



UNIVERSITY OF CALICUT

Abstract

General and Academic - Faculty of Science - Syllabus of MSc Geography Programme under CBCSS PG Regulations 2019 with effect from 2019 Admission onwards - Implemented- Orders Issued

G & A - IV - J

U.O.No. 8956/2019/Admn

Dated, Calicut University.P.O, 06.07.2019

*Read:-*1. U.O.No. 4487/2019/Admn dated 26/03/2019

2. Item No. 2 in the minutes of the meeting of the Board of Studies in Geography on 13/06/2019

3. Item No. 1.30 in the minutes of the meeting of Faculty of Science held on 27/06/2019

ORDER

The Regulations for Choice Based Credit and Semester System for Post Graduate (PG) Curriculum 2019 (CBCSS PG Regulations 2019) for all PG Programmes under CBCSS-Regular and SDE/PrivateRegistration with effect from 2019 admission has been implemented vide paper read first above.

The meeting of Board of Studies in Geography held on 13/06/2019 has approved the Syllabus of M Sc Geography Programme in tune with the new CBCSS PG Regulations with effect from 2019 Admission onwards, vide paper read second above.

The Faculty of Science at its meeting held on 27/06/2019 has approved the minutes of the meeting of the Board of Studies in Geography held on 13/06/2019, vide paper read third above.

Under these circumstances, considering the urgency, the Vice Chancellor has accorded sanction to implement the Scheme and Syllabus of MSc Geography Programme in accordance with new CBCSS PG Regulations 2019, for affiliated colleges in the University with effect from 2019 Admission onwards, subject to ratification by the Academic Council.

The Scheme and Syllabus of M Sc Geography Programme in accordance with CBCSS PG Regulations 2019, is therefore implemented in the University with effect from 2019 Admission onwards.

Orders are issued accordingly. (Syllabus appended)

Biju George K

Assistant Registrar

To

The Principals of all Affiliated Colleges

Copy to: PS to VC/PA to PVC/ PA to Registrar/PA to CE/JCE I/JCE V/DoA/EX and EG Sections/GA I F/CHMK Library/Information Centres/SF/DF/FC

Forwarded / By Order

Section Officer

UNIVERSITY OF CALICUT

M.Sc. GEOGRAPHY

CHOICE BASED CREDIT SEMESTER SYSTEM (CBCSS) 2019

STRUCTURE, SCHEME and SYLLABUS

2019 Admission Onwards

M.Sc. DEGREE PROGRAMME (GEOGRAPHY)

CREDIT DISTRIBUTION FOR EACH SEMESTER

Semester	Course Code	Course Title	Instructional hours / Week	Continuous Assessment (internal) (in %)	End Semester Evaluation (External) (in %)	Credit	
I	GRY1C01	Geomorphology	5	20	80	4	
	GRY1C02	Climatology	5	20	80	4	
	GRY1C03	Concepts and Trends in Geography	5	20	80	4	
	GRY1C04	Physical Geography of India	5	20	80	4	
	GRY1 L01	Practical I – Geomorphology and Climatology	5	20	80	3	
	Total			25	-	-	19
II	GRY2 C05	Geographic Information System	5	20	80	4	
	GRY2C06	Regional Planning and development	5	20	80	4	
	GRY2 C07	Research Methods in Geography	5	20	80	4	
	GRY2C08	Population Geography	5	20	80	4	
	GRY2L02	Practical II – Geographic Information System	5	20	80	3	
	Total			25	-	-	19
III	GRY3C09	Principles of Remote Sensing	5	20	80	5	
	GRY3C10	Urban Geography	5	20	80	4	
	E L E C T I V E	GRY3E01.1	Geography of Health	5	20	80	4
		GRY3E01.2	Social Geography With Special Reference To India				
		GRY3E02.1	Economic Geography	5	20	80	4
		GRY3E02.2	Geography of Tourism				
	GRY3L03	Practical III– Remote Sensing and Cartography	5	20	80	3	
	Total			25	-	-	20
IV	GRY 4 C 11	Environmental Geography	5	20	80	4	
	GRY 4 C 12	Agricultural Geography	5	20	80	4	
	E L E C T I V E	GRY4E03.1	Cultural Geography	5	20	80	4
		GRY4E03.2	Geography of Water Resource				
	GRY4L04	Practical IV – Quantitative Techniques in Geography	5	20	80	2	
	GRY4P01	Dissertation / Project	5	20	80	4	
	GRY4V01	Comprehensive Viva–Voce and Study Tour /Field Survey	-	20	80	4	
	Total			25	-	-	22
	Grand Total			100	-	-	80

Audit Courses (To be Completed within the first two semesters by the students)

I & II	AC1AEC	Ability Enhancement Course		100	0	4
	AC2PCC	Professional Competency Course		100	0	4

Credit earned through the audit courses will not be added for SGPA/CGPA

Duration of Theory (External) as well as Practical Examination(External) will be Three Hours

One theory/dissertation hour is equal to 1.5 hours of work load. One Practical hour is equal to 1.5 hours of workload (inclusive of field work)

Credit Distribution for Core & Electives of M.Sc. Geography Programme

Semester	Core Course		Elective Course	Total Credits
	Theory	Practical		
I	4+4+4+4	3	-	19
II	4+4+4+4	3	-	19
III	5+4	3	4+4	20
IV	4+4+4 [#] +4 [*]	2	4	22
Total	57	11	12	80
#Dissertation *Comprehensive Viva-Voce and Study Tour/Field Survey				

Code Details:

Core Subject	GRY-Geography
Core course	C
Elective	E
Semester Code	1, 2, 3, & 4
Course No.	01, 02, 03 12..
Practical	L
Project /Dissertation	P
Comprehensive Viva-Voce and Study Tour	V

AUDIT COURSES

In addition to the above courses there will be two Audit Courses (**Ability Enhancement Course & Professional Competency Course**) with **4** credits each. These have to be done one each in the first two semesters. The credits will not be counted for evaluating the overall SGPA & CGPA. The colleges shall conduct examination for these courses and have to intimate /upload the results of the same to the University on the stipulated date during the III Semester. Students have to obtain only minimum pass requirements in the Audit Courses. The details of Audit courses are given below.

Semester	Course Title	Suggested Area
I	Ability Enhancement Course (AEC)	Internship / Seminar presentation / Publications / Case study analysis / Industrial or Practical Training /Community linkage programme / Book reviews / Field Survey etc.
II	Professional Competency Course (PCC)	To test the skill level of students like testing the application level of different software's such as SPSS/R/ GNSS /Python/Any other software relevant to the programme of study /Short Term Courses in GIS /Remote Sensing / Disaster Management/ Wildlife Conservation/ Hydrology /Geophysical Surveying etc.

EVALUATION AND GRADING

1. **Evaluation:** The evaluation scheme for each course shall contain two parts; (a) Internal /Continuous Assessment (CA) and (b) External / End Semester Evaluation (ESE).
2. Of the total, 20% weightage shall be given to internal evaluation / Continuous assessment and the remaining 80% to External/ESE and the ratio and weightage between Internal and External is **1:4**.

3. Primary evaluation for Internal and External shall be based on 6 letter grades (**A+, A, B, C, D and E**) with numerical values (Grade Points) of **5, 4, 3, 2, 1 & 0** respectively.
4. **Grade Point Average:** Internal and External components are separately graded and the combined grade point with weightage **1** for Internal and **4** for external shall be applied to calculate the **Grade Point Average (GPA)** of each course. Letter grade shall be assigned to each course based on the categorization based on Ten point Scale.
5. **Evaluation of Audit Courses:** The examination and evaluation shall be conducted by the college itself either in the normal structure or MCQ model from the Question Bank and other guidelines provided by the University/BoS. The Question paper shall be for minimum 20weightage and a minimum of 2 hour duration for the examination. The result has to be intimated / uploaded to the University during the Third Semester as per the notification of the University.

INTERNAL EVALUATION / CONTINUOUS ASSESSMENT (CA)

The criteria and percentage of weightage assigned to various components for internal evaluation are as follows: -

a. Theory			
#	Component	Percentage (%)	Weightage
1	Examination /Test	40%	2
2	Seminars / Presentation	20%	1
3	Assignment	20%	1
4	Attendance	20%	1
b. Practical			
1	Lab Skill	40%	4
2	Records/viva	30%	3
3	Practical Test	30%	3

EXTERNAL / END SEMESTER EVALUATION (ESE)

Exams will be conducted by University at the end of every semester.

Weightage: Different types of questions shall be given different weightages to quantify their range given in the following model:

Sl. No.	Type of Questions	Individual weightage	Total Weightage	Number of questions to be answered
1	Short Answer type questions	2	2 x 4 = 8	4 out of 7
2	Short essay/ problem solving type	3	3 x 4 = 12	4 out of 7
3	Long Essay type questions	5	5 x 2 = 10	2 out of 4
		Total	30	18

EVALUATION OF PROJECT WORK / DISSERTATION

Consolidated Grade for Project Work / Dissertation is calculated by combining both the External and Internal in the Ratio of 4:1 (80% & 20%). **There shall be no improvement chance for Project Work.**

#	Criteria	% of weightage	Weightage External	Weightage Internal
1	Relevance of the topic and Statement of problem	60%	6	1
2	Methodology & Analysis		12	3
3	Quality of Report & Presentation		6	2
4	Viva-voce	40%	16	4
	Total Weightage	100%	40	10

COMPREHENSIVE VIVA-VOCE And STUDY TOUR/FIELD SURVEY

Comprehensive Viva-Voce may be conducted along with the Practical examination of the fourth Semester. Viva-voce covers **questions from all courses from the programme.**

Study Tour: Visit to places/locations of Geographical significance in India. The visit can also be split into two, three or four spells. Every Student has to submit individual study tour report / field survey report describing the geographical learning and experiences accompanied by maps, diagrams and photographs. Study tour can be conducted as per convenience, anytime during the course period. The Study tour / Field survey should not exceed a total 20 days.

EVALUATION OF COMPREHENSIVE VIVA-VOCE And STUDY TOUR/FIELD SURVEY

Consolidated Grade for Comprehensive Viva-voce and Study Tour /Field Survey is calculated by combining both the External and Internal in the Ratio of 4:1 (80% & 20%).

Sl. No.	Components of Evaluation	% of weightage	Weightage External	Weightage Internal
1	Comprehensive Viva-Voce	60	24	6
2	Study Tour /Field Survey report *	40	16	4
	Total	100	40	10

** Study tour is compulsory and part of curriculum. Under unavoidable circumstances, in case a student is unable to participate in study tour he/she has to take a short term field survey and submit a report*

DIRECT GRADING SYSTEM

- Direct Grading System based on a 10 – Point scale is used to evaluate the performance (External and Internal Examination of students)
- For all courses (Theory & Practical)/Semester/Overall Programme, Letter grades and
- **GPA/SGPA/CGPA** are given on the following way:
 - a. First Stage Evaluation for both Internal and External done by the Teachers concerned in the following Scale :

Grade	Grade Points
A+	5
A	4
B	3
C	2
D	1
E	0

- b. The Grade Range for both Internal & External shall be :

Letter Grade	Grade Range	Range of Percentage (%)	Merit / Indicator
O	4.25 – 5.00	85.00 – 100.00	Outstanding
A+	3.75 – 4.24	75.00 – 84.99	Excellent
A	3.25 – 3.74	65.00 – 74.99	Very Good
B+	2.75 – 3.24	55.00 – 64.99	Good
B	2.50 – 2.74	50.00 – 54.99	Above Average
C	2.25 – 2.49	45.00 – 49.99	Average
P	2.00 - 2.24	40.00 – 44.99	Pass
F	< 2.00	Below 40	Fail
I	0	0	Incomplete
Ab	0	-	Absent

'B' Grade lower limit is 50% and 'B+' Grade lower limit is 55%

No separate minimum is required for Internal evaluation for a pass, but a minimum **P** Grade is required for a pass in the external evaluation. However, a minimum **P grade** is required for pass in a course.

POSTGRADUATE PROGRAMME IN GEOGRAPHY (M.Sc. Geography)

SYLLABUS

SEMESTER I

GRY1C01 GEOMORPHOLOGY

Instructional Hours /Week: 5

Credits: 4

Modules	Themes	Topics
1	Development of Geomorphology	Introduction to geomorphology,
		Terminologies and definitions. scope,
		Content and recent trends in geomorphology.
		Geomorphic system basic concepts in geomorphology.
		Approaches to geomorphology - static, dynamic and applied
2	Structure Process and Form	Large-scale tectonic and structural landforms
		Small-scale tectonic and structural landforms
		Weathering and related landforms
		Hill slopes - Mass movement
		Karst landscapes
		Fluvial landscapes
		Glacial and glacio-fluvial landscapes
		Periglacial landscapes
		Aeolian landscapes
		Coastal landscapes
3	Historical changes Among the Landforms	Quaternary landscapes-Pleistocene and Holocene changes
		Fluvial landscapes
		Aeolian landscapes
		Coastal landscapes
		Ancient landscapes -old plains
		Ancient landforms (relict, exhumed, and stagnant)
4	Land Form Evolution	Evolving landscapes
		Cycle of erosion- views of W.M Davis- W. Penk- L.C King
		Evolution in different environments
		Concept of slopes- evolution, slope elements
5	Applied Geomorphology	Theories of slope – slope decline, slope replacement and parallel retreat of slope models.
		Climatic Geomorphology
		Diagnostic land forms
		Morphogenetic regions
		Anthropogenic geomorphology
		Human intervention on geomorphic processes
		Applied geomorphology: Meaning and concept
Application in hydrology engineering projects.		

Web References

1. <https://pubs.usgs.gov/pp/0500b/report.pdf>
2. http://www.cec.uchile.cl/~fegallar/Fundamentals_of_Geomorphology.pdf
3. https://instaar.colorado.edu/~andersrs/The_little_book_010708_web.pdf
4. <https://www.wikiwand.com/en/Geomorphology>
5. <http://www.uio.no/studier/emner/matnat/geofag/GEG2130/h08/undervisningsmateriale/GEG2130%20Periglacial%20geomorphology.pdf>
6. <https://www.journals.elsevier.com/geomorphology/>
7. <http://www.sciencedirect.com/science/journal/0169555X?sdc=1>
8. <http://geomorphology.org.uk/what-geomorphology-0>

Suggested Reading

#	Book Title	Author
1	Principles of Physical Geography	Monkhouse, F.J
2	Geomorphology	Sparks, B.W
3	Modern Physical Geography	Strahler, A.N. and Strahler, A.H
4	Principles of Geomorphology	Thornbury, W.D.
5	The Physical Basis Geography – An outline of Geomorphology	Wooldridge, S.W. and Morgan, R.S
6	Geomorphology: A Systematic Analysis of Late Cenozoic Landforms	Bloom, A. L.
7	Fundamentals of Geomorphology	Richard John Huggett
8	Geology of India and Burma	M S Krishnan
9	Field Geology	Lahee
10	Fluvial Processes in Geomorphology	John P. Miller and Luna Bergere Leopold

POSTGRADUATE PROGRAMME IN GEOGRAPHY (M.Sc. Geography)
SYLLABUS
SEMESTER I

GRY1C02 CLIMATOLOGY

Instructional Hours / Week: 5

Credit: 4

Module	Theme	Topics
1	Fundamentals	Nature, Scope and Content of Climatology
		Definitions – Weather, Climate, Meteorology
		Earths Spheres- Geosphere, Atmosphere, Hydrosphere, Biosphere
		Earth Sun Relationship
		Solar Radiation , Distribution of Solar Radiation
		Terrestrial Radiation – Albedo, Terrestrial heat balance
		Weather, Climate and Climatic Element, Climate Control
		General Atmospheric Circulation – Single Cell Model of General Circulation, Triple or Three Cell Model of General Circulation
		Effects of land and sea on pressure, wind, Temperature and Moisture distribution
		Equatorial Trough and Inter-tropical Convergence Zone
2	Stability and Instability	Jet Streams – characteristics, types of jet streams, relation with surface weather
		Stability – stability and daily weather, changes in stability
		Temperature inversion, types of temperature inversions
		Air Masses – Source Regions, Properties of Masses, Classification, Air Masses Modifications
		Fronts – Polar Front Theory, Warm Front, Cold front, Stationary Fronts, Occluded Fronts, Dry lines, ; Baroclinal Theory, Baroclinal v/s Barotrophy
		Oceans and Inter-annual Variations in Climate – Ocean Currents-Walker Circulation of The Equatorial Pacific Ocean- ElNino, Counterpoint –LaNina, Inter-annual Variations in the Monsoons
3	Extreme Weather Phenomenon	Thunderstorms, Cloud Bursts, Squall Line, Super cell thunderstorms and formations of Tornado, Downburst and Derecho
		Tropical Cyclone, Extra-Tropical Cyclones
		Water Sprout, Dust Storm, Wildfires, Hail Storms, Silver Storms, Blizzards, Heat Waves
		Concentrated Heavy Rainfall and Flooding, Heat and Drought
		Forecasting and tracking of Extreme Weather Phenomenon
4	Climatic Classification and Applied Climatology	Climatic classification of Trewartha, Thornthwaite, Koeppen
		Critical Appraisal of all three classifications
		Application of all the classification with respect to India
		Agro-climatology-Agro climatic regions of India and special focus on Kerala
5	Climate Change	Micro and macro climates: Urban climates- Urban heat island effects
		Introductions to Instruments and measurements techniques of weather elements and analysis of weather data.
		Climatic changes in the past and present-Theories -Evidences-Possible causes – Ozone depletion Major environmental (physical and biological and cultural) impacts of greenhouse gases.
		Global atmospheric composition: Greenhouse gases and aerosols
		The greenhouse effect –impacts on the ecosystems and species interactions
		Extreme weather events, sea level rise;
		Climate projections and their uncertainties
Climate impacts, vulnerability and risks Assessing climate impacts on key sectors and systems (heat stress, water resources, coastal zones, agricultural systems)		
Low Carbon Strategies		

Web References

1. <http://www.imd.gov.in>
2. <http://www.imdtvm.gov.in/>
3. <https://www.wikiwand.com/en/Climatology>
4. <http://drought.unl.edu/DroughtBasics/WhatisClimatology.aspx>
5. <http://danida.vnu.edu.vn/cpis/files/Books/Encyclopedia%20of%20World%20Climatology.pdf>
6. http://samples.jbpub.com/9781284032307/9781284028775_CH01_Rohli3e_SECURE.pdf
7. <http://metnet.imd.gov.in/Welcome%20to%20Intra-IMD/welcome.php>
8. <https://www.coursera.org/courses?languages=en&query=climate>
9. <https://ufonline.ufl.edu/courses/geo3250-climatology/>
10. <https://www.bookyards.com/en/book/details/13816/Climatology#>

Suggested Reading

#	Book Title	Author
1	Atmosphere, Weather and Climate	Barry, R.G. and Chorley P.
2	General climatology	Critchfield, J.H
3	Monsoons National	Das, P.K
4	Monsoon	Fein, J.S. and Stephens, P.N
5	Climatologically Tables of Observatories in India	IMD
6	Climatology	Lal, D.S
7	The Climate of the Earth	Lydolph, P.E
8	Our Weather	Menon, P.A
9	Introduction to Meteorology	Peterson, S
10	contemporary climatology	Robinson, P.J.& Henderson, S
11	Applied Climatology, principles and practice	Thompson, R.D. and Perry A
12	Climatology and Atmospheric Science	Oliver, J.J
13	An Introduction to Climate	Trewartha, G.T
14	Lecture notes on Climatology (IMD Training Material)	A D Tathe

POSTGRADUATE PROGRAMME IN GEOGRAPHY (M.Sc. Geography)
SYLLABUS
SEMESTER I

GRY1C03 CONCEPTS AND TRENDS IN GEOGRAPHY

Instructional Hours/Week: 5

Credit: 4

Module	Theme	Topics
1	Development of Geography as a Discipline	Nature and Scope of Geography
		Historical development Ancient, Medieval and Modern
		Geography as a science - Place of Geography in classification of Sciences
		Concept of space, place, environment, interconnection, sustainability, Scale, Change
		Concept of Landscape (Natural & Cultural)
		Geographical Knowledge in India
2	Explanation in Geography	Fundamental Concepts of Aerial Differentiation
		Tobler's First law of Geography
		Scientific explanation: Inductive and Deductive Approaches
		Structure of Scientific Theories - Kuhn's model
		Theory and Models in Geography – Limitations and Prospects
3	Spatial thinking Traditions in Geography	Spatial Integration and Organization
		Regionalism and Spatial Science
		Pattison's Four Traditions in Geography
		Diffusion of Innovation - Hagerstrand
4	Quantitative Revolution	Qualitative v/s Quantitative
		Application of Mathematics and Statistics
		Geostatistics and Geoinformatics
		Spatial Data Analytics
		Use of Primary and Secondary data
5	Philosophical Influences of Modern Geographical Thought	Anarchism – Elisee Reclus and Peter Kropotkin
		Positivism – The quantitative revolution
		Criticism of quantification
		Humanism – Phenomenology and Existentialism
		Humanistic Geography - Yi-Fu Tuan
		Structuralism – the question of <i>social relevance</i> ,
		Liberals and Radicals
		Marxist and Feminist Geography
		Trans Gender Movement
Body surveillance		

Web References

1. https://www.wikiwand.com/en/History_of_geography
2. https://www.wikiwand.com/en/Philosophy_of_geography
3. https://www.wikiwand.com/en/Quantitative_revolution
4. http://www.eurogeographyjournal.eu/articles/2_2_CHANGING%20PARADIGMS%20OF%20GEOGRAPHY_KOUTSOPOULOS.pdf
5. https://www.wikiwand.com/en/Paradigm_shift

Suggested Readings

#	Book Title	Author
1	Spatial Organisation : The Geographer's View of the World	Ronald Abler, John S Gould, Adams , Peter
2	The Geography of the Puranas	S.M Ali
3	An Introduction to Scientific Reasoning in Geography	Duglas Amedeo
4	The Art and Science of Geography Integrated Readings	R.D Dikshit
5	Explanations in Geography	David Harvey
6	Perspectives of Nature of Geography	R Hartshorne
7	Evolution of Geographic Thought	M Husain
8	Philosophy and Human Geography	R.J Johnson
9	The Future of Geography	R.J Johnson
10	The Changing Nature of Geography	R Minshull

POSTGRADUATE PROGRAMME IN GEOGRAPHY (M.Sc. Geography)
SYLLABUS
SEMESTER I

GRY1C04 PHYSICAL GEOGRAPHY OF INDIA

Instructional Hours/Week: 5

Credit: 4

Module	Theme	Topics
1	Indian Subcontinent Evolution	Geography of India Scope and Significance of Study
		India – Geographic Location – Spatial Significance
		Morpho-Tectonic Framework of India – Geology and Physiography, Geomorphology, Main tectonic features , Evolution of Indian Platform
		Global Plate Tectonics and India Subcontinent
		Seismicity and Earthquakes, Isostasy and Gravity
2	The Geodiversity of India	Evolution and Characteristics
		The Himalayas
		The Aravali
		The Great Indian Plain
		The Great Indian Desert
		The Extra Peninsular Plateaus and hills
		Mountain Ranges of Peninsula
		The Deccan Plateau
		The Hills and plateaus of North Eastern India
		The Coastal Plains
The Islands		
3	The Indian Monsoon	Geology and Minerals distribution
		Monsoon -Definition, Economic and Environmental importance
		Origin of Monsoon – Thermal Concept(Sir Edmund Halley 1686), Aero-logical (R. Scherhag1948) , Fohn's concept (1951)
		Classical Theory of Indian Monsoon, Summer Monsoon and Winter Monsoon
		Driving Mechanism of Monsoon
		Features of Summer Monsoon
		Monsoon System - On-set of Monsoon, Withdrawal of Monsoon, Break in Monsoon, Monsoon depressions, Mid-troposphere cyclone, Off-shore trough along west coast of India, Easterly Jet, Westerly Jets and Tibetan Anticyclone
		Global Connections: El Niño-Southern Oscillation (ENSO), Walker Cell, Eurasian Snow Cover, Role of Ocean and upper atmosphere
		Monsoon Variability: Distribution of Rainfall, Intra seasonal Breaks, Extremes of floods, drought and famine,
		Forecasting Monsoon: , Regional Conditions, ENSO indicators, Cross Equatorial flow of winds, Global/hemispheric condition, Parametric and Multiple power regression model, MONEX model, Coupled Dynamical Model
4	Soil and Vegetation	Vegetation - Classification
		Soils of India – Classification (Joint Classification Soil Survey of India National Bureau Soil Survey and Land Use Planning (ICAR)
		Bio-geographical zones of India
		Relief v/s Drainage , The Great Indian Water Divide
		The Drainage Network – critical appraisal of Indo Brahma theory
		Comparative study of Himalayan and Peninsular River Systems
		Major River System – Indus, Ganges, Brahmaputra, Mahanadi, Narmada, Godavari, Krishna, and Cauvery
		Drainage Regionalization
5	Contemporary Issues	Territorial Conflicts – India and Pakistan, India and China, India-Bangladesh

Web Resources

1. https://www.wikiwand.com/en/Geology_of_India
2. <http://www.portal.gsi.gov.in>
3. <http://www.geosocindia.org/>

Suggested Readings

#	Book Title	Author
1	A Manual of the Geology of India	H B Medlicott and WT Blanford
2	Geology of India for Students	D N Wadia
3	Geography of India	R L Singh
4	Geography and Geology of the Himalayan Mountains and Tibet	Colonel S G Burrard and H H Hayden
5	The Physical Geology of India	S M Mathur
6	The Origin of Himalaya Mountains	Colonel S G Burrard
7	Geology of India and Burma	M. S. Krishnan
8	Indica	Pranay Lal
9	The Monsoons	P K Das
10	The Global Monsoon System – Research and Forecast	Chih-Pei Chang
11	Soils in India Text Book of Soil Science	P C Das
12	Flora of India	Alfred Byrd Graf

**POSTGRADUATE PROGRAMME IN GEOGRAPHY (M.Sc. Geography)
SYLLABUS**

SEMESTER II

GRY2C05 GEOGRAPHIC INFORMATION SYSTEM

Instructional Hours/Week: 5

Credit: 4

Module	Theme	Topics
1	Introduction	Basic Concepts- Definition and Scope
		Historical Development of GIS
		GIS Architecture, Components and approaches
		Representing Geographic Space; Discrete and Continuous
		Representation of Spatial and Temporal Relationships
		Data Generalization, Data Collection and Data Classification
		Geographic Data Precision and Data Organization
		Ethics of using GIS data Metadata, Standards and significance, Data catalogues, - Indian standards, NSDI metadata standards, NSDI vision 2020
2	Geodesy	Co-ordinate systems; Geographic, Rectangular and non – co-ordinate system
		Ellipsoid and Geoid; Datums; Geodetic and Vertical; Global and Local,
		Relationship between co-ordinate systems and map projections
		Scales of Measurement
3	Managing Data and the Database	Data file Management: Simple list, Ordered sequential file and Indexed files.
		Acquisition of spatial data and Attribute data
		Database Management Systems, Types, Functions and Components of a Database System,
		Geographic DBMS Extensions, Relational database model; SQL
		Geographic Database design; Conceptual, Logical and Physical
		Storage of GIS data: Hybrid and Integrated data model
		Object based models: Attribute model; Entity-Relationship, Location based, Entity based and Time based representation
4	Modelling Spatial Data	Graphical representation - Raster data representation; Nature and characteristics, Coding and storing raster data
		Types of raster models; GRID, IMGRID and MAP Model
		Compression of raster data; Run-length encoding, Raster chain encoding, Block encoding, Quadtree and Wavelet.
		Vector data representation; Nature and characteristics, Simple features, Topological relations, Use of Topological relationships
		Non-Topological model: Shapefile, Spaghetti model, Compact vector models; Storing vector data
5	Spatial Analysis and GIS Application	Geovisualization and spatial query, Cartograms. Dasymetric maps, 2D and 3D Representations.
		Raster based data analysis and Vector based data analysis
		Spatial interpolation- Thiessen polygons, IDW, Kriging
		Application of GIS in Watershed Management GIS as an Important tool for Local Government

Web References

1. <https://www.coursera.org/specializations/gis>
2. <http://www.qgistutorials.com/en/>
3. https://docs.qgis.org/2.2/en/docs/training_manual/
4. www.gpsinindia.com:
5. <https://www.gislounge.com/learn-gis-for-free/>

6. <https://www.coursera.org/learn/gis>
7. <https://www.esri.com/training/>
8. <http://index-of.es/Programming/Pragmatic%20Programmers/Desktop%20GIS.pdf>
9. <http://www.geoforall.org/>
10. <http://opensourcegeospatial.icaci.org/>
11. http://www.mdpi.com/journal/ijgi/special_issues/science-applications
12. <http://giscommons.org/>

Suggested Reading

#	Book Title	Author
1	Geographic Information Systems & Science	Rhind Maguire Goodchild Longley
2	Practical GIS	Gabor Farkas
3	A Practical Guide to Geostatistical Mapping	Tomislav Hengl
4	Principles of geographical Information Systems for Land Resources	Burrough P A
5	Remote Sensing and Geographical Information Systems'	Anji Reddy
6	geographic Information Systems: A Management Perspective	Aronoff S
7	Exploring Geographic Information System	Chrisman N .R
8	Geographic Information Systems	Fraser, Taylor D R
9	Computer Assisted Cartography	Mark S Monmonier
	Introductory Reading in Geographic Information Systems	Peuquet D J and D F Marble
10	Geographic Information Systems: An Introduction	Star J and j Estes

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SEMESTER II

GRY2C06 REGIONAL PLANNING AND DEVELOPMENT

Instructional Hours /Week: 5

Credit: 4

Module	Theme	Topics
1	Concept of Regional Planning	Regional Planning: Scope, Objectives, Characteristics and significance
		Principles of Regional Planning
		Hierarchy and Types of Regional Planning
		Regional Planning and Development: Measurement and Indicators
		Factors Governing Regional Development and Growth
		Regional Planning: Leading issues and current Status
2	Theories in Regional Planning	Economic Systems: Types and Nature
		Classical theory of Economic Development
		Marxian Theory of Economic Development
		Schumpeterian Theory of Economic Development
		Rostow's Stages of Economic Growth
		Myrdal Theories of Circular Causation
		Leontief-Input Output Model
		Francis Perroux - Growth Pole Theory
		Theory of Balanced And Unbalanced Growth
		Core Peripheral model (J. Friedmann) and Growth Foci (R P Mishra)
3	Sustainable Regional Development	Concept of Modern Regional Development
		The Environment and Development
		Sustainable development-meaning, objectives and History
		Policies, programmes for Sustainable Development
		Theory of limits to Growth Model
		Theory of Beyond the Limits
		Millennium Development Goals and UN Agenda 21
4	Regional Imbalance	Regional inequalities
		Obstacles of Regional Imbalance
		Factors of Regional Imbalance
		Characteristics of Underdeveloped Regions
		Vicious Cycle of Poverty
		The dependency theory of under Development.
		Human capital formation and Economic Development.
		Studies in Regional Imbalance-Bimaldas Gupta, Hemalatha Rao, Ashok Mehta and V.Nadh
5	Regional Planning in India	Regional Planning Studies in India
		History of Planning in India
		Five-year Plans in India Successes and Failures
		Plan Models : Mahala Nobis Model in India
		Decentralized Planning in India
		73 rd CAA, Government Planning Programmes in India
		Modern Regional Planning policies: NITI Aayog
		Globalization and its impact on Regional Development in India

Web References

1. https://www.wikiwand.com/en/Regional_planning
2. <http://niti.gov.in/>
3. <http://tcpomud.gov.in/>
4. <https://www.wikiwand.com/en/TCPO>
5. <http://planningcommission.gov.in/>
6. [https://www.wikiwand.com/en/Planning_Commission_\(India\)](https://www.wikiwand.com/en/Planning_Commission_(India))

Suggested Reading

#	Book Title	Author
1	Indian Economy ,Problems of Development and Planning	Agarwal,A.N
2	Problems of Regional Economic Planning	Boudeville,J.R
3	Regional Planning in India	Chand.M,Puri.V.K
4	The Colonial Legacy", in The Indian Economy Problems and Prospects,	Chandra,Bipin
5	Planning Regions in India, Town and Country Planning Organization	Chandrasekhara,C.S.and Sundaram.K.V
6	Metropolitan Centres and Regions in India,21 st International Geographical Congress, Metropolitan Growth and Planning	Chandrasekhara,C.S.andS undaram.K.V
7	City and Region: A geographical interpretation	Dickinson.R.E
8	City , Region and Regionalism, A geographical Contribution to Human ecology	Dickinson.R.E,
9	Economic Development and Social Opportunity	Dreze.J and Sen A.
10	Indian Economy	Dutta,R.&K.P.M,Sundaram,
11	Geography: Realms Regions and Concepts	De Blij, H.J. and Muller,P.O
12	Regional Planning: Concepts,Techniques,Policies and Case Studies	Misra,R.P
13	Regional Development Planning In India, A New Strategy	Misra.R.P,Sundaram.K.V& VLS Prakash Rao
14	Indian Economy	Misra,S.K,andPuri,V.K.
15	Levels of Regional Development in India	Mitra,A
16	Economic Development :Past and Present	Gill,R
17	An Introduction to Regional Planning	Glasson,J.
18	Introduction to Regional Science	Walter,Issard
19	An Introduction to Development and Regional Planning	Ray Chaudhuri,Jayasri

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GRY2C07 RESEARCH METHODS IN GEOGRAPHY

Instructional Hours /Week: 5

Credit: 4

Module	Theme	Topics
1	Initiating Geographical Research	Introduction to Research Methods in Geography
		Nature of Geographical Research
		Scope and Content
		Ethical Practice in Geographical Research
	Research Paradigms in Geography	Ontology; Epistemology; Research Paradigms in Geography - Spatial Science, Humanistic Geography, Critical Realism, Monism, Dualism, Poststructuralist Geographies, Paradigms and Modern era of Geo-Spatial Technologies
2	Fundamentals of Research	Identifying research problem, defining a problem, Literature Review – Purpose of Literature Review, Framework of searching, Managing your search, Search Tools: Library Catalogs, Abstracts and Reviews, Citation Indexes, Bibliographies, Websites, Other Literature Sources, Evaluating the Literature
		Formulation of Hypothesis and Methodology
		Research Proposal Writing
		Philosophy of Research and importance of Research Design
		Research Scheduling
3	Generating and Working with Data in Human Geography	Data Sources - Primary and Secondary Data, Finding Historical Sources
		Quantitative and Qualitative Data
		Conducting Questionnaire Surveys
		Semi-structured Interviews and Focus Group Discussions
		Ethnography of Participant Observation
		Participatory Research Methods
		Sampling in Geography
		Human Environment Field Study Modeling in Human Geography: Understanding Explanation and Prediction in Human Geography
4	Generating and Working with Data in Physical Geography	Getting Information about the Past
		Making Observations and Measurements in the Field
		Importance Field Book and Maps
		Analyzing a Natural System
		Modelling in Physical Geography: Understanding Explanation and Prediction in Physical Geography
5	Representing, Analyzing, Interpreting, Visualizing	Data Handling and Representation, Analyzing – Meaning, Interpretations
		Tables, Graphs, Diagrams and Maps
		Using Statistics to Describe and Explore Data – Descriptive Statistics, Explanatory Statistics
		Introduction to Geostatistics
		Computer Assisted Qualitative and Quantitative Data analysis
		Using Remotely Sensed Imagery
		Using Geographic Information System
		Writing Essays, Articles, Paper, Reports and Dissertations
		Thesis, Chapter formulation, Language, Layout and Structure, Illustrations, Tables and Foot notes
		Oral Presentation
Intellectual Property Rights		

Web References

1. <http://obohcom.net/home/read?filename=Research%20method%20in%20Geography.pdf>
2. <https://orca.cf.ac.uk/59957/1/report-130906041556-.pdf>
3. <http://www.modares.ac.ir/uploads/Agr.Oth.Lib.17.pdf>
4. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.133.5983&rep=rep1&type=pdf>
5. <http://research.ncl.ac.uk/forum/v2i1/Problems%20and%20Methods%20of%20Environmental%20Research.pdf>
6. <http://www.statcan.gc.ca/pub/12-587-x/12-587-x2003001-eng.pdf>
7. <http://www1.geo.ntnu.edu.tw/~moise/Data/Books/Social/05%20social%20geography%20theory/social%20geography%20participatory%20research.pdf>

Suggested Readings

#	Book Title	Author
1	An Introduction to Scientific Research Methods in Geography and Environmental Studies	Daniel Montello, Paul Sutton
2	Doing Urban Research.	Andranovich, G.D., & Riposa, G.
3	The Survey Research Handbook	Alreck, P.L., & Settle, R.B.
4	Asking the Right Questions: A Guide to Critical Thinking	Browne, M.N., & Keeley, S.M.
5	Handbook of Qualitative Research	Denzin, N.K., & Lincoln, Y.S.
6	Methods in Human Geography.	Flowerdew, R., & Martin, D.
7	Research Methods: Planning, Conducting and Presenting Research.	Devlin, A.S.
8	Qualitative Research Methods in Geography.	Hay, I
9	History and Things: Essays on Material Culture.	Lubar, S., & Kingery, W.D.
10	Research Methodology	C R Kothari
11	Research Methods in Social Relations	Judd, C., Smith, E., & Kidder, L.H.
12	Survey Research.	Sapsford, R.

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GRY2C08 POPULATION GEOGRAPHY

Instructional Hours/Week: 5

Credit: 4

Module	Theme	Topics	
1	Development of Population Geography	Scope and Content of Population Geography	
		Methodological problems in population geography	
		Recent developments in population geography	
		Population Geography in India	
		Attributes of Population – Demographic, Social and Economic –Distribution	
	Sources of Population data	Various population data sources	
		Quality and reliability	
Population Studies and Research in India			
2	Determinants and world patterns of population Distribution	Distribution and density	
		Vital Rates and Measures : Fertility and Mortality	
		Growth	
		Migration	
		Theories of Migration	Laws of migration -Ravenstein
			Gravity Model – WJ Reilly and John Q Stewart
			Principle of Least Effort – George k Swift
			Intervening Opportunities - Stouffer
			Push – Pull Theory -Everett Lee
		Age and Sex Composition	
Literacy			
Urbanization			
Occupation			
3	Population and Resources	Optimum population	
		Over-population	
		Under-population	
		Population - Resource regions (Ackerman)	
		Theories of population	Malthus
			Ricardo
			Marx
Demographic Transition			
4	Spatial and Temporal Trends in India	Distribution	
		Density	
		Growth	
		Sustainable development strategies to promote a balanced distribution	
		Population Policy and Strategies	
		Rural – Urban Population Theoretical perspectives	
5	Population – Problems and Prospects	Developed and Developing Nations	
		Immigration Policy and Refugee Crisis	
		Inclusive Growth – Gender, Trans Gender and Differently-abled	
		Sustainable Development Goals and Population Policy of India	

Web References

1. <http://censusindia.gov.in/>
2. <http://www.nios.ac.in/media/documents/316courseE/ch26.pdf>
3. https://www.wikiwand.com/en/Uncontacted_peoples
4. https://www.wikiwand.com/en/Population_geography
5. [https://www.wikiwand.com/en/Race_\(human_classification\)](https://www.wikiwand.com/en/Race_(human_classification))
6. <http://humangeography.wikispaces.com/Population+Geography>
7. <https://www.gfmer.ch/SRH-Course-2011/family-planning/pdf/Principles-population-demography-Moazzam-Ali-2011.pdf>
8. https://www.wikiwand.com/en/Human_migration
9. <https://www.wikiwand.com/en/Refugee>

Suggested Reading

#	Book Title	Author
1	Geography of Population; Concept, Determinants and Patterns	Chandana, R.C.
2	Geography of Population	Garnier, B.J
3	Principles of Population and Development	Crook, John I
4	Population Geography	York Clarke, John I
5	Population Geography	I. Singh
6	Migration and Economic Development of Kerala	K.V Joseph
7	Census of India	Census of India
8	Population in India's Development(1947 – 2000);	Bose, Ashish
9	India's Population Problem	Mamoria C.B
10	Geography of Population Selected Essays	S.L Kayastha
11	Human Geography Issues for the 21st Century	Peter Daniels, Michael Bradshaw Denis Shaw, James Sidaway
12	Population	William Petersen,
13	Principles in Demography	Bogue, D.J
14	Statistical Methods for Geography	Rogerson
15	Quantitative Geography Techniques and Presentations	Ashis Sarkar
16	Land, Work and Resources An Introduction to Economic Geography	J.H. Paterson
17	Statistical Techniques in Geographical Analysis	Danies Wheeler, Gareth Shaw, Stewart Bar

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GRY3C09 PRINCIPLES OF REMOTE SENSING

Instructional Hours /Week: 5

Credit: 5

Module	Theme	Topics
1	Concepts and Foundations of Remote sensing	Basic Concepts: Energy Sources; Wave model of Electromagnetic Energy; Quantum theory of electromagnetic radiation
		Energy interactions in the atmosphere – Refraction, Scattering Absorption, Reflectance
		Energy interactions with earth surface features – Spectral reflectance Curve, Spectral reflectance of Vegetation, soil and water
		Atmospheric influences on spectral response patterns; Spectral Information and resolution, Spatial Information and resolution, Temporal Information and resolution, Radiometric Information and Resolution, Polarization Information, Angular Information,
		Concept of swath, Nadir; Data acquisition principles and interpretation
		Advantages and limitations of Remote Sensing, An ideal remote sensing system
2	Principles of Photogrammetry	Development of Photogrammetry; Basic principles, Elements of photographic system-Types, Scales and ground coverage, resolution, radiometric characteristics, films, filters and aerial cameras
		Elements of Image interpretation; Collateral information, Convergence of evidence, The Multi- Concept
		Geometric fundamentals of Photogrammetry; Elements of Vertical Photograph; Relief displacement, Image Parallax, Stereo model- Photo mosaics; Image interpretation Keys; Ground Control for Aerial Photography
3	Satellite Remote Sensing	Satellite Remote Sensing; Multispectral imaging; Using Discrete Detectors and Scanning mirrors- Landsat- MMS, TM, ETM+; NOAA- GOES, NOAA-AVHRR; SeaWiFS
		Multispectral imaging Using Linear Arrays; SPOT 1, 2, 3 HRV, SPOT 4, 5 HRVIR; IRS-LISS III and LISS IV; ASTER; Quick Bird
		Imaging Spectrometry using Linear and Area Arrays; AVIRIS, MODIS
		Digital Frame Cameras Based on Area Arrays
		Astronaut Photographic Systems
		Thermal Infrared Remote Sensing; Principles; Radiation properties, thermal infrared atmospheric windows; Applications
		Active and Passive Microwave Remote Sensing; Principles; Synthetic Aperture Radar Systems; Principles; Applications of Microwave Remote Sensing
LIDAR Remote Sensing; Principles and applications		
4	Digital Image Processing	Types of Imagery; Image rectification and restoration-Geometric correction, Radiometric correction, Noise removal
		Image enhancement- Contrast manipulation, spatial feature manipulation, Multi-image manipulation
		Spatial Feature Manipulation- Spatial filtering, Convolution, Edge enhancement, Fourier Analysis
		Multi-image manipulation – Spectral ratioing, Principal and Canonical component transformation, IHS enhancement, Decorrelation stretching
		Image Classification; Supervised classification, Minimum-distance-to-means, Parallelepiped, Gaussian maximum likelihood: Assembling the training data; graphical representation of spectral response patterns, Quantitative expressions of category separation, Self-classification of training data set, Interactive preliminary classification, Representative subscene classification
		Unsupervised classification; Hybrid classification; Classification of mixed pixels-Spectral mixture analysis, Fuzzy classification; Post-classification smoothing
5	Applications of Remote Sensing	Vegetation Mapping
		Agriculture
		Urban Planning
		Disaster Management

Web Resources

1. <http://www.iirs.gov.in/>
2. https://www.wikiwand.com/en/Indian_Remote_Sensing
3. <http://srtm.csi.cgiar.org/>
4. <https://asterweb.jpl.nasa.gov/gdem.asp>
5. <https://earthexplorer.usgs.gov/>
6. http://www.eorc.jaxa.jp/en/hatoyama/experience/rm_kiso/mecha_sensortype_e.html
7. http://bhuvan.nrsc.gov.in/bhuvan_links.php
8. https://nrsc.gov.in/IRS_Data_Products
9. <https://earthdata.nasa.gov/user-resources/remote-sensors>
10. <http://www.geo-informatie.nl/courses/grs10306/Materials/Practical/1%20Manual/000%20Practical%20manual%202010.pdf>

Suggested Readings

#	Book Title	Author
1	Fundamentals of Remote Sensing and Air Photo interpretation	Barrett E C and L F Curtis
2	Introduction to Remote Sensing	Compbell J
3	Principles of Remote Sensing	Curran P J
4	Digital Image Processing of Remotely Sensed Data	Hord R M
5	Remote Sensing of the environment	John R. Jenson
6	Remote sensing and Image interpretation	Lillisand T M and R W Kiwdwe
7	Remote Sensing for Earth Resources, Association of Exploration Geophysicist	Rao D P
8	Remote Sensing : Principles and Interpretation	Sabins F F Jr

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SEMESTER III

GRY3C10 URBAN GEOGRAPHY

Instructional Hours/Week: 5

Credit: 4

Module	Theme	Topics
1	History of Urbanization	Nature, Scope and content of Urban Geography
		Urbanization – Definitions, Terminologies and Urban Jargons
		Geographical approach to study of Urbanization
		History of Urbanization in India
		World Urbanization – The Classic City, The Medieval city, The Neoclassical City
		Colonization, Industrial Revolution and Urbanization
		Defining Space and Place, Identity of a Place, Space-Place relationships
		Definition of Urban Place and Areas- Identification and Spatial limits of Urban Areas. Census of India definition of Urban Area
2	Patterns and Classification	Patterns of Urbanization in India –Levels of Urbanization –Structural Patterns Macro-Spatial Patterns
		Classification of Urban Place – Based on Physical Characteristics, Functional, Socio-Cultural, Historical.
		Ashok Mitra’s Classification of Indian Cities
		Land Use Models: - Burgess Model, Sector Model, Multiple Nuclei Model, Urban Realms Model (James E Vance Jr.), Grid Model or Hippodamian Plan
		Urban Demographic Model – Density Model
3	Settlement Systems	Primate City Settlement System, Settlement System and Rank Size Rule
		Central Place Settlement Systems
		Spacing of Settlement Systems – Entropy of Settlement Systems, Identification of Central Places Functions, Measurement of Range of a Good, Thresholds, Centrality, Settlement Hierarchies, rural –urban travel behaviour
4	Urban Development and Planning	Basics of Urban Planning – Definition, Concepts and Approaches
		Urban Planning in India - Master Planning and City Development Plan
		Urban Policy of India
		Urban Renewal and Development Programmes in India – JnNURM, Post JnNURM
		City and Region – City-Region Relationship, Structure, Areas of Influence, Areas of Dominance, City Regions in India, City Region and Planning
		Rural Urban Fringe
5	Urban Governance and Urban Problems in India	Urban Governance :-Definition, Concepts, Components, Administrative Structure-hierarchy and structure
		Institutional frame and mechanism for urban governance as envisaged in the 74th Constitutional Amendment Act
		Urban Problems: Safe Drinking Water, Water, Air, Sound Pollution, Solid and Liquid Waste Management
		Urban Sprawl, Over Crowding and Urban Housing:- Slum and Squatter Settlements, Slum Redevelopment
		Unemployment, Urban Informal Sectors, Urban Crimes
		Urban Disasters
		Cities and Climate Change – Towards Sustainable Future

Web References

1. MoUD - <http://moud.gov.in/>
2. MoHUPA - <http://mhupa.gov.in/Default.aspx?ReturnUrl=%2f>
3. NUIA - <https://www.niua.org/>
4. <https://unhabitat.org/>
5. <http://uni.unhabitat.org/>
6. Urban Update Magazine - https://issuu.com/urbanupdatemag/docs/uu_may_2017
7. <http://mit-ocw.kmeacollege.ac.in/courses/urban-studies-and-planning/>
8. <https://www.coursera.org/learn/smart-cities>
9. IGBC - <https://igbc.in/igbc/>
10. GRIHA-
http://www.grihaindia.org/index.php?option=com_content&view=article&id=87

Suggested Reading

#	Book Title	Author
1	Urbanization and Urban Systems in India	R Ramachandran
2	Urban Geography - An Introductory Analysis	James H. Johnson
3	Cities: Steering Towards Sustainability	Pierre Jacquet
4	Re-Visioning Indian Cities – Urban Renewal Mission	K C Srinivasan
5	The Urban Pattern – City Planning and Design	Arthus B Gallion, Simon Eisner
6	New Forms of Urban Governance in India	I S A Baud , J De Wit
7	Introduction to Settlement Geography	Sumita Ghosh
8	Town Planning	Rangwala
9	Urban and Regional Planning	K S Rame Gowda

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SEMESTER IV

GRY4C11 ENVIRONMENTAL GEOGRAPHY

Instructional hours/week: 5

Credit: 4

Module	Themes	Topics
1	Concepts in Environmental Geography	The concept of environment. Environmental Thought. Early environmental thinking. Environmentalism.
		Man and Environment relationship
		Development and scope, Human-Ecological adaptations. Recent concepts
		Ecosystem-types and functions. Biodiversity
2	Human interference in Biosphere	Human impacts on Land, water and air. Human impacts on Agricultural and Industrial environment. Human Settlement and its impact on environment.
		Environmental Pollution: Water and Soil Pollution-types, sources and consequences
3	Global Environmental Issues-Eco crisis	Eco-crisis. Global environmental issues . Global warming, Ozone depletion, Acid rains, hazardous waste, Biodiversity Loss.
	International Laws	Role of UN in protection of Global Environment, Multinational authorities and agreements, Stockholm Conference, Nairobi Declaration, Rio Conference, Rio+5 and the Rio+10, Conference of Parties, International Protocols, Future of International laws-Paris conference. Syndromes with environment, Environmental refugee.
	Environmental Policy and Management	Environmental management and planning –Goals, needs, themes and problems in ecosystem management. Leopold Matrix.
		Environmental Impact Assessment, Environmental Mapping: Application of Remote Sensing and GIS.
4	Environmental Policy and Management in India	National Environmental Policy: National Policy on EIA and Regulatory Framework. Green Tribunal.
	Environmental Acts in India	Anti Pollution Acts: The water Act. 1974. The Air Act 1981. The Environment Protection Act 1986. Role of Central & State Pollution Control Boards .
	Environment movements in India	Environment movements /Reports in India with special reference to Himalayan and Western Ghats Ecology .Protection of Biodiversity in India-measures.
5	Environmental Sustainability	Environmental sustainability-Recent Concepts., Environmental Justice. Ecological Footprint. Green Economy. Green rating Project. Eco-mark Scheme. Polluter Pays Principle. Ecocide Act.

Web References

1. <http://envfor.nic.in/>
2. https://www.wikiwand.com/en/Integrated_geography
3. <http://www.unep.org/>
4. <http://en.unesco.org/>
5. <http://www.cseindia.org/>
6. <https://www.uv.mx/personal/fpanico/files/2011/04/AA.-VV.-Environmental-geography.pdf>
7. https://www.wikiwand.com/en/Human_impact_on_the_environment
8. <https://www.wikiwand.com/en/Environmentalism>

Suggested Readings

#	Books	Author
1	Fundamentals of Ecology	Odum,E.P.
2	Environmental impact statements.	Bregman, J.I. and Mackenthum
3	Environmental impact assessment.	Canter, W. Larry
4	Environmental impact assessment: principles and Procedures	Munn, R.E.
5	Soils in Our Environment,	Raymond W. Miller and Roy L. Donalvee.
6	Water Pollution.	Sharma.B.K.
7	Environmental Law and Policy in India	Divan, Sand Rosencranz.A.
8	Environmental Management Systems	ISO 14004
9	Environmental Ethics.	Misra.R.P.
10	Environmental Geo Science	Strahler A.N. and Strahler A.H.
11	Geography and Man's Environment	Strahler A.N. and Strahler A.H.
12	The Earth Report	Goldsmith Edward et al.
13	Principles of Environmental Science	William P.Cunningham. Mary Ann Cunningham-
14	Environmental Management	Saxena HM.

SYLLABUS

SEMESTER IV

GRY4C12 AGRICULTURAL GEOGRAPHY

Instructional Hours/Week: 5

Credits: 4

Module	Theme	Topics
1	Introduction to Agricultural geography	Definition, Origin and dispersal of agriculture, Theories of agriculture evolution
		Nature, Scope and Development of Agricultural Geography
		Major agricultural hearths; Diffusion of agricultural innovations;
		Approaches of Agricultural Geography
		Agriculture typology and Systems
		Determinants of Agriculture; Physical, Socio-economic, technological and institutional;
2	Models and Theories in Agricultural Geography	Von Thunan Theory of Agricultural Location, Application of Von Thunan Model in India,
		Agricultural transformation and development by Schultz and Mellor
		Agriculture and regional development by Boserup, Lewis and Fenin – Ranis Model;
3	Measurement in Agriculture Geography	Land use survey: History and Techniques of land use survey
		Agriculture land use Classifications L. D Stamp, M.Shafi;
		Land Capability Survey and Classifications
		Crop Suitability Analysis
		Agriculture Regionalization: Methods and Techniques
		World Agricultural Regions by D. Whittlesey
4	Contemporary Strategies and Agriculture Issues	Agriculture, Economic development and Environment
		Farm Management and its Principles
		Sustainable Agriculture Practices
		Agriculture Marketing and Finance
		Instability of Agriculture and New Agricultural Policy, GATT, FAO, WTO
5	Indian Agriculture Prospects and Problems	Agriculture and Indian Economy
		Agro-climatic and Agro ecological regions
		Land Reforms in India – Theoretical Issues,
		Agriculture Development under the Five-year plans
		Green revolution in India and New Strategies
		New Agriculture Policies, Problems and Prospects in India

Web References

1. <http://agriculture.gov.in/>
2. <http://www.keralaagriculture.gov.in/>
3. <http://www.icar.org.in/>
4. <http://nptel.ac.in/courses/126104005/>
5. <https://www.coursera.org/learn/sustainable-agriculture>

6. https://www.wikiwand.com/en/Agricultural_geography

7. <http://www.kissankerala.net/home.jsp>

Suggested Reading

#	Book Title	Author
1	An introduction to Agricultural Geography	Grigg, David
2	Agricultural Geography	Jasbir Singh and Dhillon S.S.
3	Agricultural Geography	Symons, Leslie
4	The Geography of Economic Systems	Berry.B.J.L
5	Agricultural Geography	Chauhan,D
6	The Changing World Food Prospects- The Nineties and Beyond	Brown,L.R.
7	Population and Food – Global Trends and Future Prospects	Dyson,T
8	Regional Perspectives on Agricultural Development	Gobind,N
9	Geography of Agriculture	Gregory,H.F
10	The Agricultural Systems of the World	Grigg F.D.B
11	Agricultural Geography	Hussain,M
12	Systematic Agricultural Geography	Hussain,M
13	Agricultural Geography,	Jasbir,S. and Dhillon,S.S
14	Agriculture and Environment Change	Mannion, A.M. 1995
15	Agricultural Geography	Shafi,M
16	Agricultural Productivity and Regional Imbalances- A Study of Uttar Pradesh	Shafi, M.

M.Sc. GEOGRAPHY

CHOICE BASED CREDIT SEMESTER SYSTEM (CBCSS) 2019

ELECTIVE COURSES

POSTGRADUATE PROGRAMME IN GEOGRAPHY (M.Sc. Geography)

SYLLABUS

SEMESTER III

GRY3E01.1 GEOGRAPHY OF HEALTH

Instructional Hours /Week: 5

Credit: 4

Module	Theme	Topics	
1	Development of Health geography	Definition, nature and scope, objectives of Health geography elements	
		Growth and developments of medical/Health Geography	
		Methods and techniques- Geographic information system	
2	The Human Ecology of Disease	Health -The Triangle of Human Ecology	
		Transmission and Creation of Infectious Disease	
		Nutrition and Health	
		Geological Sources of Nutrients	Mineral Elements Needed for Good Health
			Dietary Sources of Essential Mineral Elements
			Mineral Element Bioavailability
			Quantitative Estimates of Mineral Needs and Safe Exposures
Clinical Assessment of Mineral Status			
Ecological Aspects of Mineral Nutrition			
3	Landscape Epidemiology	Regions	
		Transmissible Disease Systems	
		The Landscape Epidemiology Approach	
		The Cultural Dimension of Water-Based Disease Transmission -	
		The Cultural Ecology of Tick-Borne and Other Transmissible Diseases	
		Regionalization -Ecological Complications	
4	Climate and Weather: Influences on Health	Direct Biometeorological Influences	
		The Influences of the Weather	
		Seasonality of Death and Birth	
		Climate Change - Health and Disease	
5	Political Ecology of Non communicable Diseases and Disease Diffusion in Space	The Dimension of Mortality	
		The Poverty Syndrome	
		Race in the Study of Health Risks	
		Gender: Women's Health	
		Causal Reasoning and Epidemiological Design	
		Disease Ecology: Cancer	
		Disease Ecology: Cardiovascular Disease	
		The Precautionary Principle and Some Political Ecology of Research	
		Disease Diffusion	
		Modeling Disease Diffusion	
Influenzas Geographic Approaches to the Pandemic of AIDS &Other Epidemics			

Web References

1. https://www.wikiwand.com/en/Health_geography
2. <http://www.who.int/en/>
3. <https://humangeography.wikispaces.com/Medical+Geography+and+Epidemiology>
4. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2530998/>
5. <https://www.esri.com/library/ebooks/geomedicine.pdf>

Suggested Reading

#	Book Title	Author
1	Agriculture, Environment and Health,	Ashraf, S.W.A.,
2	Geo-Ecology of Cholera in West Bengal	Banerjee, b and Hazra J.,
3	Implementing Health Policy, Centre for Policy Research	Chatterjee Mera
4	Atlas of Diseases distribution	Cliff, A. & Stewart, L.,
5	Health Care Planning in Developing Centres	Hazra, J
6	Patterns of Diseases and Hunger – A Study in Medical Geography	Learmonth, A.T.A.
7	Ecology and Human Diseases	. May, J.M
8	Studies in Disease Ecology	May, J.M
9	Medical Geography	Mc. Glashan. N.D
10	Medical Geography of India	Misra, R.P
11	Geomorphic aspect of health and diseases in India	Rais, A and Learmonth, A.T.A
12	The Geography of Life and Death	Stamp, L.D.,

POSTGRADUATE PROGRAMME IN GEOGRAPHY (M.Sc. Geography)

SYLLABUS

SEMESTER III

GRY3E01.2 SOCIAL GEOGRAPHY WITH SPECIAL REFERENCE TO INDIA

Instructional Hours /Week: 5

Credit: 4

Module	Theme	Topics
1	Field of Social geography	Problems of definition, Nature and Scope.
2	Social Evolution of India Before Colonisation	The Concept, Sources, Limitation and problems of reconstruction: The Prehistoric and the historic Scene – Peopling of India. The Janapadas of Ancient India and Mughal Subhas-continuity and change.
3	Social Evolution of India during Colonisation and after	Transformation of the regional structure During colonial period and after Independence: -The social, economic and Political consequences.
4	Spatial distribution of Various components of India's Social Structure:	The racial composition. The tribal Social Formation: The Problem of definition, distribution/redistribution. The social and spatial organization of agrarian communities with special reference to the Institution of Caste. Linguistic diversity and the question of identity. Religion in Indian Society Historical background and pattern of current distribution.
5	Problems of Indian Nationalism in contemporary India	The process of social change and transformation. Racial-Caste-Religious-Linguistic and ethnic Minorities their problems and redressal. Communalism, terrorism and bribery.

Suggested Readings

#	Book Title	Author
1	The Geography of Puranas	Ali, S.M
2	The Personality of India, MS University of Baroda	Rao, Subba
3	An Atlas of Tribal India	Raza, Moonis and A Ahmad
4	Tribal Life in India	Bose, N.K
5	Social change in Modern India	Srinivas, M.N
6	Social Geography	Ahmad, A
7	Buffalo Nationalism. A Critique of Spiritual Fascism	Ilaiah, K
8	Nation without Nation in India	Aloysius, G.
9	India Pakistan and Ceylone	Spate O.H.K and Learmonth A.T.A

POSTGRADUATE PROGRAMME IN GEOGRAPHY (M.Sc. Geography)

SYLLABUS

SEMESTER III

GRY3E02.1 ECONOMIC GEOGRAPHY

Instructional hours/week: 5

Credit: 4

Module	Theme	Topics
1	Introduction to Economic Geography	Scope, Content and Recent Trends in Economic Geography
		Approaches- Classification of Economies Developed, Developing, and Least Developed
		Sectors of Economy - Primary, Secondary and Tertiary
		Factors of location of Economic Activities – Physical, Social, Economic and Cultural
2	Primary sector	Agriculture: Factors affecting agriculture- Types, World pattern
		Forestry: World forests - Types
		Fishing, Major Fishing grounds
		Major Dairying and Mining Regions.
3	Industries	Classification of industries: Resource based and Foot loose industries. Theories of industrial location - Weber, Losch and Isard
		Case studies of selected industries: Iron & steel, Aluminum, chemical, oil, Refining and Petro-Chemical, Textile, Engineering, and Knowledge based industries.
	Transportation	Modes of transportation, Accessibility and Connectivity. Land, Air and Water Transport. Major International Transport Routes and International Ports.
4	World Economic Development	Globalization, Liberalization, and Privatization- Merits and Demerits. Global Market world
		Trade Blocks- WTO, ASEAN, OPEC & SAARC
		Impact of Information Technology on global economy
5	Economic Development of India	Regional Disparities- Globalization and Indian Economy, Emerging Economic Regions -SEZ and IT Hubs

Web Resources

1. <http://commerce.gov.in/>
2. <http://www.mnre.gov.in/>
3. <http://mines.nic.in/>
4. <https://data.gov.in/>
5. <http://www.finmin.nic.in/>
6. <http://texmin.nic.in/>
7. <https://www.india.gov.in/information-department-economic-affairs>
8. <http://dea.gov.in/>
9. <http://eands.dacnet.nic.in/>
10. <http://www.indianrailways.gov.in/railwayboard/>
11. <http://www.civilaviation.gov.in/>
12. https://www.wikiwand.com/en/Economic_geography
13. <https://data.worldbank.org/country/india>
14. <http://databank.worldbank.org/data/reports.aspx?source=2&country=IND>
15. http://164.100.133.129:81/eCONTENT/Uploads/World_Economic_Geography.pdf
16. <https://www.free-ebooks.net/ebook/Economic-geography-1915/pdf>

Suggested Reading

#	Book Title	Author
1	Geography of Market Centres and Retail Distribution	Berry J.L
2	Economic Geography of Asia, Allied Book Agency	Chatterjee, S.P
3	Network Analysis in Geography	Chorley, R.J. and Haggett, P
4	India-Economic Development and Social Opportunity	Dreze, J. and Sen, A
5	Markets, the State and the Environment	Eckarsley, R.
6	A Geography of Marketing	Garnier. B.J. and Delobez
7	The Stages of Economic Growth	Rostow, W.W.:
8	Economic Geography	Wheeler, J.O
9	The Scope of Geography	Rhoads Murphy
10	Economic Geography	Hartshorn, T. A.& Alexander, J.W

POSTGRADUATE PROGRAMME IN GEOGRAPHY (M.Sc. Geography)

SYLLABUS

SEMESTER III

GRY3E02.2 GEOGRAPHY OF TOURISM

Instructional Hours/Week: 5

Credit: 4

Module	Theme	Topics
1	Concept of Tourism	Concept, nature, scope & definition of tourism
		Components of tourism
		Types of tourism
		Socio, economic and political significance of tourism
		Role of Geography in tourism
2	Motivations for Travel	Travel motivations
		Factors influencing the growth of tourism
		Accommodation - Types of hotels, Supplementary accommodations
		Role of travel agency in tourism
		Tour itinerary
		International organizations
		Travel formalities - Visa, Passport, Credit cards.
3	Impact of Tourism	Economic, Socio-cultural & Environmental impacts
		Multiplier effect on the economy
		Tourism planning
		Major natural & cultural attractions of UK, Mexico, Switzerland, Hong Kong, & Malaysia
4	Tourism in India	Growth & development
		Tourism organization in India
		Major natural & cultural attractions -
		Problems & prospects
5	Tourism in Kerala	major natural & cultural tourist centers
		Eco tourism
		Rural tourism
		Monsoon tourism
		Medical tourism in Kerala
		Tourism as an industry in Kerala
		Problems & prospects.

Web References

1. <http://tourism.gov.in/>
2. <https://www.keralatourism.org/>
3. https://www.wikiwand.com/en/Kerala_Tourism_Development_Corporation
4. <https://www.ktdc.com/>
5. https://www.wikiwand.com/en/Tourism_geography
6. http://shora.tabriz.ir/Uploads/83/cms/user/File/657/E_Book/Tourism/Tourism%20Geography.pdf
7. <https://www.wikiwand.com/en/Ecotourism>
8. <http://www.ecotourism.org/what-is-ecotourism>

Suggested Reading

#	Book Title	Author
1	Tourism Development: Principles & Practices	Bhatia, A.K.:
2	Hill Tourism: Planning & Development	Chandra R. H
3	Geography of World Tourism	Milton D
4	Tourism Today: A Geographical analysis	Pearce D.G
5	Tourism and the Environment: A Sustainable Relationship	Hunter C and Green H
6	Himalayan Pilgrimages & New Tourism	Kaur J.
7	Tourism and Development in the Third World	Lea J.
8	Tourism To-day: A Geographical Analysis	Pearce D.G
9	A Geography of Tourism	Robinson, H
10	Tourism Planning and Development - A new perspective	Sharna J.K
11	Critical issues in Tourism-A Geographical Perspective	Shaw G. and Williams A.M.

POSTGRADUATE PROGRAMME IN GEOGRAPHY (M.Sc. Geography)

SYLLABUS

SEMESTER IV

GRY4E03.1 CULTURAL GEOGRAPHY

Instructional Hours/Week: 4

Credits: 4

Module	Theme	Topics
1	Nature of Cultural Geography	The Nature of Cultural Geography
		The evolutionary approach in cultural geography
		The evolution of cultural Geography
		The Framework of cultural Geography
		Themes in cultural Geography
		The Cultural Region
		Cultural Adaptation and Environmental perception
		Man as modifier of the earth,
		Cultural Integration
		The cultural landscape
		Cultural history of mankind
2	Humanisation of the Earth	Humanisation of the Earth
		Pleistocene inheritance
		The environmental changes during the Pleistocene,
		The Impact of glaciations
		Shifting life zone of Pleistocene
		Human ancestors
		Food gathering and Hunting
		Discovery of fire and building of shelter
		Homo sapiens their rise and dominance.
		Man's deployment over the continents
		Culture as a new method of evolution and interrelationships in human living.
3	The Evolution of Civilizations	The beginning of plant domestication, origin of agriculture, evolution of cropping system,
		origin of Animal Domestication, the Regions of Animal Domestication, The Consequences of Animal Domestication. The evolution of system of Animal Husbandry.
		The origin of Metal Extracting and the Diffusion of metal smelting Technology.
		The evolution of civilization, The Main culture Hearths- Mesopotamia, The Nile Valley, The Indus valley and the North China.
		The main cultural regions of the world with special reference to India and Southeast Asian cultural regions.
4	Geography of Languages and Religion	The Geography of Language
		the major linguistic families and their distribution in the world
		The Geography of Religion -The major religions of the world and their distribution
		The Health of semetic and Hindu religion. Places of pilgrimage. Religions Landscape. Cultural Integration in Religion.
5	Development of Settlements	Settlements-origin, patterns- Clustered, Semi clustered and dispersed
		Building Materials and house types
		Rural and urban settlements - Types
		Quality of life in rural and urban Centers

Web References

1. https://en.wikipedia.org/wiki/Category:Cultural_geography
2. <http://www.harpercollege.edu/mhealy/g101ilec/intro/clt/cltclt/cltcltfr.htm>
3. https://www.wikiwand.com/en/Cultural_geography
4. https://www.wikiwand.com/en/Carl_O._Sauer
5. https://www.wikiwand.com/en/Richard_Hartshorne
6. https://www.wikiwand.com/en/Natural_landscape
7. https://www.wikiwand.com/en/Cultural_landscape
8. <https://merlepatchett.wordpress.com/2010/09/03/cultural-geography/>
9. https://www.wikiwand.com/en/World_Heritage_Site
10. <http://www1.geo.ntnu.edu.tw/~moise/Data/Books/Social/05%20social%20geography%20theory/rematerializing%20social%20and%20cultural%20geography.pdf>

Suggested Reading

#	Book Title	Author
1	A Geography of Mankind	Broek, J.C. and Webb, J.W
2	Cultural Geography	Crang, Mike
3	Dimensions in Human Geography	Hazra,
4	Human Geography Today	Massey
5	India: Culture, society and Economy, Inter-India	Mukherjee, A.B. and Aijazuddin, A
6	Readings in Cultural Geography	Philit Wegener & Mitchel,
7	Introducing Cultural Geography	Spencer & Thomas
8	Cultural Geography	R.K. Tripathi
9	Man's role in changing the face of the earth Vol. I & II	Thomas

POSTGRADUATE PROGRAMME IN GEOGRAPHY (M.Sc. Geography)

SYLLABUS

SEMESTER IV

GRY4E03.2 GEOGRAPHY OF WATER RESOURCE

Instructional Hours/Week: 5

Credit: 4

Module	Theme	Topics
1	Fundamentals of Hydrology	Scope and Content of Water Resources Geography
		Definitions – Water Resources Geography, Hydrology
		Hydrological Cycle; Global Water Balance; Water Budget
		Precipitation – Type, Form, Measurement of Rainfall – Spatial measurement methods – Temporal measurement methods – Frequency analysis of point rainfall – Intensity, duration, frequency relationship – Probable maximum precipitation.
		Abstraction from Precipitation –Loss from Precipitation - Evaporation Process –Reservoir Evaporation –Infiltration Process – Effective Rainfall
2	Surface and Ground water	Surface Water Systems, Drainage Basin as Geohydrological unit, – Basin Hydrological Phenomena- overland flow – base flow – stream flow
		Ground water - Origin & age of ground water, rock properties affecting groundwater permeability. zones of aeration & saturation, aquifers and their characteristics/classification, groundwater basins & springs
		Darcy's Law
3	Water Quality	Principles of water quality, Suspended and Dissolved Solids, EC , pH and Trace constituents , BOD and COD of Water
		Indian and International Standards (i.e., BIS and WHO)
		Water Pollution: Definitions of Water Pollution, Types of water pollution – Agriculture, Domestic, Industrial
		Saline water intrusion related pollution of Aquifer
4	Water Management Practices	Concept and Practice of Water Management
		Traditional Water Harvesting, Storing and Management in Northern India, Western India, Eastern India, Central India, Deccan Plateau, Southern India
		Approaches of Surface Water Management - Watershed based approaches
		Rainwater Harvesting –Significance, Types and Methods
		Artificial groundwater recharge - Concept & methods of artificial ground water recharge
		Wetlands and Micro Watershed Management
		Government of India and State Government Initiatives for Water Management
5	Contemporary Issues and Concepts	Water Conflicts – Cauvery, Krishna, Narmada, Indus System, Ganges, and Brahmaputra System
		Water policy of India – Surface Water and Groundwater
		Mapping Water Foot Print
		Waste Water Reuse
		Water, Climate Change and Sustainable Development

Web References

1. Ministry of Water Resources – <http://wrmin.nic.in/>
2. Ministry of Environment and Forest – <http://envfor.nic.in/>
3. National Institute of Hydrology - <http://www.nihroorkee.gov.in/>
4. UNESCO_IHE Delft Institute of Water Education - <https://www.un-ihe.org/open-courseware>
5. Central Ground Water Board- <http://cgwb.gov.in/>
6. Center for Water Resources Development and Management – <http://www.cwrmd.org/>
7. Kerala State Pollution Control Boards: www.keralapcb.nic.in

Suggested Reading

#	Book Title	Author
1	Modern Physical Geography Strahler	Strahler A. and Strahler
2	Basics of Water Resources- Course Book (UNESCO_IHE)	Pieter van der Zaag
3	Hydrology Principles, Analysis and Design	Raghunath, H.M
4	Hydrology in Practice	Van Nostrand Reibhold
5	Introduction to Hydrology	Viessman, W. and Lewis
6	Principles of Hydrology	Mysooru R. Yadupathi Putty
7	Handbook of Applied Hydrology	Chow, V.T
8	Water Conservation Techniques in Traditional Human Settlements	Pietro Laureano
9	Water Resources-An Integrated Approach	Joseph Holden
10	Water Management: Multiple Dimensions	Rakesh Hooja, Ramesh K. Arora, and K.K. Parnami (eds)

M.Sc. GEOGRAPHY

CHOICE BASED CREDIT SEMESTER SYSTEM (CBCSS) 2019

PRACTICAL COURSES

POSTGRADUATE PROGRAMME IN GEOGRAPHY (M.Sc. Geography)

SYLLABUS

SEMESTER I

PRACTICAL-I

GRY1L01 GEOMORPHOLOGY & CLIMATOLOGY

Instructional hours / week: 5

Credit: 3

Module	Theme	Topics	
1	Profiles	Drawing of serial, superimposed, composite, and projected profiles- Longitudinal profile of a stream	
	Drainage basin analysis	Delineation of basins subdivisions- stream ordering- Strahler's and Horton's method-Bifurcation ratio-Drainage density.	
2	Significance of Slope	Calculation and determination of slopes by	G.H. Smith's method
			Robinson's method
			Wentworth method
		Trend surface analysis	Area-height curve
			Hypsometric curve
			Clinographic curve
		Altimetric frequency curve.	
3	Block diagrams	One point perspective and Two point perspective Block diagrams	
		Preparation of block diagrams from contour maps - Multiple section method	
		Block diagrams representing erosion and depositional features produced by	River
			Glacier,
			Wind
Underground Water			
		Waves	
4	Preparation of Isoleths maps	Isotherms, Isobars, Isohytes, Equipluves, and Equi-Variable maps	
	Preparation of climatic diagrams	Representation of climatic data by columnar and circular graphs, frequency graphs, wind roses. Climatograph	
5	Trend graphs	Running mean, Adjusted profiles, Relative Temperature curve	
		Deviation graphs & Rainfall dispersion diagrams-identification of breaks -merits & demerits.	
	Concept of water balance	Calculation of water balance and determination of climatic types using Thomthwaite's method	
		Index of Aridity	
		Study of Indian Monsoon: Interpreting IMD Data to prepare rainfall distribution and variability Maps	
		Identification and preparation of cyclonic Tracks	

Web References

1. https://www.wou.edu/las/physci/taylor/g322/drainage_anal.pdf
2. <https://www.wou.edu/las/physci/taylor/geog522/rittchp5.pdf>
3. <https://www2.geog.soton.ac.uk/users/leungs/2016-ola2-0506/pdf/GEOG2016%20Basin%20Morphometry%20%20Lecture%202.pdf>
4. <http://geohaunt.org/geohaunt/site/CH.php?i=184>
5. http://irangeomorphology.ir/files/site1/ybakhshi_67841/files/Geomorphological_Mapping.pdf

Suggested Reading

#	Book Title	Author
1	Maps & Diagrams	Monkhouse & Wilkinson
2	Practical Geography	Singh L.R
3	Applied Climatology	Subrahmaniam V.P
4	Skin of the Earth	Austin Miller

POSTGRADUATE PROGRAMME IN GEOGRAPHY (M.Sc. Geography)

SYLLABUS

SEMESTER II

PRACTICAL-II

GRY2L02 GEOGRAPHIC INFORMATION SYSTEM

Instructional Hours/Week: 5

Credit: 3

Module	Theme	Topics
1	Fundamentals of GIS	Exercise 1: Using BHUVAN, Google Earth and Google Maps, Open Street Maps India, MapServer, GeoServer, Map Guide, WRIS
		Introduction to GIS Software (Open Source/ Proprietary as per availability in institution)
		Exercise 2: Scanning a Map, Saving Map in Different file formats and organizing Folders and Files, Naming Folders and Files.
		Exercise 3: Spatial Referencing–Use Sample Maps in Software to check different Coordinate Systems (Fundamentals of Spatial Referencing to discussed: Definition – Reference Surfaces for Mapping – Geoid and the Vertical Datum – the Ellipsoid – the Local Horizontal datum – the Global Horizontal Datum, Coordinate System – 2D geographic Coordinates, 3D Geographic Coordinates, 2D Cartesian Coordinates, 2D polar Coordinates)
		Exercise 4: Uploading Map to GIS platform. Assigning Coordinate values to Map or Georeferencing Map or Spatial referencing, RMS error Checking, Saving spatially referenced Map in TIFF, GIF, IMG formats.
2	Geographic Data and Thematic Visualization	Exercise 5: Creating Geodatabase, Vectorization of Scanned Map, Editing Vector data, (Fundamentals to be discussed: Geographic data – Raster, Vector and Attribute data, Creating and Managing Geodatabases and RDBMS)
		Exercise 6 : Creating and Editing Attribute data, Joining Tables, Adding delimited text layer,
		Exercise 7: Creating and Editing Meta-Data
		Exercise 8: Extracting Spatial data from Google Earth, Saving in KMZ/KML format, adding to GIS platform
		Exercise 9: Using a Handheld GPS to collect spatial data, Transfer and input to GIS
		Exercise 10: Using Mobile Mapping Application to Collect data, Transfer and input to GIS (Suggested Android Apps – MapPad, SW Maps, Mapit etc. Any Mobile mapping application can be used to complete the exercise)
		Exercise 11: Creating Thematic Maps – representing single data, representing multiple data;
		Exercise 12 : Map Layout Setting, Exporting / Saving map in different formats
		Exercise 13: Using ASTER / SRTM data to Prepare DEM, TIN, Slope, Aspect, Contour Maps
		Exercise 14: Extracting Spatial Elevation data from Google Earth web application, Creating DEM and Contour
		Exercise 15: Spatial Analysis - Buffer, Overlay, Union, Network (Fundamentals to be discussed – What is Spatial Analysis, Topology and its significance, Methods of Spatial analysis)
		Exercise 16 : Spatial Analysis - Area Calculation
		Exercise 17: Spatial Analysis – Interpolation (IDW, Kriging, Natural

		Neighbour, Spline) of Rainfall and Groundwater data
		Exercise 18: Interpolation of elevation point data to contours and DEM
5	Application of GIS	Hydrology Applications
		Exercise 18: Watershed Analysis – Delineation, Flow Direction Map, Flow Accumulation, Pour Point fixing, Slope.
		Exercise 19: Stream Ordering (Strahler Method)
		Exercise 20: Modeling in GIS – Watershed Modeling

Web References

1. <https://www.coursera.org/specializations/gis>
2. <http://www.qgistutorials.com/en/>
3. https://docs.qgis.org/2.2/en/docs/training_manual/
4. www.gpsinindia.com:
5. <https://www.gislounge.com/learn-gis-for-free/>
6. <https://www.coursera.org/learn/gis>
7. <https://www.esri.com/training/>
8. <http://index-of.es/Programming/Pragmatic%20Programmers/Desktop%20GIS.pdf>
9. <http://www.geoforall.org/>
10. <http://opensourcegeospatial.icaci.org/>
11. http://www.mdpi.com/journal/ijgi/special_issues/science-applications

Suggested Reading

#	Book Title	Author
1	Geographic Information Systems & Science	Rhind Maguire Goodchild Longley
2	Practical GIS	Gabor Farkas
3	A Practical Guide to Geostatistical Mapping	Tomislav Hengl
4	Practical GIS Analysis	David L. Verbyla
5	A Practical Guide to Geostatistical Mapping	Tomislav Hengl

POSTGRADUATE PROGRAMME IN GEOGRAPHY (M.Sc. Geography)

SYLLABUS

SEMESTER III

PRACTICAL-III

GRY3L03 REMOTE SENSING AND CARTOGRAPHY

Instructional Hours/Week: 5

Credit: 3

		Part I	REMOTE SENSING
Module	Theme	Title	
1	Optical Remote Sensing and Photogrammetry	Exercise. 01. Development and Basic principles of Photogrammetry	
		Exercise. 02. Marginal information of aerial photographs	
		Exercise. 03. Methods of stereoscopic viewing	
		Exercise. 04. Stereographic test	
		Exercise. 05. Interpretation of stereo-pairs for mapping terrain forms	
		Exercise. 06. Land use / Land cover mapping from aerial photographs	
		Exercise. 07. Determination of photo scale	
2	Digital Image Processing	Exercise. 01 Remote Sensing Data Acquisition Mechanism	
		Exercise. 02 Satellite Image Annotation	
		Exercise. 03. Image preprocessing	
		Exercise. 04. Image Enhancement	
		Exercise. 05. Generating False Colour Composite	
		Exercise. 06. Generating Spectral Response Pattern of land cover classes	
		Exercise. 07. Supervised classification of images	
		Exercise. 08. Change Detection Analysis	
3	Appraisal of Topographic Maps	Exercise. 01. Comparative study of maps of different scales prepared by survey of India	
		Exercise. 02. Study of relationship between physical and cultural features represented on the map	
		Exercise. 03. Comparison of Topographic maps and Aerial Photographs	
		Part II	CARTOGRAPHY
4	Map projections	Construction of maps using map projection techniques	Exercise. 01. Significance of map projections in map making
			Exercise. 02. Classification of map projections
			I. Zenithal map projections
			Exercise. 03. Equatorial case of Gnomonic projection
			Exercise. 04. Equatorial case of Stereographic projection
			Exercise. 05. Equatorial case of Orthographic projection
			II. Conical map Projections
			Exercise. 06. Polyconic map projection
			Exercise. 07. International projection
			III. Cylindrical map projections
			Exercise. 08. Mercator's projection
			Exercise. 09. Gall's projection
			IV. Conventional projections

			Exercise. 10. Sinusoidal projections
			Exercise. 11. Molleweide's projection
			Exercise. 12. Interrupted case of sinusoidal projection
			Exercise. 13. Interrupted case of Molleweide's projection
			Exercise. 14. Choice of map projections
5	Surveying		Exercise. 01. Prismatic compass – Open and closed traverse
			Exercise. 02. Plane table – Intersection and Resection
			Exercise. 03. Dumpy level – Preparation of contours
			Exercise. 04. Theodolite – Finding heights of accessible and in accessible points
			Exercise 05. Total Station – Preparation of Plan
			Exercise 06. Survey using Aqua meter

Web Resources

1. <http://www.iirs.gov.in/>
2. <http://srtm.csi.cgiar.org/>
3. <https://asterweb.jpl.nasa.gov/gdem.asp>
4. <https://earthexplorer.usgs.gov/>
5. https://www.wikiwand.com/en/Indian_Remote_Sensing
6. http://bhuvan.nrsc.gov.in/bhuvan_links.php
7. https://nrsc.gov.in/IRS_Data_Products
8. <http://www.geo-informatie.nl/courses/grs10306/Materials/Practical/1%20Manual/000%20Practical%20manual%202010.pdf>

Suggested Reading

#	Book Title	Author
1	Elements of Cartography	Arthur H. Robinson
2	Statistical Methods in Geographical Studie	Aslam Mahmood
3	Cartographic Methods	G R P Lawernce
4	Cartography – Visualization of Geospatial Data	Menno-Jan Kraak & Ferjan Ormeling
5	Quantitative techniques in Geography	R. Hammond & P Mccullagh
6	Fundamentals of Cartography	R P Misra

POSTGRADUATE PROGRAMME IN GEOGRAPHY (M.Sc. Geography)

SYLLABUS

SEMESTER IV

PRACTICAL-IV

GR4L04 QUANTITATIVE TECHNIQUES IN GEOGRAPHY

Instructional hours/ week: 5

Credit: 3

Module	Theme	Contents	
1.	Introduction	Meaning, development and significance of quantitative techniques in geography	
		Models: Problem solving techniques (problems of scale, field work, outline of the method, constructing the hypothesis, collecting and portraying information and analysis of information).	
2.	Statistics	Measures of central tendency-	
		Measures of variation- mathematical methods and graphical methods	
		Lorenz curve	
		Semi log graph	
		Triangular graph	
		Centro graphic analysis	
		Mean centre & median centre and standard distance	
		Normal curve and properties of normal curve	
3.	Sampling	Measures of Skewness and Kurtosis- Residual mapping.	
		Hypothesis testing – student t-test & chi-square test	
		Measures of spatial distribution	
4	Application of Quantitative Techniques	Agricultural Geography	Agricultural regionalization methods- Crop combination methods- Weaver and Rafiullah, Crop concentration method- Location quotient and crop diversification method- R.L Bhatia, Agricultural productivity, Land capability classification, etc
		Settlement Geography	Urban morphology, Nearest neighbor analysis, Demongeons co-efficient of dispersion, Simple index dispersion, Bernard's index of concentration, Kant's index of concentration, density of housing
		Population Geography	Surveys, Crude birth rate, death rate, fertility ration , Growth-Malthusian theory, Population pyramid, spatial diffusion-diffusion study of local area)
		Transport Geography	Transport network analysis- measures of accessibility, connectivity and efficiency of transport network- degree of development of network. Diameter, density and route shape of network).-
		Industrial and Economic Geography	Industrial location , correlation, Regression
5.	Sources of Statistics And Statistical Organisations	Census of India	
		Pre and post independence period- Central statistical organization (CSO)- National sample survey organization (NSSO)	
		Population statistics	
		Agricultural statistics- Livestock and poultry statistics	
		Trade statistics-	
		Labour statistics-National income statistics- Financial statistics.	
Tourism Statistics			

Web References

1. https://www.wikiwand.com/en/Quantitative_revolution
2. <http://ludwig.missouri.edu/405/quantitative.pdf>
3. <https://www.inflibnet.ac.in/ojs/index.php/JARG/article/view/223>

Suggested Reading

#	Book Title	Author
1	Statistical methods and the geographer	MGSU, Bikaner Gregory S
2	Applied General Statistics	Growzon & Cowden
3	Locational Analysis in Human Geographical Studies	Hagget, P
4	Statistical Concepts in Geography	John Silk
5	Multivariate Statistical Analysis in Geography	Johnston, R J
6	Statistical Analysis in Geography	King, T J:
7	Statistical Methods in Geographical Studies	Mahmood A
8	Statistics for Geosciences Techniques and Applications	Saroj K Pal
9	Quantitative methods in geographical research	Najma Khan
10	Quantitative Geography	R.G.Woodcock and M.J.Bailey

M.Sc. GEOGRAPHY

CHOICE BASED CREDIT SEMESTER SYSTEM (CBCSS) 2019

AUDIT COURSES

AUDIT COURSES

Semester	Course Code	Course Title	Instructional hours / Week	Continuous Assessment (internal) (in %)	End Semester Evaluation (External) (in %)	Credit
I & II	AC1AEC	Ability Enhancement Course	-	100	-	4
	AC2PCC	Professional Competency Course	-	100	-	4

AC1AEC - GIS AND HYDROLOGICAL APPLICATION	
1	Introduction to Open Source /Proprietary software for GIS and hydrological modeling;
2	Spatial Data Infrastructures for Open Access Water Data;
3	Using Open Source /Proprietary software to digitize vector layers from a scanned map;
4	Using Open Source /Proprietary software for importing tabular data into GIS, data correction and interpolation;
5	Using Open Source /Proprietary software for catchment and stream delineation;
6	Data visualization (2D/3D) and map design
7	Preparation of Thematic Maps

AC2PCC – RIVER BASIN MODELLING USING SWAT	
1	Introduction to Open Source /Proprietary software for GIS and hydrological modeling;
2	Spatial Data Infrastructures for Open Access Water Data;
3	Using Open Source /Proprietary software to digitize vector layers from a scanned map;
4	Using Open Source /Proprietary software for importing tabular data into GIS, data correction and interpolation;
5	Using Open Source /Proprietary software for catchment and stream delineation;
6	File conversions using GDAL and Python;
7	An overview of the SWAT model and wide range of applications across the world.
8	Data needs, possible sources and required formats for input into the model
9	Theory and practice on the SWAT calibration and validation
10	.Development of a SWAT model for a selected case study basin

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