<b>Unit – 2 Atmospheric Temperature</b>			13
Insolation: Definition, Mechanism, Solar Constant. Factors affecting the Insolation: Angle of incidence, length of the day, Sunspots, Distance between the earth and the sun, effect of the atmosphere. Heating and cooling process of the atmosphere-Radiation, Conduction, convection, and advection. Temperature: meaning and Influencing Factors on the Distribution of Temperature Distribution of the temperature: Vertical, Horizontal, and Inversion of temperature. Global Energy Budget: Incoming shortwave solar radiation, Outgoing Longwave Terrestrial radiation, Albedo. Net Radiation and Latitudinal Heat Balances.			
<b>Unit – 3 Atmospheric Pressure and Winds</b>			13
Atmospheric Pressure: Influencing factors on atmospheric pressure. Vertical and Horizontal Distribution of the atmospheric pressure and			

Pressure Belts, Pressure Gradient. Tri-cellular-Hadley, Ferrel's and Polar Cells. Winds: influencing factors, Types - planetary, seasonal, local wind Variable winds-Cyclones and anti-cyclones. Air-Masses and Fronts: Definition, Nature, Source Regions, Classification.	
<b>Unit – 4 Atmospheric Moisture</b>	13
Humidity: Sources, influencing factors and types-Absolute, Relative and Specific. Hydrological cycle: process of evaporation, condensation. Clouds and its types Precipitation and its forms. Climate Change: Causes and consequences, recent issues-floods, drought.	
<b>Case Study:</b> Students will have to visit and study a local area Weather Station and prepare report how it gathers data and sends to the main station.	

### Climatology Practical

**Exercise 1:** Acquisition of Climate Variables

**Exercise 2:** Plotting of variables (Manual and Automated)

**Exercise 3:** Generating Descriptive Statistics of Climate Variables

**Exercise 4:** Derivation of Water-Balance Chart

**Exercise 5:** Derivation of Actual and Potential Evapotranspiration

**Exercise 6:** Derivation of Drought Indices (Standard Precipitation Index, Aridity Index)

**Exercise 7:** Calculation of Bio-Climatic Variables (refer worldclim.org)

**Exercise 8:** Parametric and Non-Parametric Trend Detection

**Exercise 9:** Periodicity and Return Period Calculation

**Exercise 10:** Charting and Graphing of Climate variables (Scatterplot, Bar, Wind rose, Spider, Isohyets, Non-Linear Splines)

**Field based Activity:** Measurement of Water-Balance in the field, Study of erosional and run-off in the field.

#### Textbooks

1. Lal, D. S. (1998). Climatology. Allahabad: Chaitanya Publishing House.
2. P Mallappa, Physical Geography (Kannada Version)
3. Ranganath Principles of Physical Geography (Kannada Version)
4. Nanjannavar S S: Physical Geography (Kannada Version)

5. Hugar M R Physical Geography part 1(Kannada Version)
6. Goudar M B, Physical Geography (Kannada Version)
7. Kolhapure and S S Nanjan, Physical Geography (Kannada Version)

### References

8. Lutgens, Frederic K. & Tarbuck, Edward J. (2010). The Atmosphere: An Introduction to Meteorology. New Jersey: Pearson Prentice Hall.
9. Oliver, John E. & Hidore, John J. (2003). Climatology: An Atmospheric Science. Delhi: Pearson Education.
10. Singh, S. (2005). Climatology. Allahabad: Prayag Pustak Bhawan.
11. Barry, R.G. and Chorley, R.J. (2003): Atmosphere, Weather and Climate; Psychology Press, Hove; East Sussex.
12. Critchfield, H.J., (1975): general Climatology, Prentice Hall, New Jersey.
13. Mather, J.R.(1974): Climatology: Fundamentals and Applications; Mc Craw Hill Book Co., U.S.A.
14. Rumney, G.R. (1968): Climatology and the World Climates, Macmillan, London.
15. Trewartha, G.T. (1980): An Introduction to Climate; McGraw Hill, New York, 5th edition, (International Student Edition)

### Reference Websites

1. <https://earthobservatory.nasa.gov/>
2. <https://mausam.imd.gov.in/>
3. <https://www.weatheronline.in/>
4. <https://earthexplorer.usgs.gov/>
5. <https://www.nhc.noaa.gov/satellite.php>

### Pedagogy

<b>Formative Assessment</b>	
<b>Assessment Occasion/ type</b>	<b>Weightage in Marks</b>
Quiz	30%
Assignment	20%
CIA	50%
<b>Total</b>	<b>100%</b>

## B.A. / BSc Semester 2

### Title of the Course: OE 2.1 Introduction to Human Geography

Number of Theory Credits	Number of lecture hours/ semester
3	42
<p><b>Course Outcomes:</b></p> <ol style="list-style-type: none"> <li>1. Students will learn how human, physical, and environmental components of the world interact.</li> <li>2. Students will be familiarized with economic processes such as globalization, trade and their impacts on economic, cultural and social activities.</li> <li>3. the student will Describe what geography and human geography are.</li> <li>4. Understand population dynamics and migration.</li> </ol>	
<p><b>Course Objectives:</b></p> <p>This course aims to</p> <ol style="list-style-type: none"> <li>1. Understand the basics concepts of human geography</li> <li>2. Study population attributes and dynamic nature of it</li> <li>3. Introduce economic, cultural, and trade activities and their impact on the development of the region</li> </ol>	
Content of Theory Course	42Hrs
<b>Unit – 1 Introduction to Human Geography</b>	10
Nature and scope, Development Environmental Determinism and Possibilism, Neo determinism (stop and go determinism) Approaches to human geography: Exploration and Descriptive approach, regional analysis Approach, Areal Differentiation Approach, Spatial organization Approach. Modern approaches: Welfare or Humanistic Approach, Radical Approach, Behavioral Approach, Post Modernism in geography Fields and sub fields in Human geography	
<b>Unit – 2 Geographical Analysis of Population</b>	10
Distribution and Growth of Population Density of population: meaning and Types: Arithmetic Density and Physiological Density. Regional distribution of Density of Population. Carrying capacity and sustainability, population Pyramid. Population Theories: Malthus Theory of Population, Demographic Transition Theory Population Movement: Migration, Ravenstein's Law of Migration, Factors of population Migration, Economic Push and Pull factors, Cultural Push and Pull Factors, Environmental Push and Pull Factors. Migration Types: Immigration and Emigration, Internal and International Migration	
<b>Unit – 3 Cultural Patterns and Processes &amp; Human Economic Activities, Development and Settlements</b>	22
Concept of Culture, Material and Non material culture Cultural Regions, cultural Traits and Complexes, cultural Hearths, cultural Diffusion. Languages of the World: Types, Classification and Distribution. Language Extinction Religions: Types and Classification. Distribution. Universalizing Religions: Christianity, Islam, Buddhism. Ethnic Religions: Hinduism, the Chinese religion, Shintoism, Judaism. The Major tribal population of the world. Human Economic Activities, Development and Settlements - Primary Economic Activities – Agriculture, Types: Primitive Subsistence, Intensive subsistence, Plantation Agriculture, Extensive	

Commercial grain cultivation, Mixed Farming, Dairy Farming  
 Secondary and Tertiary Activities: Manufacturing, classification – based on size – Small Scale and Large scale. Based on Raw material – Argo-based, Mineral based, Chemical Based and Forest based. Industrial Regions of the world.  
 Tertiary Activities: Types: Trade and commerce, Retail Trading services, Whole sale trading. Transport and communications: Factors, communication services – Telecommunication. Services: Informal and Non formal sector. Information technology and service.  
 Human Settlements: Factors, Classification, Types and Patterns: Rural, Urban. Compact or Nucleated and Dispersed settlements. Rural settlement Patterns: linear, rectangular, circular, star shaped, T shaped.  
 Urban settlements: urbanism, classification – population size, occupation structure, Administration. functional classification of urban centers, types of urban settlements: towns, city, conurbation, Megalopolis, Million cities.

Case Study: Students will have to select nearby village and study human activities and submit the report.

**References**

1. Hartshorne, T. A., & Alexander, J. W. (2010). Economic Geography. New Delhi: PHI Learning.
2. Knox, P., Agnew, J., & McCarthy, L. (2008). The Geography of the World Economy. London: Hodder Arnold.
3. Lloyd, P., & Dicken, B. (1972). Location in Space: A Theoretical Approach to Economic Geography. New York: Harper and Row.
4. Siddhartha, K. (2000). Economic Geography: Theories, Process and Patterns, New Delhi: Kisalaya Publications.
5. Smith, D. M. (1971). Industrial Location: An Economic Geographical Analysis, New York: John Wiley and Sons.
6. Mohan. K (2019) , GES PERIODOS VOL 2: Indian, Human and Economic Geography, Oak Bridge publication, New Delhi.

**Pedagogy**

<b>Formative Assessment</b>	
<b>Assessment Occasion/ type</b>	<b>Weightage in Marks</b>
Quiz	30%
Assignment	20%
CIA	50%
<b>Total</b>	<b>100%</b>

## B.A. / BSc Semester 2

### Title of the Course: OE 2.2 Fundamentals of Natural Disasters

Number of Theory Credits	Number of lecture hours/ semester
3	42
<b>Course Outcomes:</b> Students will be able to 1. Understand the basics concepts in natural disasters 2. Study types of natural disasters and their effects	
<b>Course Objectives:</b> 1. The paper is intended to provide a general concept in the dimensions of disasters caused by nature beyond the human control. 2. Introduce a holistic classification of natural disasters considering the Earth Sciences 3. Demonstrate the devastating effect of natural disasters to society;	
Content of Theory Course	42Hrs
<b>Unit – 1 Introduction to Natural Disaster</b>	14
meaning, definition, and scope. Lithosphere and Natural Disasters Earthquakes and volcanoes, Landslides and Avalanches	
<b>Unit – 2 Atmosphere and Natural Disasters</b>	14
Heat wave and wildfire Cloud burst, hailstorm, Drought and famines	
<b>Hydrosphere and Natural Disaster</b>	14
Tsunami its effects and preparedness. Hurricanes and cyclones Floods and flash floods <b>Biosphere and Natural Disasters</b> Epidemics and pandemics Covid -19 and its effects Techniques and technology to mitigate natural disasters <b>Disaster in Indian context:</b> A regional survey of Land Subsidence, Coastal Disaster, Cyclonic Disaster & Disaster in Hills, terror attacks, communal clashes, Remedial measures. National and international policies for disaster management. <b>Case Study:</b> Students will have to study COVID-19 situation in local area and prepare report for its impact on society.	

### References

1. Dr. Mrinalini Pandey Disaster Management Wiley India Pvt. Ltd.
2. Tushar Bhattacharya Disaster Science and Management McGraw Hill Education (India) Pvt. Ltd.
3. Jagbir Singh Disaster Management: Future Challenges and Opportunities K W Publishers Pvt. Ltd.

4. J. P. Singhal Disaster Management Laxmi Publications.
5. Shailesh Shukla, Shama Hussain Biodiversity, Environment and Disaster Management Unique Publications
6. C. K. Rajan, Navale Pandharinath Earth and Atmospheric Disaster Management: Nature and Manmade B S Publication

**Pedagogy**

<b>Formative Assessment</b>	
<b>Assessment Occasion/ type</b>	<b>Weightage in Marks</b>
Seminar	30%
Assignment	20%
CIA	50%
<b>Total</b>	<b>100%</b>



## B.A. / BSc Semester 2

### Title of the Course: OE 2.3 Climate Change: Vulnerability and Adaptation

Number of Theory Credits	Number of lecture hours/ semester
3	42
<p><b>Course Outcomes:</b></p> <p>1. This course is to make understand the basic concepts of Climate-Weather systems and to impart necessary skills of Climate change, and its impact on earth systems to the students. So that, students acquire basic understanding of the climate systems of the earth and to study the applications of the Geoinformatics to study the climate change.</p>	
<p><b>Course Objectives:</b></p> <ol style="list-style-type: none"> <li>1. to provide a sound understanding of the economics of climate change from multiple viewpoints</li> <li>2. Demonstrate knowledge of the projected impacts of climate change and potential strategies</li> <li>3. for alleviating their negative impacts.</li> <li>4. Define key terms (e.g., adaptation, resilience, vulnerability, mainstreaming)</li> <li>5. Study application of the Geoinformatics in the Climate Change and Adaptation</li> </ol>	
Content of Theory Course	42Hrs
<b>Unit – 1 Introduction to Climate Change</b>	14
<p>Meaning and concept of climate change.                      Origin of atmosphere. Concepts of weather and climate.                      Evidence of Climate Change: Historical and current weather and climate events: Meteorological, Lithogenic and biological, Greenhouse effect, Greenhouse Gases, Global Warming.                      Extreme weather and climate event: Drought, Extreme Heat, Extreme precipitation, Hurricanes, Tornadoes and Wildfire.</p>	
<b>Unit – 2 Causes and Effect of climate change</b>	14
<p>Natural cause: Solar variation, Volcanic eruption, ocean currents, Earth orbital change and internal variability                      Human causes: Burning fossil fuel, Deforestation, Intensive Agriculture, and industries.                      Impacts of climate change: Water resources, agriculture, human health, vegetation, economy and El nino, La Nina and Arctic Oscillation                      International efforts to control the climate change: UNFCC its policy framework and provisions, Earth Summit Rio-de-Janeiro, World summit, Kyoto Protocol, Copenhagen summit and Doha Conference</p>	
<b>Unit – 3 Climate change Vulnerability, Adaptation, Vulnerability Assessment and climate change mitigation</b>	14
<p>Meaning and type of vulnerability                      Meaning, Definition, and types of adaptation                      Approaches of adaptation and Adaptation Strategies.                      Adaptation in different sectors: Agriculture, Forest, Water resources, Biodiversity, Disaster Risk Management. Climate change vulnerability assessment                      Global Initiatives to climate change mitigation: Kyoto Protocol, carbon trading, clean development mechanism, COP.</p>	

Indian initiative to support climate change mitigation: Improving energy efficiency, Diversification of energy sources, Modifying industrial processes, a multipronged strategy for sustainable development and Clean Development Mechanism (CDM) in India.

**Case study:** MGNREGA (Mahatma Gandhi National Rural Employment 16 Guarantee Act) potential of generating co-benefits, Vertical Shaft Brick Kiln (VSBK) or Ecolin.

### References

1. Earth: Evolution of a Habitable World, 2nd edn., Cambridge, UK: Cambridge University Press (2013) Jonathan I. Lunine.
2. Evolution of the Earth, McGraw-Hill Education; 8th edition (2009) Donald Prothero, Robert Dott, Jr.
3. A Textbook of Climatology, Wisdom Press (2015) Tapas Bhattacharya
4. Global Warming: The Complete Briefing, Cambridge University Press; 4th edition (2009), John Houghton
5. K.Siddhartha (2020): Climatology, Atmosphere, Weather and Climate. Kitaba Mahal Publication, New Delhi.
6. K.Siddhartha and others (2014): Basic Physical Geography Kishalaya Publications Pvt, Publication , New Delhi.
7. Satapathy. S: Adaptation to Climate Change with a Focus on Rural Areas and India. Indian Ministry of Environment and Forests, Director of the Climate Change Division.
8. IPCC – Intergovernmental Panel on Climate Change 2007b: Food, fibre and forest products. In: Parry, M.L.; Canziani, O.F.; Palutikof, J.P.; van der Linden, P.J.; Hanson, C.E.: Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.
9. Patricia Butler, Chris Swanston, Maria Janowiak, Linda Parker, Matt St. Pierre, and Leslie Brandt: Adaptation strategies and Approaches.
10. Ministry of Environment and Forest Government of India: Adaptation to Climate Change with a Focus on Rural Areas and India
11. Neelam Rana, Anand Kumar, Kavita Syal and Mustafa Ali Khan: Climate Change Mitigation in India

### Web Resources

1. IEA Training Material: Vulnerability and Climate Change Impact Assessment for Adaptation. [http://www.iisd.org/pdf/2010/iea\\_training\\_vol\\_2\\_via.pdf](http://www.iisd.org/pdf/2010/iea_training_vol_2_via.pdf)
2. Guidance on Integrating Climate Change Adaptation into Development Co-operation. <http://www.oecd.org/dac/43652123.pdf>
3. Mainstreaming Climate Change Adaptation into Development Planning: A Guide for Practitioners. <http://www.unep.org/pdf/mainstreaming-cc-adaptation-web.pdf>
4. CGE Climate Change Training Materials. [http://unfccc.int/national\\_reports/non-annex\\_i\\_natcom/training\\_material/methodological\\_documents/items/349.php](http://unfccc.int/national_reports/non-annex_i_natcom/training_material/methodological_documents/items/349.php)

5. Compendium on Methods and Tools to Evaluate Impacts of, and Vulnerability and Adaptation to, Climate Change.\_  
[http://unfccc.int/adaptation/nairobi\\_work\\_programme/knowledge\\_resources\\_and\\_publications/items/5457.php](http://unfccc.int/adaptation/nairobi_work_programme/knowledge_resources_and_publications/items/5457.php)
6. Centre for climate and Energy solutions. <https://www.c2es.org/content/extreme-weather-and-climate-change/>
7. <https://www.history.com/topics/natural-disasters-and-environment/history-of-climate-change>
8. [http://www.ozcoasts.org.au/glossary/images/VulnerabilityDiag\\_AllenConsulting.jpg](http://www.ozcoasts.org.au/glossary/images/VulnerabilityDiag_AllenConsulting.jpg)
9. <http://ccaafs.cgiar.org/news/media-centre/climatehotspots>
10. [http://www.oecd.org/document/24/0,3746,en\\_2649\\_34421\\_45619928\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/24/0,3746,en_2649_34421_45619928_1_1_1_1,00.html)
11. <http://pmindia.nic.in/Pg01-52.pdf>
12. <https://www.checinternational.org/climate-change-mitigation-adaptation-resilience/>

### **Pedagogy**

<b>Formative Assessment</b>	
<b>Assessment Occasion/ type</b>	<b>Weightage in Marks</b>
Case Studies	30%
Assignment	20%
CIA	50%
<b>Total</b>	<b>100%</b>

## B.A. / BSc Semester 2

### Title of the Course: DE 2.4: Basics of Geographic Information Systems (GIS)

Number of Theory Credits	Number of lecture hours/ semester
3	42
<p><b>Course Outcomes:</b></p> <ol style="list-style-type: none"> <li>1. Students are trained to adapt the theoretical concepts in a practical way through the mathematical models of geography.</li> <li>2. Students will have the hands-on training on various modes of spatial and non-spatial data collection, data storage, data analytics, data interpretation and data display through the thematic maps.</li> <li>3. Students are exposed on spatial thinking to solve the geographical problems with range of proven mathematical and statistical models.</li> <li>4. Students can employ in various corporate and government organization where they deal to solve geographical problems.</li> </ol>	
<p><b>Course Objectives:</b> This course aims to:</p> <ol style="list-style-type: none"> <li>1. Understand the concept and techniques of the Geographic Information Systems.</li> <li>2. Define the GIS data types and structures.</li> <li>3. Study geo processing and visualization concepts and techniques in GIS.</li> </ol>	
Content of Theory Course	42Hrs
<b>Unit – 1 Introduction</b>	10
Emergence of GI Science, Milestone and Developmental stages in GIS, Definition, scope, role of GIS in digital world; Components, functionalities, merits and demerits, global market, interdisciplinary domains, and its integration with GIS.	
<b>Unit – 2 Geodesy and Spatial Mathematics</b>	10
Cartesian coordinates, latitude, longitudes, formats of angular units, geographical coordinates, Datum: WGS84, vs NAD32. UTM, Aerial Distance measurement using Geographic and projected coordinates, Area, Perimeter, length by coordinates and various international measures.	
<b>Unit – 3 GIS Data and Scale</b>	10
Spatial Data and its structures; sources and types of data collection; data errors, topology of data and relationship. Large Scale vs Small Scale, generalization; precision and accuracy of data-logical consistency and non-spatial data integration	
<b>Unit – 4 Geoprocessing and Visualization</b>	12
Spatial and Non-Spatial Queries, proximity analysis, Preparation of Terrain and Surface models. Hotspot and density mapping. Types of maps, thematic maps and	

its types, relief maps, flow maps and cartograms. Tabulations: Graphs and Pivot tables.

**Case Study:** Students will have to select a AOI and prepare different GIS layers with report and their connectedness.

### References

1. An Introduction to Geographical Information Systems - Ian Heywood (2011)
2. Geographic Information Systems: A Management Perspective - Aronoff, S. (1989)
3. GIS - Fundamentals, Applications, and Implementations - Elangovan, K. (2006)
4. Introduction to Geographical Information Systems - Chang, Kang-Tsung (2015)
5. Remote Sensing and GIS - Bhatta, B. (2011)
6. Mathematical Modelling in Geographical Information System, Global Positioning System and Digital Cartography - Sharma, H.S. (2006)
7. Spatial analysis and Location-Allocation Models - Ghosh, A. and G. Rushton (1987)
8. Geographic Information Systems and Cartographic Modelling - Tomlin, C.D. (1990)
9. Geographic Information Systems and Science - Paul A. Longley, et. al. (2015)
10. Geographic Information Systems and Environmental Modelling - Clarke, C., K. (2002)

### Reference Websites

1. IIRS MOOC programme: <https://isat.iirs.gov.in/mooc.php>
2. ITC Netherlands, Principles of GIS\_ [https://webapps.itc.utwente.nl/librarywww/papers\\_2009/general/principlesgis.pdf](https://webapps.itc.utwente.nl/librarywww/papers_2009/general/principlesgis.pdf)
3. Geographical Information Systems: Principles, Techniques, Management and Applications [https://www.geos.ed.ac.uk/~gisteac/gis\\_book\\_abridged/](https://www.geos.ed.ac.uk/~gisteac/gis_book_abridged/)

### Pedagogy

Formative Assessment	
Assessment Occasion/ type	Weightage in Marks
Quiz	30%
Assignment	20%
CIA	50%
<b>Total</b>	100%

**Question Paper Pattern for BA/BSc. Geography**  
**Duration of examination 2 hours for 60 Marks**

**Part – A**

**3x4=12**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

**Part- B**

**6x3= 18**

- 7.
- 8.
- 9.
- 10.
- 11.

**Part- C**

**10x3=30**

- 12.
- 13.
- 14.
- 15.

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