

BENGALURU CITY UNIVERSITY

CHOICE BASED CREDIT SYSTEM

**(Semester Scheme with Multiple Entry and Exit Options for
Under Graduate Course)**

**B.A. / B.Sc. Syllabus for Geography (Basic / Honors)
(I & II Semester)**

2021-22 onwards



Proceedings

of
Geography (Honours)
Under Graduate Programme in Geography

Preparing the curricula and syllabus for Four-Years Under Graduate Programme in Geography is bestowed to the committee formed by Higher Education Council, Government of Karnataka under the Chairmanship of Prof. Ashok Hanajgi. The committee has been conducted several online meetings with Committee Members involving the Members of BOS, UG & PG who are working under various Universities spread in Karnataka state. Subsequently, two-day workshop has been organized in the Department of Geography, Bangalore University, Bengaluru during 30 - 31 August and 21st - 22nd September 2021 to design curricula and syllabus for Four-year Under Graduate Programme in Geography. The workshop was conducted under the headship of Prof. Ashok Hanjagi, Chairman, Syllabus Framing Committee for Geography as per the direction of Karnataka Higher Education Council.

In connection with the above, the BOS, UG Committee, Bengaluru City University, held its meeting on 22nd September 2021 in the Department of Geography, Bengaluru City University at 2.30 pm to discuss and finalize curricula and syllabus for Four-Years Under Graduate Honours Programme about to commence from the academic year 2021-22.

At the outset Dr. Rajasekaran D, Chairman, BOS, UG, and Principal, Department of Geography, Govt. Arts College, Bangalore - 560001, welcomed the Committee members for the meeting and informed that University has directed to conduct BOS meeting to approve curriculum and syllabus for B.A/B.Sc. Geography Honours Under Graduate Program in Geography to be commenced in 2021-22 which has been designed on par with NEP-2020 guidelines.

The curricula and syllabus for Four-Years B.A./B.Sc. Geography Under Graduate Program in Geography committee formed by Higher Education Council, Government of Karnataka under the Chairmanship of Prof. Ashok Hanajgi has been studied thoroughly by the BOS, UG members.


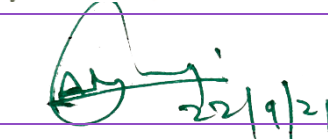




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Subsequently, the BOS, UG Committee members discussed thoroughly and recommended as under:

Item	Recommendations of the committee
1 Approval of the curriculum and syllabus for B.A./B.Sc. Geography (Honours) Under Graduate Programme in Geography to be commenced in 2021-22.	The BOS Committee resolved the curriculum and syllabus for B.A./B.Sc. Geography (Honours) Under Graduate Programme in Geography to be commenced in 2021-22.

Dr Rajasekaran D, Chairman, BOS assured that the recommendations of the committee will be submitted to the University for further processing. The meeting concluded with vote of thanks.

Members of BOS Committee		
	Name and Address	Signatures
1	Dr. Rajasekaran D , Principal, Department of Geography, Govt. Arts College, Bangalore-01.	
2	Dr. Ashok D Hanjagi , Professor & Chairman, Department of Geography, Bangalore University, Bangalore-560 056.	
3	Dr. Surendra P. Assistant Professor, Department of Geography, Bangalore University, Bangalore-560 056.	
4	Dr. Shivamurthy HN , Assistant Professor, Department of Geography, Govt. Arts College, Bangalore-01.	
5	Dr. Afsari Jan , Assistant Professor, Department of Geography, Abbas Khan College for Women, Durga Complex, OTC Road, Cubban Pet, Bangalore - 560002	Absent
6	Dr. L T Naik , Associate Professor, Department of Geography, Karnataka Science College, Dharwad - 580001	
7	Sri K N Mahadeva Prasad , Department of Geography, Maharani's Arts College for Woman, Mysore - 570006	


Dr. Rajasekaran D
Chairman, BOS, UG
Bengaluru City University



Syllabus & Regulations Governing the Choice-Based Credit System (CBCS)

**for the Four-Years (Eight Semesters) Bachelor of
Arts / Bachelor of Science (B.A./B.Sc.)
Geography Program**

National Educational
Policy 2020





Eligibility for Admission:

Candidates who have passed any PUC Science, Commerce, Arts examinations in Karnataka State or any other States in India with equal qualifications are eligible for admission to the course, provided they have secured 50% marks (45% for SC / ST / Category-I Candidates).

Scheme and Duration of the Course:

B. A./B. Sc. Geography Programme consists of 8 semesters in four academic years.

Discipline Specific Core (DSC) Courses:

First, second, third and fourth semesters will have one DSC course each. Every DSC course has 6 credits and a practical component (4 credits for theory and 2 credits for practical).

Fifth and sixth semesters will have two Discipline Specific Core (DSC) courses each. Every DSC course has 5 credits and has practical component (3 credits for theory and 2 credits for practical).

Seventh and eighth semesters will have three Discipline Specific Core (DSC) courses each. In seventh semester, two DSC courses have 5 credits each (3 credits for theory and 2 credits for practical) and one course has 3 credits with no practical component. Whereas in eighth semester, one DSC course has 5 credits and a practical component (3 credits for theory and 2 credits for practical). Remaining two DSC courses have 3 credits each with no practical component. Totally, the programme has 14 DSC courses.

The approval of the National Education Policy (NEP) by the Ministry of Human Resource Development, Government of India has been well deliberated as discussed since 2015. The advent of industry 4.0 scenario has rendered our current system of education outdated. Hence, the NEP is designed to contemplate the current skill requirements. The Indian education system with its earlier policies on education has greatly led to creation of fragmented system of education. However, bringing the whole system under one large umbrella is one of the best recommendations. The current NEP has attempted to rectify the same by removing stand-alone institutions, affiliated institutions, proposed formation and up-gradation of institutions to offer multidisciplinary education. Multidisciplinary education system with flexibility for undergraduate students is a key highlight of the NEP. It focuses on promoting and building vocational and skill enhancement courses, right from the entry level, which can ease the burden on the employment opportunities and supply of proficient/talented workforce.



This National Education Policy 2020 aims to address the many growing developmental aspirations of our country. This Policy proposes the revision and revamping of all aspects of the education structure, including its regulation and governance, to create a new system that is aligned with the aspirations & goals of 21st century education, including Sustainable Development Goal - 4, while building upon India's traditions and value systems.

NEP aims to have an education system, which is interdisciplinary in nature by 2030 with equitable access to the highest-quality education for all learners regardless of their social or economic background and seeks to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all within the time-frame.

Vision of NEP-2020



- An education system that contributes to an equitable and vibrant knowledge society, by providing high-quality education to all.
- Develops a deep sense of respect towards the fundamental rights, duties and Constitutional values, bonding with one's country, and a conscious awareness of one's role and responsibilities in a changing world.
- Instills skills, values, and dispositions that support responsible commitment to human rights, sustainable development and living, and global well-being.

Open Elective (OE) Courses:

First, second, third and fourth semesters will have one OE course each. Every OE course has 3 credits and with no practical component. OE courses are for other disciplines and the candidate has to choose one OE from the pool in each semester. The OE courses enhance the geographical knowledge and help students in preparation for the competitive examinations. There are totally 4 OE courses in the programme.

Candidates entering into the fifth semester from the social science background like, political science, economics, history, sociology etc. can opt for 4 credits DSC as major / minor (without practical) in the semester of fifth and sixth. Further, the students coming from arts and science background with practical can opt course with 3+2 credits DSC as major / minor.

Vocational Courses:

Fifth and Sixth semester will have two vocational courses each for 3 credits. The candidate has to choose one vocational course from the pool. There is 2 credits internship course which have to be selected by the candidate. These courses can enable students to obtain the required technical knowledge along with artistic or practical skills.

Discipline Specific Elective (DSE) Courses:

Seventh and eighth semesters will have DSE courses. All the DSE courses have 3 credits and with no practical component.

The seventh semester will have research methodology for 3 credits and the eighth semester will either be a research project or Internship for 6 credits. If candidate is not interested to opt for the Research Methodology in the seventh semester the candidate can opt one more DSE course from the given pool.

However, the candidates willing to pursue a PhD program in future can select a Research Project in the eighth semester. The candidate should have opted for the Research Methodology course in the seventh semester itself. If candidate is not interested to opt for the Research project in the eighth semester, the candidate can opt two more DSE courses from the given pool. The DSE courses enhance the geographical knowledge and help students in preparation for the competitive examinations.

There shall be University examination at the end of each semester. The course pattern and the scheme of examinations are as follows:

Duration of the Course:



other co-curricular activities. The internal assessment marks shall be notified on the department / college notice board for the information of the students and it shall be communicated to the Registrar (Evaluation) within 10 days before the commencement of the University examinations, and the Registrar (Evaluation) shall have access to the records of such internal assessment evaluations.

Board of Examiners (BOE):

Board of examiners constituted by the University shall consist of a Chairman, internal and external members out of which at least one shall be from the Department / College offering the course and at least two external members from other universities. The board shall scrutinize the question papers and shall forward for the approval of university.

Results:

A candidate should obtain a minimum of 40% marks in each of the papers in the University examination and 50% marks including internal assessment marks. A candidate should obtain a minimum of 50% marks in all Semesters). The candidates who have passed in all the semester examinations are eligible for the B.A./B.Sc. Degree Honours in Geography. If candidate choose second DSC from social science stream like Sociology, Political Science, History, Economics, etc., can be awarded as B.A. Degree Honours in Geography. If candidate choose second DSC from science stream like Physics, Chemistry, Botany, Geology, Environmental Science etc., can be awarded as B.Sc. Degree Honours in Geography.

Carry Over:

A candidate who fails in a lower semester examination may go to the higher semester, however, the result of the candidates who have passed the VIII semester examination but not passed the lower semester examinations shall be declared as NCL (not completed lower semester examinations). Such candidates shall be eligible for the degree only after completion of all the lower semester examinations.

Question Paper Pattern:

The Theory exam will be conducting for 70 Marks and it consists of 3 Parts namely short, medium and long answer questions.

Part – A Each question carries 4 marks and student has to answer 4 questions.

Part – B Each question carries 8 marks and student has to answer 3 questions.

Part – C Each question carries 15 marks and student has to answer 2 questions.



Model Curriculum

Name of the Degree Program:	B.A./B.Sc. (Basic/Honours) Degree in Geography
Discipline Core:	Geography
Total Credits for the Program:	186
Starting year of implementation:	2021-2022

Programme 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 or failure of initiatives.

Syllabus Aims

The aims of the syllabus describe the B.A. / B.Sc program in geography at 5th, 6th, 7th & 8th 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 a gratefulness of the nature, value, limitations and importance of different approaches to analyze 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.

Curriculum Structure for Undergraduate Program B.A. / B.Sc. Geography

Programme Articulation Matrix for Core Courses (DSC):

Semester	Title/Name of the Course	Programme 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	Cartography & Spatial Statistics	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
	Geo-surveying	PO-2, PO-3, PO-4	Basics of Cartography	Interactive Lectures, Group Activity	In-course & End Course Assessment
VII	Sustainable Soil 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
	Basics of Natural Disaster Management	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

Programme Articulation Matrix for Open Elective (OE)

Semester	Title/Name 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	Human of 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

Programme Articulation Matrix for Vocational Courses:

Semester	Title/Name 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

Programme Articulation Matrix for Discipline Specific Elective (DSE):

Semester	Title/Name of the Course	PO that the course addresses	Pre-requisite course(s)	Pedagogy	Assessment
VII	Physical Geography	PO-1	No Pre-requisite course(s)	Interactive Lectures, case studies	In-course & End Courses Assessment
	Development of Geographical Thought	PO-1	No Pre-requisite course(s)	Interactive Lectures, case studies	In-course & End Courses Assessment
	Trade & Transport Geography	PO-1	No Pre-requisite course(s)	Interactive Lectures, case studies	In-course & End Courses Assessment
	Settlement Geography	PO-1	No Pre-requisite course(s)	Interactive Lectures, case studies	In-course & End Courses Assessment
	Introduction to Oceanography	PO-1	Introduction to Climatology	Inquiry-based learning, Interactive Lectures, case studies	In-course & End Courses Assessment
	Regional Geography of India	PO-2, PO-4	Principles of Geomorphology Introduction to Climatology Fundamentals of Human Geography	Blended learning, Investigative Case-Based Learning, Seminar	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
	Climate Change: Vulnerability & Adaptation	PO-1, PO-2, PO-4	Introduction to Climatology	Problem or project-based learning, concept map	In-course & End Courses Assessment

Contd...

Semester	Title/Name of the Course	PO that the course addresses	Pre-requisite course(s)	Pedagogy	Assessment
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	Principles of Geomorphology Introduction to Climatology Fundamentals of Human Geography	Blended learning, Investigative Case-Based Learning, Seminar	In-course & End Courses assessment
	Economic Geography	PO-1, PO-2, PO-4	Fundamentals of Human Geography	Cooperative Learning, Group Activity, Interactive Lectures, MOOCs	In-course & End Courses assessment
	Regional Planning and Development	PO-1, PO-2, PO-4	Fundamentals of Human Geography	Inquiry-based learning, Interactive Lectures, case studies	In-course & End Courses assessment
	Geopolitics & Defense Strategies	PO-1, PO-2, PO-4	No Pre-requisite course(s)	Cooperative Learning, Group Activity, Interactive Lectures, MOOCs	In-course & End Courses assessment
	Alternative Energy Sources	PO-1, PO-2, PO-4	Environmental Geography	Blended learning, Interactive Lectures, MOOCs	In-course & End Courses assessment
	Natural Resource Management	PO-1, PO-2, PO-4	Environmental Geography	Inquiry-based learning, Interactive Lectures, case studies	In-course & End Courses assessment
	Urban Geography	PO-1, PO-2	Fundamentals of Human Geography	Blended learning, Interactive Lectures, MOOCs	In-course & End Courses assessment
	Economic Geography	PO-1, PO-2, PO-4	Fundamentals of Human Geography	Blended learning, Interactive Lectures, MOOCs	In-course & End Courses assessment
	Disaster Risk Reduction	PO-2, PO-4	Environmental Geography	Blended learning, Interactive Lectures, MOOCs	In-course & End Courses assessment
	Sustainable Rural Development	PO-1, PO-2, PO-4	Regional Planning and Development	Blended learning, Interactive Lectures, MOOCs	In-course & End Courses assessment

B.A. / B.Sc. (Basic / Honours) Degree in Geography – Course Types in the Programme

Semester	Discipline Specific Core (DSC)	Open Elective (OE) (3)	Vocational Courses (3)	Discipline Specific Elective (DSE) (4)	Research/Other Courses
I	Principles of Geomorphology	Earth System Dynamics /Introduction to Natural Resources / Introduction to Physical Geography / Fundamentals of Remote Sensing	Nil	Nil	Nil
II	Introduction to Climatology	Earth System Dynamics /Introduction to Natural Resources / Introduction Physical Geography / Fundamentals of Remote Sensing	Nil	Nil	Nil
III	Fundamentals of Human Geography	Geography of India / Geography of Tourism / Disaster Risk Reduction / Application of GIS & Remote Sensing	Nil	Nil	Nil
IV	Cartography & Spatial Statistics	Geography of Karnataka/ Biogeography / Population & Settlement Geography / Regional Planning & Development	Nil	Nil	Nil
V	Population Resource & Dynamics	Nil	Basics of Map Making /	Nil	Internship
	Fundamentals of Remote Sensing		Mobile Asset Mapping		
VI	Environmental Geography	Nil	Open-Source GIS/	Nil	Nil
	Fundamentals of Geographic Information System		Landscaping & Layout Mapping		
VII	Advanced Geomorphology	Nil	Nil	Physical Geography / Development of Geographical Thought / Trade & Transport Geography / Settlement Geography	Research Methodology
	Advanced Climatology				
	Geo-surveying			Introduction to Oceanography /	

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VIII	Sustainable Soil Resource Management	Nil	Nil	Regional Geography of India / Tourism Geography / Climate Change: Vulnerability & Adaptation Bio-geography / Geography of Health & Wellbeing / Regional Geography of Karnataka / Economic Geography	Research Project / Internship
	Agriculture & Food Security				
	Basics of Natural Disaster Management			Regional Planning and Development / Geopolitics & Defense Strategies / Alternative Energy Sources / Natural Resource Management	
				Urban Geography / Economic Geography / Disaster Risk Reduction / Sustainable Rural Development	

Course wise Credit and marks distribution for the B.A./B. Sc. (Basic/Hons) Geography in Universities and Colleges in Karnataka

Semester	Course Type	Course Name		Credits	Marks					
					Tutorial	Total	Theory	Practical	Tutorial	Total
I	DSC	Principles of Geomorphology	4	2	-	6	100	50	-	150
	OC	Earth System Dynamics / Introduction to Natural Resources / Introduction to Physical Geography / Fundamentals of Remote Sensing	3	-	-	3	100	-	-	100
II	DSC	Introduction to Climatology	4	2	-	6	100	50	-	150
	OE	Human Geography / Fundamentals of Natural Disasters / Climate Change: Vulnerability & Adaptation / Basics of Geographic Information Systems	3	-	-	3	100	-	-	100
III	DSC	Fundamentals of Human Geography	4	2	-	6	100	50	-	150
	OE	Geography of India / Geography of Tourism / Disaster Risk Reduction / Application of GIS & Remote Sensing	3	-	-	3	100	-	-	100
VI	DSC	Cartography & Spatial Statistics	4	2	-	6	100	50	-	150
	OE	Geography of Karnataka / Biogeography / Population & Settlement Geography / Regional Planning & Development	3	-	-	3	100	-	-	100
V	DSC	Population Resource & Dynamics	4	1	-	4	70	30	-	100
	DSC	Fundamentals of Remote Sensing	3	2	-	5	70	30	-	100
	VOC	Vocational – 1 Basics of Map Making/ Mobile Asset Mapping	3	-	-	3	100	-	-	100
	-	Internship	2	-	-	2	50	-	-	50
VI	DSC	Environmental Geography	4	1	-	4	70	30	-	100
	DSC	Fundamentals of Geographic Information System	3	2	-	5	70	30	-	100
	VOC	Vocational – 2 Open-Source GIS / Landscaping & Layout Mapping	3	-	-	3	100	-	-	100
VII	DSC	Advanced Geomorphology	3	2	-	5	70	30	-	100

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	DSC	Advanced Climatology	3	2	-	5	70	30	-	100
	DSC	Geo-surveying	3	-	-	3	100	-	-	100
	DSE	Physical Geography / Development of Geographical Thought / Trade & Transport Geography / Settlement Geography	3	-	-	3	100	-	-	100
	DSE	Introduction to Oceanography / Regional Geography of India / Tourism Geography / Climate Change: Vulnerability & Adaptation	3	-	-	3	100	-	-	100
	-	Research Methodology	3	-	-	3	100	-	-	100
VIII	DSC	Sustainable Soil Resource Management	3	2	-	5	70	30	-	100
	DSC	Agriculture & Food Security	3	-	-	3	100	-	-	100
	DSC	Basics of Natural Disaster Management	3	-	-	3	100	-	-	100
	DSE	Bio-geography / Geography of Health & Wellbeing / Regional Geography of Karnataka / Economic Geography	3	-	-	3	100	-	-	100
	DSE	Research Project / Internship	6	-	-	6	150	-	-	150
		Regional Planning and Development / Geopolitics & Defense Strategies / Alternative Energy Sources / Natural Resource Management	--or-- 3 +							
		Urban Geography/ Economic Geography / Disaster Risk Reduction / Sustainable Rural Development	3							

DSC: Discipline Specific Core, DSE: Discipline Specific Elective, OE: Open Elective, L+T+P: Lecture+Tutorial+Practical

Programme Structure for the B.A./B.Sc. Geography (Basic / Honours) Degree in Universities and Colleges of Karnataka

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: Digital Fluency (2) (1+0+2)	Physical Education for Fitness(1) (0+0+2)	Health & Wellness(1) (0+0+2)	25
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 GeographicInformation Systems (3)	L2-1 (3), L2-1 (3) (3+1+0 each)	Environment al Studies (2)	Nil	Physical Education - Yoga (1) (0+0+2)	NCC/ NSS/R&R (S&G)/ Cultural(1)(0+0+2)	25
Exit option with Certificate (50 Credits)								
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: Artificial Intelligence (2) (1+0+2)	Physical Education - Sports Skills (1) (0+0+2)	NCC/ NSS/R&R (S&G)/ Cultural(1)(0+0+2)	25
IV	DSC-A4 Cartography & Spatial Statistics (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)	Constitution of India (2)	Physical Education – Games (1) (0+0+2)	NCC/ NSS/R&R (S&G)/ Cultural(1)(0+0+2)	25
Exit option with Diploma (100 Credits)								
Choose any one Discipline as Major, the other as the Minor								
V	DSC-A5 Population Resource & Dynamics (4+1)* DSC-A6 Fundamentals of Remote Sensing (3+2) DSC-B5 (3+2)	Vocational – 1 (3) Voc 1.1 Basics of Map Making / Voc 1.2 Mobile Asset Mapping	Nil	Nil	SEC-3: Such as Cyber Security (2) (1+0+2)	Physical Education – Games (1) (0+0+2)	NCC/ NSS/R&R (S&G)/ Cultural(1)(0+0+2)	22
VI	DSC-A7 Environmental Geography (4+1)* DSC-A8 Fundamentals of Geographic Information Systems (3+2) DSC-B6 (3+2)	Vocational – 2 (3) Voc 2.1 Open-Source GIS / Voc2.2 Landscaping& Layout Mapping Internship (2)	Nil	Nil	SEC-4: Professional Communication (2)	Physical Education – Games (1) (0+0+2)	SEC-4: Professional Communication (2)	24
Exit option with Bachelor of Arts, B.A. / Bachelor of Science, B.Sc Basic Degree (144 Credits)								
VII	DSC-A9 Advanced Geomorphology (3+2) DSC-A10 Advanced Climatology (3+2) DSC-A11 Geo-surveying (3)	DSE-A1.1 Physical Geography / DSE-A1.2 Development of Geographical Thought / DSE-A1.3. Trade & Transport Geography / DSE-A1.4 Settlement Geography (3)	Nil	Nil	Nil	Nil	Nil	22

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(Student can select one from above and another from below pools for 3 credits each)

DSE-A2.1 Introduction to Oceanography /
DSE-A2.2 Regional Geography of India /
DSE-A2.3 Tourism Geography /
DSE-A2.4 Climate Change: Vulnerability & Adaptation (3)

Research Methodology (3)

DSE-A3.1 Bio-geography /
DSE-A3.2 Geography of Health & Wellbeing /
DSE-A3.3 Regional Geography of Karnataka
DSE-A3.4 Economic Geography (3)

Research Project / Internship (6)

DSE-A4.1 Regional Planning and Development /
DSE-A4.2 Geopolitics & Defense Strategies /
DSE-A4.3 Alternative Energy Sources /
DSE-A4.4 Natural Resource Management (3)

(If student is not willing to carry out Research Project or Internship, he /she can elect any two DSE. One from above and another from below pools for 3 credits each)

DSE-A5.1 Urban Geography
DSE-A5.2 Economic Geography /
DSE-A6.3 Disaster Risk Reduction /
DSE-A6.4 Sustainable Rural Development (3)

Award of Bachelor of Arts Honours, / Bachelor of Science Honours Degree (186 Credits)

VIII	DSC-A12 Sustainable Soil Resource Management (3+2) DSC-A13 Agriculture & Food Security (3) DSC-A14 Basics of Natural Disaster Management (3)	Research Methodology (3) DSE-A3.1 Bio-geography / DSE-A3.2 Geography of Health & Wellbeing / DSE-A3.3 Regional Geography of Karnataka DSE-A3.4 Economic Geography (3) Research Project / Internship (6) DSE-A4.1 Regional Planning and Development / DSE-A4.2 Geopolitics & Defense Strategies / DSE-A4.3 Alternative Energy Sources / DSE-A4.4 Natural Resource Management (3) <i>(If student is not willing to carry out Research Project or Internship, he /she can elect any two DSE. One from above and another from below pools for 3 credits each)</i> DSE-A5.1 Urban Geography DSE-A5.2 Economic Geography / DSE-A6.3 Disaster Risk Reduction / DSE-A6.4 Sustainable Rural Development (3)	Nil	Nil	Nil	Nil	Nil	20
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Note: * Students belongs to social science disciplines without practical can study these courses for 4 credits (theory only not practical).

Technical Skills and possible jobs after each exit during and after the programme

Year	Exit Level	Credit	Technical Skills	Possible Jobs
I	Certificate	50	<ul style="list-style-type: none"> •Map Interpretation •Geomorphic Analysis •Climate DataAnalysis & Interpretation 	<ul style="list-style-type: none"> •Field Surveyor •Weather Data Analyst
II	Diploma	100	<ul style="list-style-type: none"> •Cartography •Statistics Analysis 	<ul style="list-style-type: none"> •Field Surveyor •Cartographer
III	Degree	142	<ul style="list-style-type: none"> •Cartography •GIS and Image Analysis •Tourism Management 	<ul style="list-style-type: none"> •GIS Field Surveyor •GIS Trainee •Nature Conservation Officer •School Teacher
IV	Degree with Honours	182	<ul style="list-style-type: none"> •GIS & Image Analysis •Resource Management •Town Planning •Tourism Management 	<ul style="list-style-type: none"> •Sustainability Consultant •Tourism officer •Transport planner •Cartographer •GIS Engineer •Environmental consultant •Geography Teacher •Geography Researcher

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 Classes
4	56	2	56

Course Outcomes:

1. After the completion of this course, students should be able to:
2. Define the field of Geomorphology and to explain the essential principles of it.
3. to outline the mechanism of dynamic nature of the Earth's surface and interior of the Earth.
4. to illustrate and explain the forces affecting the crust of the earth and its effect on it.
5. to understand the conceptual and dynamic aspects of landform development

Course Objectives - This course aims to:

1. to define the concepts in Geomorphology and Physical Geography
2. to introduce various concept to understand cycles of the solid Earth surface
3. to understand the dynamic nature of the Earth's surface, various processes, and landforms.
4. to study the impact human on geomorphic system.

Content of Theory Course 1**56 Hrs****Unit – 1 Geomorphology****14**

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.

Unit – 2 Systems and Cycles of the Solid Earth**14**

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.

Unit – 3 The Dynamics of Earth**14**

Earth's Movements: Endogenetic and Exogenetic forces;
 Sudden and Diastrophic movements: Epeirogenic and Orogenetic Movements; Process of folding and faulting; Volcanicity and earthquake;
 Rocks: Characteristics, types, importance, and rock cycle;
 Weathering: meaning, types and controlling factors;
 Mass Movement: meaning, controlling factors, types-landslides, rock-falls.

Unit – 4 Evolution of Landforms**14**

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).

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 SNanjannavar, Physical Geography (Kannada Version)

References

1. Bloom A.L. (1978) Geomorphology: A Systematic Analysis of Late Cenozoic Landforms Prentice – Hall of India, New Delhi.
2. Brunsden D. (1985) Geomorphology in the Service of Man: The Future of Geography, Methnen, 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/>

Formative Assessment

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

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

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Case Study: Students must be taken to observe local land formation and degradation and write a report on their effectiveness.

Title of the Course: OE-1.1 Earth System Dynamics

Number of Theory Credits	Number of lecture hours/ semester	Number of practical Credits	Number of practical Classes
3	42	0	0

Course Outcomes:

1. 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
2. To articulate the synergies and trade-offs of earth system and interconnected sub-systems to the students of interdisciplinary students.

Course Objectives - This course aims to:

1. Understand the concepts in Earth Sciences
2. To study the global issues in the Earth system
3. To study application of geoinformatics to solve the disaster and hazards

Content of Theory Course 1**42Hrs****Unit – 1 Earth System Dynamics****10**

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.

Unit – 2 Issues in Earth System**11**

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.

Unit – 3 Climate Change**10**

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.

Unit – 4 Geoinformatics Applications:**11**

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.

References

1. 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.
A Textbook of Climatology, Wisdom Press (2015) Tapas Bhattacharya

Formative Assessment

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

Number of Theory Credits	Number of lecture hours/ semester	Number of practical Credits	Number of practical Classes
3	42	0	0

Course Outcomes:

1. Understand concepts of different natural resources, its use, overuse, with its solution by natural resource management methods.
2. Appreciate the need for managing land and water resources for sustainable growth and development, managerial skills such as land evaluation and land classification.
3. Also, able to understand the causes and consequences of water stress and draw water conservation and management plans.

Course Objectives - This course aims to:

1. explain the types of natural resources that exist.
2. Study the role of government and different agencies in the natural resource management
3. Study the threat to the natural resources and the policies to solve it.

Content of Theory Course 1	42Hrs
Unit – 1 Concept of Resources	10
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.	
Unit – 2 Land Resources	11
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.	
Unit – 3 Water Resources	10
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	
Unit – 4 Minerals Resources	11
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	

References

1. Dr.Alka Gautham: Geography of Resources: Exploitation, Conservation and Mangement, 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.

Formative Assessment	
Assessment Occasion/ type	Weightage in Marks
Seminar	30%
Assignment	20%
CIA	50%

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Total	100%
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Title of the Course: OE 1.3 Introduction to Physical Geography

Number of Theory Credits	Number of lecture hours/ semester	Number of practical Credits	Number of practical Classes
3	42	0	0

Course Outcomes:

1. Students will be able to understand the fundamental concepts in Earth Sciences
2. understands basic terminology used to describe physical processes and landscape forms.
3. Describe elements of the atmosphere and the oceans

Course Objectives - This course aims to:

1. Study basic principles of the Earth Sciences
2. Understand the landforms, atmospheric elements and structure and basics of oceanography

Content of Theory Course 1		42Hrs
Unit – 1		10
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,		
Unit – 2		11
Rocks - types, significance, Weathering –types. Agents of Denudation - River, Glacier, Wind and Under Ground water. Volcanicity, Earthquakes and Tsunamis		
Unit – 3		10
Structure and Composition of Atmosphere, Weather and Climate. Atmospheric Temperature, Heat Budget of the atmosphere, Atmospheric Pressure, Winds and Precipitation		
Unit – 4		11
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		

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. Kislaya publication, New Delhi
4. R.N. Tikka (2002) Physical Geography. Kedarnath Ramnath & co, Meerut
5. William D. Thornbury (1997) Principle of Geomorphology. New Age International (Pvt Ltd.) New Delhi.

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

Title of the Course: OE 1.4 Fundamentals of Remote Sensing

Number of Theory Credits	Number of lecture hours/ semester	Number of practical Credits	Number of practical Classes
3	42	0	0

Course Outcomes:

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.
2. Students will learn how to handle and process the satellite images for understanding of biophysical phenomena of the earth system.

Course Objectives - This course aims to:

1. To congregate the basic concepts and fundamentals of physical principles of remote sensing
2. To create a firm basis for successful integration of remote sensing in any field of application.
3. To study basics of digital image processing and image interpretation techniques.
4. To study the applications of the remote sensing to solve the real-world problems.

Content of Theory Course 1		42Hrs
Unit – 1 Introduction		10
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.		
Unit – 2 Process and types of Remote Sensing		11
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.		
Unit – 3 Image Classification and Interpretation		10
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.		
Unit – 4 Applications of Remote Sensing		11
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.		

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
9. https://onlinecourses.nptel.ac.in/noc19_ce41/preview

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

Title of the Course: DSC A-2 Introduction to Climatology

Number of Theory Credits	Number of lecture hours/ semester	Number of practical Credits	Number of practical Classes
4	56	2	56

Course Outcomes:

After the completion of this course, students should be able to

1. define the field of climatology and to understand the atmospheric composition and structure.
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.
3. to illustrate and explain the air pressure system, wind regulating forces and the formation of the Atmospheric Disturbance.
4. to understand and compute the air humidity as well as to explain the process of Condensation and formation of precipitation and its types.

Course Objectives - This course aims to:

1. to define the field of climatology and components of the climate system
2. to introduce various dimensions of climatology like structure and composition.
3. to understand the global atmospheric pressure, temperature, and wind system.
4. to study the concept of atmospheric moisture and its types

Content of Theory Course 1		56Hrs
Unit – 1 Composition and Structure of the Atmosphere		14
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		
Unit – 2 Atmospheric Temperature		14
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.		
Unit – 3 Atmospheric Pressure and Winds		14
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.		
Unit – 4 Atmospheric Moisture		14
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,		

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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)

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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)

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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>

Formative Assessment

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

Climatology Practical

Content of Practical Course 1: List of Experiments to be conducted
Conduct all exercises with Goal, Procedure, devices, and findings.

Exercise 1: Structure and functions of the Indian Meteorological Department (IMD).

Exercise 2: Collection of temperature data from IMD website.

Exercise 3: Plotting of downloaded temperature data using graphical methods-line graph.

Exercise 4: Centigrade and Fahrenheit thermometer for measuring temperature.

Exercise 5: Mercurial Barometer and Aneroid Barometer for measuring atmospheric pressure

Exercise 6: Wind Vane and cup-anemometer.

Exercise 7: Wet and Dry bulb thermometer for measuring humidity

Exercise 8: Rain gauge- Dial type for measuring rainfall Exercise 3: Rainfall Trend Analysis (monthly and annual)

Exercise 9: Interpretation of Indian Daily Weather charts.

Note: Students are expected to download weather charts of the four seasons.

Title of the Course: OE 2.1 Introduction to Human Geography

Number of Theory Credits	Number of lecture hours/ semester	Number of practical Credits	Number of practical Classes
3	42	0	0

Course Outcomes:

1. Students will learn how human, physical, and environmental components of the world interact.
2. Students will be familiarized with economic processes such as globalization, trade and their impacts on economic, cultural and social activities.
3. the student will Describe what geography and human geography are.
4. Understand population dynamics and migration.

Course Objectives - This course aims to:

1. Understand the basics concepts of human geography
2. Study population attributes and dynamic nature of it
3. Introduce economic, cultural, and trade activities and their impact on the development of the region

Content of Theory Course 1	42Hrs
Unit – 1 Introduction to Human Geography	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, Behavioural Approach, Post Modernism in geography; Fields and sub fields in Human geography	
Unit – 2 Geographical Analysis of Population	11
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	
Unit – 3 Cultural Patterns and Processes	10
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.	
Unit – 4 Human Economic Activities, Development and Settlements	11
Primary Economic Activities – Agriculture, Types - Primitive Subsistence, Intensive subsistence, Plantation Agriculture, Extensive Commercial grain cultivation, Mixed Farming, Dairy Farming;	

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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, Wholesale 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 centres, types of urban settlements: towns, city, conurbation, Megalopolis, Million cities.

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: Kishalay Publications.
5. Smith, D. M. (1971). Industrial Location: An Economic Geographical Analysis, New York: John Wiley and Sons.

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

Title of the Course: OE 2.2 Fundamentals of Natural disasters

Number of Theory Credits	Number of lecture hours/ semester	Number of practical Credits	Number of practical Classes
3	42	0	0

Course Outcomes:

1. Understand the basics concepts in natural disasters
2. Study types of natural disasters and their effects

Course Objectives - This course aims to:

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 1	42 Hrs.
Unit – 1 Introduction to Natural Disaster	10
Meaning, Definition, and Scope. Lithosphere and Natural Disasters Earthquakes and Volcanoes, Landslides And Avalanches	
Unit – 2 Atmosphere and Natural Disasters	11
Heat wave and wildfire Cloud burst, hailstorm, Drought and famines	
Hydrosphere and Natural Disaster	10
Tsunami Hurricanes and cyclones Floods and flash floods	
Biosphere and Natural Disasters	11
Epidemics and pandemics Covid -19 and its effects Techniques and technology to mitigate natural disasters	

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, Shamna Hussain Biodiversity, Environment and Disaster Management Unique Publications
6. C. K. Rajan, NavalePandharinath Earth and Atmospheric Disaster Management: Nature and Manmade B S Publication

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

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

Number of Theory Credits	Number of lecture hours/ semester	Number of practical Credits	Number of practical Classes
3	42	0	0

Course Outcomes:

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.

Course Objectives - This course aims to:

1. to provide a sound understanding of the economics of climate change from multiple viewpoints
2. Demonstrate knowledge of the projected impacts of climate change and potential strategies
3. for alleviating their negative impacts.
4. Define key terms (e.g., adaptation, resilience, vulnerability, mainstreaming)
5. Study application of the Geoinformatics in the Climate Change and Adaptation

Content of Theory Course 1	42Hrs
Unit – 1 Introduction to Climate Change	10
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.	
Unit – 2 Causes and Effects of climate change	11
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: UNFCCC its policy framework and provisions, Earth Summit Rio-de-Janeiro, World summit, Kyoto Protocol, Copenhagen summit and Doha Conference	
Unit – 3 Climate change Vulnerability and Adaptation	10
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	
Unit – 4 Vulnerability Assessment and climate change mitigation	11
Climate change vulnerability assessment Global Initiatives to climate change mitigation: Kyoto Protocol, carbon trading, clean development mechanism, COP. 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 studies: MGNREGA (Mahatma Gandhi National Rural Employment 16 Guarantee Act) potential of generating co-benefits, Vertical Shaft Brick Kiln (VSBK) or Ecolink	

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.

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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.
2. http://www.iisd.org/pdf/2010/iea_training_vol_2_via.pdf
3. Guidance on Integrating Climate Change Adaptation into Development Co-operation.
4. <http://www.oecd.org/dac/43652123.pdf>
5. Mainstreaming Climate Change Adaptation into Development Planning: A Guide for Practitioners.
6. <http://www.unep.org/pdf/mainstreaming-cc-adaptation-web.pdf>
7. CGE Climate Change Training Materials.
8. http://unfccc.int/national_reports/nonannex_i_natcom/training_material/methodological_documents/items/349.php
9. Compendium on Methods and Tools to Evaluate Impacts of, and Vulnerability and Adaptation to, Climate Change.
10. http://unfccc.int/adaptation/nairobi_work_programme/knowledge_resources_and_publications/items/5457.php
11. Centre for climate and Energy solutions. <https://www.c2es.org/content/extreme-weather-and-climate-change/>
12. <https://www.history.com/topics/natural-disasters-and-environment/history-of-climate-change>
13. [ghhttp://www.ozcoasts.org.au/glossary/images/VulnerabilityDiag_AllenConsulting.jpg](http://www.ozcoasts.org.au/glossary/images/VulnerabilityDiag_AllenConsulting.jpg)
14. [ghhttp://ccafs.cgiar.org/news/media-centre/climatehotspots](http://ccafs.cgiar.org/news/media-centre/climatehotspots)
15. [ghhttp://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)
16. [ghhttp://pmindia.nic.in/Pg01-52.pdf](http://pmindia.nic.in/Pg01-52.pdf)
17. <https://www.checinternational.org/climate-change-mitigation-adaptation-resilience/>

Formative Assessment

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

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

Number of Theory Credits	Number of lecture hours/ semester	Number of practical Credits	Number of practical Classes
3	42	0	0

Course Outcomes:

1. Students are trained to adapt the theoretical concepts in a practical way through the mathematical models of geography.
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.
3. Students are exposed on spatial thinking to solve the geographical problems with range of proven mathematical and statistical models.
4. Students can employ in various corporate and government organization where they deal to solve geographical problems.

Course Objectives - This course aims to:

1. Understand the concept and techniques of the Geographic Information Systems.
2. Define the GIS data types and structures.
3. Study geo processing and visualization concepts and techniques in GIS.

Content of Theory Course 1	42Hrs
Unit – 1 Introduction	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.	
Unit – 2 Geodesy and Spatial Mathematics	11
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.	
Unit – 3 GIS Data and Scale	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	
Unit – 4 Geoprocessing and Visualization	11
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.	

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)

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Web Resources

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

Formative Assessment

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

