Chowgule Education Society's

Parvatibai Chowgule College of Arts and Science

(Autonomous)

Accredited by NAAC with Grade 'A+'

Best Affiliated College-Goa University Silver Jubilee Year Award

DEPARTMENT OF GEOGRAPHY AND RESEARCH CENTRE

SYLLABUS FOR POST GRADUATE DEGREE PROGRAMME IN GEOGRAPHY

(Implemented from the Academic Year 2023-2024 onwards)

Annexure A

Parvatibai Chowgule College of Arts and Science (Autonomous)
Department of Geography and Research Centre
NEP 2020
Course Structure and Syllabus: M.A. Geography
Approved in the Academic Year 2023-2024

Sem/ Level	Core	Course 1	Course 2	Course 3	Course 4	Course 5
I/400	**Core 4 Credits**	Advanced Geomorphology	Advanced Climatology	Introduction to Remote Sensing	Advanced Cartographic Skills in Geography	
I/400	**Elective 2 Credits**	Advanced Regional Planning and Development	Techniques of Regional Analysis	Environment Impact Assessment	Natural Resources Management in India	Climate Change and Adaptations
II/400	**Core 4 Credits**	Advanced Population Studies in Geography	Advanced Economic Geography	Introduction to Geographic Information System	Field Techniques and Village Survey	
II/400	**Elective 2 Credits**	Techniques of Disaster Management, Mitigation and Resilience	Geographical Thought	Advanced Urban Geography	Soil and Water Resource Management	Geography of India
III/500	**Generic Elective 4 Credits**	Regional Perspectives of Geopolitics	Geography of Wellbeing with Special Reference to India	Cultural Geography		
III/500	**Discipline Specific Elective 8 Credits**	Tropical Climatology	Biogeography	Geography & Disaster Management		
III/500	**Research Specific Elective 8 Credits**	Fundamentals of Research Methodology	Quantitative Techniques			

IV/500	**Research Specific Elective 4 Credits**	Digital Cartography in Geographical Research				
IV/500	**Dissertation/ Internship** **16 Credits**	Dissertation/ Internship				

Semester I and II Level 400 Courses

- Any two electives to be chosen in Semester I/II
- Bridge Course for level 400 Courses
- Generic Elective can be opted across the departments
- Electives 401 and 402 should be taken together

Semester	Course Code	Course Title (T/P)	Credits (T+P)
Semester I Level 400 Discipline Specific Core			
I	PGMP –GEG-DSC-401	Advanced Geomorphology (T/P)	3+1
I	PGMP –GEG- DSC-402	Advanced Climatology (T/P)	3+1
I	PGMP –GEG- DSC-403	Introduction to Remote Sensing	2+2
I	PGMP –GEG- DSC-404	Advanced Cartographic Skills in Geography	2+2
Semester I Level 400 Discipline Specific Elective			
I	PGMP –GEG-DSE- 401	Advanced Regional Planning and Development	2
I	PGMP –GEG-DSE- 402	Techniques of Regional Analysis	2
I	PGMP –GEG-DSE- 403	Environment Impact Assessment	2
I	PGMP –GEG-DSE- 404	Natural Resources Management in India	2

I	PGMP –GEG-DSE- 405	Climate Change and Adaptations	2
Semester II Level 400 Discipline Specific Core			
II	PGMP –GEG-DSC-405	Advanced Population Studies in Geography	3+1
II	PGMP –GEG- DSC-406	Advanced Economic Geography	3+1
II	PGMP –GEG- DSC-407	Introduction to Geographic Information System	2+2
II	PGMP –GEG- DSC-408	Field Techniques and Village Survey	2+2
Semester II Level 400 Discipline Specific Elective			
II	PGMP –GEG-DSE- 406	Techniques of Disaster Management, Mitigation and Resilience	2
II	PGMP –GEG-DSE- 407	Geographical Thought	2
II	PGMP –GEG-DSE- 408	Advanced Urban Geography	2
II	PGMP –GEG-DSE- 409	Soil and Water Resource Management	2
II	PGMP –GEG-DSE- 410	Geography of India	2

Semester III Level 500 Courses

- Generic Elective (GE) Total 04 credits (Any one course with 04 credits).
- Generic Elective (GE) can be opted across the departments.
- Discipline Specific Elective (DSE) Total 08 credits (Any two courses with 04 credits each).
- Discipline Research Specific Elective (DRSE): Total 08 credits (Two courses with 04 credits each).

Semester	**Course Code**	**Course Title (T/P)**	**Credits (T)**
Semester III Level 500 Generic Electives (GE)			
III	PGMP–GEG-GE- 501	Regional Perspectives of Geopolitics	04
III	PGMP–GEG-GE- 502	Geography of Wellbeing with Special Reference to India	04

III	PGMP–GEG-GE- 503	Cultural Geography	04
Semester III Level 500 Discipline Specific Elective (DSE)			
III	PGMP–GEG-DSE- 501	Tropical Climatology	04
III	PGMP–GEG-DSE- 502	Biogeography	04
III	PGMP–GEG-DSE- 503	Geography & Disaster Management	04
Semester III Level 500 Discipline Research Specific Elective (DRSE)			
III	PGMP–GEG-DRSE- 501	Fundamentals of Research Methodology	04
III	PGMP–GEG-DRSE- 502	Quantitative Techniques	04

Semester IV Level 500 Courses

- Research Specific Elective (RSE): Total 04 credits (One course with 04 credits).
- Discipline Specific Dissertation/Internship (DSD/I) Total 16 credits.

Semester	**Course Code**	**Course Title (T/P)**	**Credits (T+P)**
Semester IV Level 500 Research Specific Elective (RSE)			
IV	PGMP-GEG-RSE-501	Digital Cartography in Geographical Research	04 (02+02)
Semester IV Level 500 Discipline Specific Dissertation/Internship (DSD/I)			
IV	PGMP-GEG-DSD/I -501	Dissertation/Internship	16

Annexure A

SEMESTER I Level 400 Discipline Specific Core

Course Title: Advanced Geomorphology
Course Code: PGMP –GEG-DSC- 401
Credits: 03
Marks: 75
Duration: 45 Hours of 1 hour each

Pre-requisite Courses:

- Basic knowledge about geomorphic concepts

Course Objectives:

1. To understanding the natural processes which act on the earth's surface, shaping landforms.
2. To perform absolute dating techniques to find the ages of geological formation.
3. Assess the roles of structure, stage and time in shaping the landforms, interpret geomorphological maps and apply the knowledge in geographical research.
4. To develop skills in landform recognition and interpretation of geological features and maps

Course Learning Outcomes:

After successful completion of the course the students will be able to:

CLO1: Understand the dynamics of the physical geography including the origin of the Earth and its evolution through geologic time scale.
CLO2: Differentiate various process in landform formations which shapes the earth.
CLO3: Analyse the relationship between folding, faulting, volcanic activity, and plate tectonics.
CLO4: Applying geomorphology skills in Disaster management and planning.

Module I	Concept of geomorphology and Geo tectonic : Fundamental Concepts in Geomorphology, Theories of Landform Development, (L.C King, Wood, John Hack and Frank Ahnert) Geomorphic Dating Methods: Radiocarbon dating, tree-ring dating (Dendrochronology), and Lichenometry.) Tropical Geomorphology: Recent advancement in Geo-tectonics- Plate tectonics, Geosynclines and Geo-magnetism	(15 Hours)
Module II	Polycyclic reliefs. Weathering in Tropical areas Denudation processes, Landforms in humid tropics.	(15 Hours)

Module III	Applied Geomorphology: Role of Geomorphology in Hazard management and mitigation Application of geomorphology in planning and development	(15 Hours)

References:

Mandatory:

1. Thornbury, W. D. (2013) Principles of Geomorphology. New Delhi: New Age International Limited Publishers.
2. Gupta A. (2011) Tropical Geomorphology, Cambridge University Press.
3. Christopherson, Robert W., (2011) Geosystems: An Introduction to Physical Geography, 8 Ed., Macmillan Publishing Company.
4. Singh, S. (2006) Physical Geography. Allahabad: Prayag Pustak Bhavan.
5. Allision, R. (2002) Applied Geomorphology: Theory and Practices, Wiley Europe.
6. Bloom A. L. (2003) Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, New Delhi.
7. Kale, V. and Gupta, A. (2001) Introduction to Geomorphology, Orient Longman, Kolkata.

Supplementary:

1. Siddhartha, K. (2013). The Earth's Dynamic Surface. New Delhi: Kisalaya Publications Pvt. Limited.
2. Goudie Andrew (2014), Encyclopedia of Geomorphology, Volume I, Routledge Publication.
3. Goudie Andrew (2014), Encyclopedia of Geomorphology, Volume II, Routledge Publication.
4. Selby, M.J. (2005) Earth's Changing Surface, Indian Edition, OUP.

Web References:

1. http://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S000017GE/P001786/M025400/ET/1512631234UGCModuleofAppliedGeomorphologyfinal.pdf
2. https://www.nationalgeographic.org/encyclopedia/uniformitarianism/
3. http://studymaterial.unipune.ac.in:8080/jspui/bitstream/123456789/4495/1/Gg.111%20davis%20theory.pdf
4. https://study.com/academy/lesson/isostasy-definition-equation-examples.html
5. https://www.geographynotes.com/geomorphology/7-major-geomorphic-theories-of-landform-development/686
6. https://www.bbc.co.uk/bitesize/guides/z83nj6f/revision/2
7. https://lotusarise.com/applied-geomorphology-upsc/
8. https://onlinelibrary.wiley.com/doi/abs/10.1002/9781118786352.wbieg0144#:~:text=Applied%20geomorphology%20is%20a%20field,to%20problems%20of%20geomorphic%20context.

Course Title: Advanced Geomorphology (Practical)
Course Code: PGMP –GEG-DSC- 401
Credits: 01
Marks: 25
Duration: 15 Practical of 2hrs each

Module I	Geomorphic Mapping: Morphometric Analysis (Drainage Basin) Geomorphic mapping Sediment size Analysis	(20 sessions)
Module II	Field work: Observation of faults lineament and rocks.Measurement of channel cross-sections in the field, Study of erosional and depositional features in the field (river and coast).	(10 sessions)

References:

Mandatory:

1. Khullar D. R. (2007) Essentials of Practical Geography, New Academic Publishing Co. Jalandhar.
2. Strahler A. (2016) Introducing Physical Geography, 6th ed., Wiley.
3. SinghR. L. and Singh P. B. R. (2014) Elements of Practical Geography, Kalyani Publishers, New Delhi.
4. Singh, R. B. (ed.), (2006). Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications Delhi, India.
5. Kale, V. and Gupta, A. (2001) Introduction to Geomorphology, Orient Longman, Kolkata.

Supplementary:

1. Khullar D. R. (2007) Essentials of Practical Geography, New Academic Publishing Co. Jalandhar.
2. Sarkar, A. (2015) Practical Geography: A systematic approach, Orient Black Swan Private Ltd., New Delhi.
3. Siddhartha, K. (2013). The Earth's Dynamic Surface. New Delhi: Kisalaya Publications Pvt. Limited.

Web References:

1. https://www.geog.ucl.ac.uk/resources/laboratory/laboratory-methods/particle-size-analysis/particle-size-analysis-for-soils-sediments
2. https://www.fsl.orst.edu/geowater/FX3/help/3_Running_FishXing/Crossing_Input_Window/Tailwater_Methods/Channel_Cross_Section_Method.htm
3. https://irangeomorphology.ir/files/site1/ybakhshi_67841/files/Geomorphological_Mapping.pdf
4. https://www.hindawi.com/journals/geography/2014/927176/
5. https://www.geomorphology.org.uk/sites/default/files/geom_tech_chapters/2.6_GeomMapping.pdf
6. https://www.youtube.com/watch?v=BJR8drMF7yI
7. https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/2008JF001092#:~:text=The%20hypsometric%20curve%20represents%20the,Keller%20and%20Pinter%2C%202002%5D.
8. https://www.youtube.com/watch?v=u6q7u2lIW_M

Course Title: Advanced Climatology
Course Code: PGMP –GEG-DSC- 402
Credits: 03
Marks: 75
Duration: 45Hours of 1 hour each

Pre-requisite Courses: NIL

Course Objectives:

1. To develop knowledge of the structure of the atmosphere and atmospheric phenomena and
2. To understand the nature and scope of modern study of climate by imparting latest knowledge about the basic thermal and dynamical atmospheric processes operating at different spatial and temporal scales
3. To understand climatic variability and change to the issue of current and future global environmental change.
4. To explain weather generation systems of the atmosphere and how they influence Climate of the world and regions in the long term

Course Learning Outcomes:

After successful completion of the course the students will be able to:

CLO1: Develop in depth basic knowledge of atmospheric weather and climate and the structure of the atmosphere.

CLO2: Understand and explain how temperature, pressure, humidity and wind motion vary in time and space and their effect on weather.

CLO3: Understanding the characteristics of climatic regions.

CLO4: Apply knowledge on upper atmospheric conditions and cyclonic features.

Module I	Atmospheric Motions: Atmospheric humidity and Condensation, Fog Clouds and Precipitation, Air masses, Fronts and Glacial Lake Outburst (GLO) Precipitation Theories: Ice-crystal theory, Collision-Coalescence Theory	(15 Hours)
Module II	Monsoon Dynamics: Theories of Monsoonal Circulation. Indian Ocean Dipole, Madden-Julian Oscillation index. Atmospheric stability and instability Jet streams, ENSO Events. Western Disturbances and Easterly waves.	(15 Hours)

Module III	Climatic Classification and Disturbances: Climatic Classification – Koppen and Thornthwaite classification, Genesis and impacts of Atmospheric disturbances: Cyclones and anti-cyclones, Thunderstorms, Tornadoes, Hailstorms, Heat and Cold waves,	(15 hours)

References:

Mandatory:

1. Lal, D. S. (2003). Climatology. Allahabad: Sharda Pustak Bhawan.
2. Oliver, J. E. (2002). Climatology: An Atmospheric Science. Noida: Pearson Education India.
3. Rohli, R. V., & Vega, A. J. (2017). Climatology. Burlington: Jones & Bartlett Learning.
4. Strahler, A. (2013). Introducing Physical Geography (6 ed.). New York: Wiley.
5. Thompson, R., & Perry, A. (1997). Applied Climatology. New York: Routledge.
6. Trewartha, G. T. (1980). An Introduction to Climate (5 ed.). New York: McGraw Hill.

Supplementary:

1. Singh, S.(2020). Climatology. Pravalika Publications. Allahabad.
2. IPCC, 2013. Climate Change 2013: The Physical Science Basis, the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, Moduleed Kingdom and New York, NY, USA,
3. Chawan S.V. (ed) (2015): Physical Geography, Paper I, Published by Director (I/C), Institute of Distance and Open Learning, University of Mumbai.

Web References:

1. https://www.imdpune.gov.in/training/training%20notes/Climatology-IMTC.pdf
2. https://samples.jbpub.com/9781284032307/9781284028775_CH01_Rohli3e_SECURE.pdf
3. https://en.wikibooks.org/wiki/Climatology/Introduction
4. https://assamhistory.com/climatology/
5. https://www.pmfias.com/climatology/

Course Title: Advanced Climatology (Practical)
Course Code: PGMP –GEG-DSC- 402
Credits: 01
Marks: 25
Duration: 15 Practical of 2hrs each

Module I	Temperature and Rainfall Analysis: Collection and Processing of atmospheric data Analysis of atmospheric data – Tephigram (Temperature-Height diagram) Classification of climate based on Koppen and Thornthwaite's Climatic classification. Discomfort index by Thom's (1959) method. Identification and categorization of heat and cold waves. Calculation of decadal rainfall deviation.	(18 sessions)
Module II	Water Budget: Computation of water budget and water deficit amounts during crop growing season. Computation of Water Requirement Satisfaction index. Construction of crop-coefficient curve for any one crop.	(12 sessions)

References:

Mandatory:

1. Lal, D. S. (2003). Climatology. Allahabad: Sharda Pustak Bhawan.
2. Oliver, J. E. (2002). Climatology: An Atmospheric Science. Noida: Pearson Education India.
3. Rohli, R. V., & Vega, A. J. (2017). Climatology. Burlington: Jones & Bartlett Learning.
4. Strahler, A. (2013). Introducing Physical Geography (6 ed.). New York: Wiley.
5. Thompson, R., & Perry, A. (1997). Applied Climatology. New York: Routledge.
6. Trewartha, G. T. (1980). An Introduction to Climate (5 ed.). New York: McGraw Hill.

Supplementary:

1. Aguado, E. Burt, J.E. (2001): Understanding Weather and Climate, Prentice Hall of India Pvt. Ltd, New Delhi.
2. Critchfield, H.J. (1983): General Climatology, Prentice Hall of India, New Delhi.
3. Oliver John, E. and Hidore John, J. (2003): Climatology, Pearson Education.

4. Oliver, J. E., and Hidore J. J., (2002): Climatology: An Atmospheric Science, Pearson Education, New Delhi.
5. Trewartha, G. T., and Horne L. H., (1980): An Introduction to Climate, McGraw-Hill

Course Title: Introduction to Remote Sensing
Course Code: PGMP –GEG-DSC- 403
Credits: 02
Marks: 50
Duration: 30 hours

Prerequisite Courses: Nil

Course Objectives:

1. To introduce basics of remote sensing and its importance.
2. Attain a foundational knowledge and comprehension of the physical computational and perceptional bias of remote sensing.
3. To attain the data collection processes in remote sensing.
4. Aware and use of modern techniques in geography through remote sensing.

Course Outcomes:

At the end of this course, students will be able to:
CLO1: Understand basic principles of remote sensing.
CLO2: Compare traditional vs. modern techniques of remote sensing.
CLO3: Explain basic computational properties of remote sensing.
CLO4: Classify the different datasets and products of remote sensing applications.

Module I	Introduction to Remote Sensing system, Satellites and Aerial Photographs: Remote Sensing: principles, historical development, satellite and sensors, concept of resolution, photography vs. image. Aerial photography: stereoscopy, principles of aerial photo interpretation	(15 Hours)
Module II	Electro-magnetic Radiation, and Spectral Signatures: Electromagnetic radiation principles; interaction mechanism with atmosphere and earth surfaces; spectral responses of earth surface features, visual interpretation of satellite images	(15 Hours)

References:

Mandatory:

1. Bossler J.D (2002), Manual of Geospatial Science and Technology, Taylor and Francis, London.
2. Girard M.C and Girard C.M (2003), Processing of Remote Sensing Data, Oxford & IBH, New Delhi.
3. John R. Jensen (2000), Remote Sensing of the environment: An earth resource perspective, Pearson publication.
4. John.Wiley and Sons. Pradip Kumar Guha (2013), Remote Sensing for the beginner, Third Edition, East-West Press, New Delhi.

5. Suresh S and Mani K., (2017), Application of Remote Sensing in understanding the relationship Between NDVI and LST, IJRET, Vol. 6, Issue: 02.

Supplementary:

1. Campbell, J.B.2002: Introduction to Remote Sensing. Taylor Publications
2. Jensen, J.R. 2000: Remote Sensing of the Environment: An Earth Resource Perspective. Prentice Hall.
3. Joseph George, 2003: Fundamentals of Remote Sensing. Universities Press

Web references:

1. https://www.usgs.gov/faqs/what-remote-sensing-and-what-it-used#:~:text=Remote%20sensing%20is%20the%20process,sense%22%20things%20about%20the%20Earth.
2. https://oceanservice.noaa.gov/facts/remotesensing.html
3. https://gisgeography.com/remote-sensing-earth-observation-guide/

Course Title: Introduction to Remote Sensing (Practical)
Course Code: PGMP –GEG-DSC- 403
Credits: 02
Marks: 50
Duration: 60 hours

Prerequisite Courses:

1. Basic knowledge of Remote Sensing
2. Bridge course is compulsory who have not completed Remote Sensing at under graduate level

Course Objective:

1. To introduce basics of remote sensing and its importance.
2. Attain a foundational knowledge and comprehension of the physical computational and perception bases of remote sensing.
3. To attain the data collection processes in remote sensing.
4. Aware and use of modern techniques in geography through remote sensing.

Course Outcomes:

At the end of this course, students will be able to:

CLO1: Understand traditional v/s modern techniques of remote sensing.

CLO2: Understand and recognize and explain basic computational properties and remote sensing.

CLO3: Classify the different datasets and products of remote sensing applications.

Module I	Data Representation& Accessing Web Resources: Downloading free satellite data: Multispectral Data and Digital Elevation Data Introduction to Remote Sensing Software, Image visualization. Comparison of images with various resolution concepts Basic calculations (scale, height of objects) on aerial photographs Visual Interpretation of Aerial Photographs Colour composite in remote sensing software Visual interpretation of satellite images.	(30 sessions)
Module II	Image Interpretation, Image Classification & Change Detection: Image Correction, PCA and indices, Image classification techniques, Accuracy Assessment, Area calculations, Change Detection in land use pattern	(30 sessions)

Reference Books:

Mandatory:

1. Bossler J.D (2002), Manual of Geospatial Science and Technology, Taylor and Francis, London.
2. Girard M.C and Girard C.M (2003), Processing of Remote Sensing Data, Oxford & IBH, New Delhi.
3. John R. Jensen (2000), Remote Sensing of the environment: An earth resource perspective, Pearson publication.
4. John.Wiley and Sons. Pradip Kumar Guha (2013), Remote Sensing for the beginner, Third Edition, East-West Press, New Delhi.
5. Suresh S and Mani K., (2017), Application of Remote Sensing in understanding the relationship Between NDVI and LST, IJRET, Vol. 6, Issue: 02.

Supplementary:

1. Campbell, J.B.2002: Introduction to Remote Sensing. Taylor Publications
2. Jensen, J.R. 2000: Remote Sensing of the Environment: An Earth Resource Perspective. Prentice Hall.
3. Joseph George, 2003: Fundamentals of Remote Sensing. Universities Press

Web references:

1. https://www.usgs.gov/faqs/what-remote-sensing-and-what-it-used#:~:text=Remote%20sensing%20is%20the%20process,sense%22%20things%20about%20the%20Earth.
2. https://oceanservice.noaa.gov/facts/remotesensing.html
3. https://gisgeography.com/remote-sensing-earth-observation-guide/
4. http://www.ai.soc.i.kyoto-u.ac.jp/field_en/english_textbook/RemoteSensing_1.
5. https://www.iwmi.cgiar.org/assessment/files/word/Workshops/ILRI-March/Presentations/Atsmachew.pdf

Course Title: Advanced Cartographic Skills in Geography
Course Code: PGMP –GEG-DSC- 404
Credits: 02
Marks: 50
Duration: 30 hours

Pre-requisite Courses: Students must have knowledge of cartography skills such as scales and map types.

Course Objectives:

1. Understand what a survey, pre-requisites and post field work practices.
2. Apply various field based methods for data collection.
3. Design and formulate survey plans and questionnaires.

Course Learning Outcomes: After successful completion of the course the students will be able to:

CLO1: Will be able to perform survey techniques in different terrain and conditions.
CLO2: Will be able to prepare and test questionnaire.
CLO3: Enhancement of skills in using of various field instruments like GPS & DGPS in survey.
CLO4: Able to create plans and map layouts using cartography skills.

Module I	Map Scales and Projections: Elements of Maps Types and classification of Maps Indexing of Maps - SOI Toposheet, USGS Maps Map Projections and datum-Concept and Types	(15 Hours)
Module II	Computer Aided Cartography: Data Entry, Editing, Sorting and Retrieval DBMS (Data Base Management System) Interpolation and Extrapolation	(15 Hours)

References:

Mandatory:

1. Kraak M.-J. and Ormeling F., 2003: Cartography: Visualization of Geo-Spatial Data, Prentice-Hall
2. Mishra R.P. Ramesh. A 2000, Fundamentals of Cartography. Concept Publishing Company, New Delhi.
3. Robinson A. H., 2009: Elements of Cartography, John Wiley and Sons, New York.
4. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
5. Peterson, G.N. 2009. GIS Cartography, A Guide to effective map designing, CRC Press.

Supplementary:

1. Singh &Karanjta., 1972. Map work and Practical Geography Central Book Dept Allahabad 1972.
2. Singh, R.L.andDutt, P.K., 1968. Elements of Practical Geography, Students Friends, Allahabad.1968.

Web references:

1. http://uregina.ca/~sauchyn/geog411/
2. https://www.arcgis.com/home/item.html?id=12bde0260dd84c148446072c52c7c9d2
3. https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1015&context=geographyfacpub
4. https://www.sciencedirect.com/topics/earth-and-planetary-sciences/field-survey
5. https://methods.sagepub.com/reference/encyclopedia-of-survey-research-methods/n187.xml

Course Title: Advanced Cartographic Skills in Geography (Practical)
Course Code: PGMP –GEG-DSC- 404
Credits: 02
Marks: 50
Duration: 60 hours

Module I	Map Scales and Projections: Map Projections – Conical, Cylindrical, Zenithal (3 each) Types and classification of Maps Classification of Colour Schemes, for various data representation, Lettering of map	(30 sessions)
Module II	Data Representation: Data Analysis: Processing of Data; tabulation, graphic presentation and analysis of Data (using Excel)	(30 sessions)

References:
Mandatory:

1. Kraak M.-J. and Ormeling F., 2003: Cartography: Visualization of Geo-Spatial Data, Prentice-Hall
2. Mishra R.P. Ramesh. A 2000, Fundamentals of Cartography. Concept Publishing Company, New Delhi.
3. Robinson A. H., 2009: Elements of Cartography, John Wiley and Sons, New York.
4. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
5. Peterson, G.N. 2009. GIS Cartography, A Guide to effective map designing, CRC Press.

Supplementary:

1. Singh &Karanjta., 1972. Map work and Practical Geography Central Book Dept Allahabad 1972.
2. Singh, R.L.andDutt, P.K., 1968. Elements of Practical Geography, Students Friends, Allahabad.1968.

Web references:

1. http://uregina.ca/~sauchyn/geog411/
2. https://www.arcgis.com/home/item.html?id=12bde0260dd84c148446072c52c7c9d2
3. https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1015&context=geographyfacpub
4. https://www.sciencedirect.com/topics/earth-and-planetary-sciences/field-survey
5. https://methods.sagepub.com/reference/encyclopedia-of-survey-research-methods/n187.xml

Discipline Specific Electives

Course Title: Advanced Regional Planning and Development
Course Code: PGMP –GEG-DSE- 401
Credits: 02
Marks: 50

Prerequisite Courses: NIL

Course Objectives:

1. To equip the students with the knowledge of regions: in terms of typology, functions and to prepare planning for the regions through the understanding of land, infrastructure, climate, etc
2. To understand the structure and nature of development and planning process and different levels.

Course Learning Outcomes:

After successful completion of the course the students will be able to

CLO1: Understand regional planning and its importance to regional development.
CLO2: Differentiate types of regions in context of formal and functional regions for development purpose and sustainable practices in regional planning and development.
CLO3: Support the concept of multi-level planning and decentralized planning and the participation of people in planning process.

Module I	Concept and Types of regions: Concept of Region in geography, approaches and applications to regional planning concept of space, area and locational attributes. Types of regions, hierarchy; Delineation of different types of regions and their utility in planning.	(15 Hours)
Module II	Regional case studies and applications: Planning process – sectoral, temporal and spatial dimensions; short-term and long-term perspectives of planning Physical regions, resource regions, regional divisions according to variations in levels of socio-economic development; Special purpose regions: river valley regions, metropolitan regions, Problem regions-hilly regions, tribal regions, regions of drought and floods. Indicators of development and their data sources,	(15 Hours)

measuring levels of regional development and disparities –A case study from ~~of~~ India.

References:

Mandatory:

1. Glasson, J. (2017) Contemporary Issues in Regional Planning, Routledge.
2. Chandana, R.C. (2016) Regional Planning and Development, 6th ed, Kalyani Publishers.
3. Kumar, A., Meshram, D.S., Gowda, K. (Eds) (2016) Urban and Regional Planning Education: Learning for India, Springer.
4. Town and Country Planning Organisation, (2015) Ministry of Urban and Development Plan Formulation and Implementation (URDPFI) Guidelines, Government of India, Ministry of Urban Development, Vol. 1.
5. Bhargava, G. (2001) Development of India's Urban, Rural, and Regional Planning in 21st Century: Policy Perspective, Gyan Publishing House.
6. Chand, M., Puri, V.K. (2000) Regional Planning In India, Allied Publishers Ltd.

Supplementary:

1. Higgins, B., Savoie, D.J. (2017) Regional Development: Theories and Their Application, Routledge .
2. Gore, C. (2011) Regions in Question: Space, Development Theory, and Regional Policy, Routledge.
3. Ray, J. (2001) Introduction to Development & Regional Planning, Orient Blackswan.

Web references:

1. https://mohua.gov.in/upload/uploadfiles/files/URDPFI%20Guidelines%20Vol%20I(2).pdf
2. https://rdavisaphgfinal.weebly.com/nature-and-perspectives/types-of-regions
3. https://www.albert.io/blog/regions-ap-human-geography-crash-course/
4. http://www2.harpercollege.edu/mhealy/g101ilec/intro/int/g3intrfr.htm
5. https://www.brainkart.com/article/Approaches-to-the-Study-of-Geography_33741/
6. https://geographyandyou.com/regional-development-and-planning-in-india/
7. https://mitpress.mit.edu/books/regional-development-and-planning
8. https://journals.sagepub.com/doi/10.1177/016001760102400307

Course Title: Techniques of Regional Analysis
Course Code: PGMP –GEG-DSE- 402
Credits: 02
Marks: 50
Duration: 30 hours

Prerequisite Courses: Nil

Course Objectives:

1. To equip the students with the knowledge of regions: in terms of typology, functions and to prepare planning for the regions through the understanding of land, infrastructure, climate, etc
2. To understand the structure and nature of development and planning process and different levels.
3. To create an understanding of reserve utilization in terms of sustainable development.

Course Learning Outcomes:

After successful completion of the course the students will be able to

CLO1: Differentiate types of regions in context of formal and functional regions for development purpose.
CLO2: Determine the importance of sustainable practices in regional planning and development.
CLO3: Support the concept of multi-level planning and decentralized planning and the participation of people in planning process.

Module I	Introduction: origin, growth, scope and nature of regional science. Attributes of Regional Analysis- Physical and Cultural Case study of Physical and Cultural Attributes.	(15 Hours)
Module II	Regional Economic Analysis: regional income estimation and social accounting; interregional flow analysis and balance of payment statements; regional cycle and multiplier analysis; regional industrial location and complex analysis; interregional and regional input-output techniques. Decision Analysis: game theory and decision analysis	(15 Hours)

References:

Mandatory

1. Glasson, J. (2017) Contemporary Issues in Regional Planning, Routledge.
2. Chandana, R.C. (2016) Regional Planning and Development, 6th ed, Kalyani Publishers.

3. Kumar, A., Meshram, D.S., Gowda, K. (Eds) (2016) Urban and Regional Planning Education: Learning for India, Springer.
4. Bhargava, G. (2001) Development of India's Urban, Rural, and Regional Planning in 21st Century: Policy Perspective, Gyan Publishing House.
5. Chand, M., Puri, V.K. (2000) Regional Planning In India, Allied Publishers Ltd.

Supplementary:

1. Higgins, B., Savoie, D.J. (2017) Regional Development: Theories and Their Application, Routledge .
2. Gore, C. (2011) Regions in Question: Space, Development Theory, and Regional Policy, Routledge.
3. Ray, J. (2001) Introduction to Development & Regional Planning, Orient Blackswan.

Web References:

1. http://www.economia.unam.mx/cedrus/descargas/Methodsofregionalanalysis.pdf
2. https://library.fiveable.me/ap-hug/Module-1/regional-analysis/study-guide/KBREMrUx0XlbNmfha937
3. https://globalchange.mit.edu/research/focus-areas/regional-analysis
4. https://static1.squarespace.com/static/5887c80b86e6c0638ec11e45/t/5afc25c4562fa76042f3c270/1526474184866/CB714+-+Part+3.pdf
5. https://ideas.repec.org/a/bla/presci/v1y1955i1p227-247.html
6. http://www.usp.br/nereus/wp-content/uploads/Industrial-location.pdf
7. https://niu.edu.in/sla/online-classes/Location-of-Industries.pdf

Course Title: Environment Impact Assessment
Course Code: PGMP –GEG-DSE- 403
Credits: 02
Marks: 50
Duration: 30 hours

Prerequisite Courses: Nil

Course Objectives:

1. It lays the foundation of environmental issues and its impact on society.
2. To gain skills to mitigate the environmental problems.

Course outcome:

CLO1: After successful completion of the course the students will be able to:

CLO2; The students will learn various issues related to environmental impact assessment and its importance.

CLO3: Will be able to understand the various policies related to environment and classify the environmental issues

CLO4: Will be able to create EIA report.

Module I	Environmental Impact Assessment (EIA): Principles, Concepts and approaches, Methods, procedure and current issues in EIA. Environmental Impact Assessment Regulations and Policies in India. Procedures of EIA: Less Developed and More Developed countries EIA Procedures, National Green Tribunal.	(15 Hours)
Module II	EIA: evaluation and mitigation, cost-benefit analysis of any two projects in India Case Studies of environmental impact assessment: Water Impact Assessment; Hydroelectric power Impact Assessment; Ecological Impact assessment; Social Impact Assessment; Mining Impact Assessment.	(15 Hours)

References:

Mandatory

1. Richard, K. Morgan, 1999. Environmental Impact Assessment: A Methodological Perspective, Springer.
2. Sinclair, J., 2000. Canadian Environmental Assessment in Transition, University of Waterloo Press, Waterloo.
3. Smith, L.G., 1993. Impact Assessment and Sustainable Resource Management, Longman, Harlow.
4. Subramanian, V., 2001. Text Book on Environmental Sciences, Narosa Publishing House, N. Delhi.
5. Eccleston, C. H., 2017. Environmental Impact Assessment: A Guide to Best Professional Practices, CRC Press, New York.

Supplementary

1. Chandna R. C., 2002: Environmental Geography, Kalyani, Ludhiana
2. Cunninghum W. P. and Cunninghum M. A., 2004: Principals of EnvironmentalScience: Inquiry and Applications, Tata Macgraw Hill, New Delhi.
3. MoEF, 2006: National Environmental Policy-2006, Ministry of Environment andForests, Government of India.
4. Singh, R.B. (Eds.) (2009) Biogeography and Biodiversity. Rawat Publication, Jaipur

Course Title: Natural Resource Management
Course Code: PGMP –GEG-DSE- 404
Credits: 02
Marks: 50
Duration: 30 hours

Prerequisite Courses: Nil

Course Objectives:

1. Awareness about resource availability, accessibility, utilization, its use and misuse.
2. Spatial distribution of natural resources.
3.

Course outcome:

After successful completion of the course the students will be able to:

CLO1: Conservation methods and awareness about community participation in resource management and utilization.

CLO2: Assessment of role of national and international efforts to mitigate resource problems.

Module I	Introduction: Concept, approaches and appraisal to natural resource management, Natural Resources: Land, Water, Forest. Integrated Resource Management: Case Studies (any one) from Himalayan, coastal and desert regions, use of techniques of RS and GIS.	(15 Hours)
Module II	Problems in Resource Management: Issues and constraints in resource management, Environmental, Political and Socio-Economic challenges. Governance: Sustainable Development Goals, (SDG 12) National Policy, Planning and Institutional advancement in natural resource management.	(15 Hours)

References:

Mandatory

1. Berkes, F. (ed.), 1989. Common Property Resources: Ecology and CommModuley Based Sustainable Development, Belhaven Press London.
2. Mather, A.S. and Chapman, K. 1995. Environmental Resources, Longman, Harlow, England.
3. McClay, K.R. 1995. Resource Management Information System: Process & Practice, Taylor Francis, London.
4. Mitchell B. 1988. Geography and Resources Analysis, 2nd edition, Longman, London.

5. Newson, M.D. 1991. Land, Water and Development: River Basin Systems and Management, Routledge,London.
6. Owen, S. and Owens, P.L. 1991. Environment, Resources and Conservation, Cambridge University Press, New York.

Supplementary

1. Mitchell, B. 1997. Resource and Environmental Management, Longman, Harlow, England.
2. Taylor, Russel D., and Torquebiau, Emmanuel (Eds.). 2011. Natural Resource Management and Local Development, Springer, Netherland.
3. Thakur, B. 2003-2018. Perspectives in Resource Management in Developing Countries, Vol.1-13, Concept Publishing Company, New Delhi.

Course Title: Climate Change and Adaptations
Course Code: PGMP –GEG-DSE- 405
Credits: 02
Marks: 50
Duration: 30 hours

Prerequisite Courses: Nil

Course Objectives:

1. Providing in depth knowledge of Climate Change.
2. Assessment of Climate Change impacts on fragile ecosystems.
3. Adaptation strategy and governance.

Course outcome:

After successful completion of the course the students will be able to

CLO1: Understanding of various dimensions of Climate Change.
CLO2: Significance of adaptation strategies.
CLO3: Evaluate the role of Local and global organisations

Module I	Introduction to Climate Change: Meaning, Concept and Approaches. Measuring Climate Change: Urban heat islands, Stress, exposure, risk and vulnerability related to climatic hazards and disasters. Empirical Assessment of Climate Change Adaptation: Assessment in fragile ecosystems; Mountain, Desert and Coastal.	(15 Hours)
Module II	Climate Change Adaptation: Role of Indigenous Traditional Knowledge (ITK) and Resilience for Future Sustainability Policy Framework for Climate Change Adaptation: SDGs Approach, International Climate Change Agreements and Local Governance.	(15 Hours)

References:

Mandatory

1. Adger, W. N. 2006. Vulnerability, Global Environmental Change, 16 (3), 268-281
2. Agrawala, S. and Fankhauser, S. (Eds.), 2008. Economic Aspects of Adaptation to Climate Change: Costs, Benefits and Policy Instruments, OECD, Paris
3. Barros, Vicente R. (eds.), 2014. Climate Change 2014. Impacts, Adaptation and Vulnerability: Global and Sectoral Aspects. Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Part B; Regional Aspect), Cambridge University Press, New York.

4. Bergkamp, G., Orlando, B. and Burton, I. 2003. Change: Adaptation of Water Resources Management to Climate Change, IUCN, Gland.
5. Brewster, E. N. 2010. Climate Change Adaptation: Steps for a Vulnerable Planet, New York, Nova Science.

Supplementary:-

1. Mukherji Shormila, 2004. Fragile Environment, Manak Publication Pvt. Ltd.
2. NDMA, 2009. National Disaster Management Guidelines-Management of Landslides and Snow Avalanches. Publication of National Disaster Management Authority, Government of India. New Delhi
3. Pandey, R, Jha, S. 2011. Climate vulnerability index –measure of climate change vulnerability to communities: a case of rural Lower Himalayas, India, Mitigation and Adaptation Strategies Global Change, Published online December 2011
4. Rai, S.C. 2009. Land Use and Climate Change, Nova Science Publishers, Inc., New York.

Web references:

1. http://www.yourarticlelibrary.com/watershed-management/watershed-management-meaning-types-steps-and-programmes/77309
2. http://agritech.tnau.ac.in/agriculture/agri_majorareas_watershed_watershedmgt.html
3. https://dep.wv.gov/WWE/watershed/Pages/watershed_management.aspx
4. https://www.rdrwa.ca/node/27
5. https://www.teriin.org/blog/watershed-management-and-development

SEMESTER II Level 400 Discipline Specific Core

Course Title: Advanced Population Studies in Geography
Course Code: PGMP –GEG-DSC- 405
Credits: 03
Marks: 75
Duration: 45 hours

Prerequisite Courses: NIL

Course Objectives:

1. To introduce basic and advance concept of population characteristics to understand the dynamics of population.
2. To enable students to develop an understanding and apply certain theories of population theories in the context of population growth, resources and migration.
3. To envisage contemporary population issues in the context of India.

Course Learning Outcomes: After successful completion of the course the students will be able to:

CLO1: Identify, describe, and explain key terms, themes, and concepts in population geography/Demonstrate basic understanding of key population geography concepts, patterns, and processes

CLO2: Demonstrate competency with population geographic and demographic datasets and analysis methods.

CLO3: Identify and apply theoretical social science concepts explain past and current population trends national &global contexts.

CLO4: Synthesize various theoretical frameworks and construction order to interpret principal causes and impacts associated with population change.

CLO5: Analyze and interpret and represent geographic population data using case studies that signify important recent and ongoing population trends

Module I	Introduction to Population Geography: Development of population geography, contents and approaches in ~~of~~ population geography and sources of population data. Components of population physiological, social and economic.	(15 Hours)
Module II	Fertility and mortality: Determinants of Fertility and Mortality, Demographic Transition theory, its relevance and impacts. Global Population growth and distribution – Global perspective and dynamics of population growth	

	Human Population over Time and Space, Determinants of population growth Theories of Population growth: Malthus and Saddler. Importance of Migration, types of migration, cause – effect of migration, Indian migration abroad, recent trends and consequences. Migration theories – Lee, Ravenstein, Zelinsky and Sjaard.	(15 Hours)
Module III	Population Issues -Global and India: Pro – natal and Anti–natal population policies, two case studies, Population ageing, issues and challenges, climate change and displacement, India's Population Policy and consequences, Demographic dividend, Demographic Challenges in India, Human development Index	(15 Hours)

References:
Mandatory:

1. Newbold K.B. (2017) Population Geography: Tools & Issues, 3rd ed, Rowman & Littlefield Publishers.
2. Majumdar P.K. (2013) India's Demography: Changing Demographic Scenario in India, Rawat Publications.
3. Mukherji S. (2013) Migration in India: Links to Urbanization, Regional Disparities and Development Policies, Rawat Publications.
4. Pacione M. (2012) Population Geography: Progress and Prospect, Routledge.
5. Khullar D.R. (2011) India: A Comprehensive Geography, Kalyani Publishers.
6. Chandna R.C. (2002) Geography of Population: Concept, Determinants and Patterns, Kalyani Publishers, New Delhi.

Supplementary:

1. Fouberg, E.H., Murphy, A.B., de Blij H.J. (2015) Human Geography: People, Place, and Culture, 11thed, Wiley.
2. Dyson T. (2011) Population and Development: The Demographic Transition, Rawat Publications.
3. Hassan M. (2007) Population Geography, Rawat Publication, Jaipur.
4. Kayastha S. L. (2006) Geography of Population, Rawat Publication, Jaipur.

Web References:

1. https://www.studysmarter.co.uk/explanations/human-geography/population-geography/
2. http://www.eolss.net/sample-chapters/c01/e6-14-03-01.pdf

3. https://ofm.wa.gov/washington-data-research/population-demographics/population-estimates/components-population-change#:~:text=The%20main%20components%20of%20population,between%20live%20births%20and%20deaths.
4. https://www.nature.com/scitable/knowledge/library/introduction-to-population-demographics-83032908/
5. https://www.census.gov/newsroom/blogs/random-samplings/2016/03/growth-or-decline-understanding-how-populations-change.html
6. https://egyankosh.ac.in/bitstream/123456789/43759/1/Unit-3.pdf
7. https://hdr.undp.org/data-center/human-development-index#/indicies/HDI
8. https://www.geogalot.com/myp-humanities/year-10/population-patterns-and-trends/006-population-policies
9. https://ourworldindata.org/world-population-growth
10. https://www.jstor.org/stable/213996
11. http://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S000453PO/P001844/M029737/ET/1525155291PS_MU_15Lee_Migration_Theory__Push_and_pullModule15Paper10Ed.pdf

Course Title: Advanced Population Studies in Geography (Practical)
Course Code: PGMP –GEG-DSC- 405
Credits: 01
Marks: 25
Duration: 30 Hours

Module I	Fertility and Mortality measures, Population growth and projections (semi average method, least square method, Exponential population growth), Population density- Arithmetic, Agricultural, Nutritional and Economic. Gender Ratio, Work Participation Rate, Literacy rate, Migration rate, Dependency ratio. Calories per head	(16 sessions)
Module II	Models and Indexes: Gini's concentration Index, Demographic Transition model , Human Development Index, Gender Index, Poverty index , Social development index	(14 sessions)

References:

Mandatory:

1. Newbold K.B. (2017) Population Geography: Tools & Issues, 3rd ed, Rowman & Littlefield Publishers.
2. Majumdar P.K. (2013) India's Demography: Changing Demographic Scenario in India, Rawat Publications.
3. Mukherji S. (2013) Migration in India: Links to Urbanization, Regional Disparities and Development Policies, Rawat Publications.
4. Pacione M. (2012) Population Geography: Progress and Prospect, Routledge.
5. Khullar D.R. (2011) India: A Comprehensive Geography, Kalyani Publishers.
6. Chandna R.C. (2002) Geography of Population: Concept, Determinants and Patterns, Kalyani Publishers, New Delhi.

Supplementary:

1. Fouberg, E.H., Murphy, A.B., de Blij H.J. (2015) Human Geography: People, Place, and Culture, 11thed, Wiley.
2. Dyson T. (2011) Population and Development: The Demographic Transition, Rawat Publications.
3. Hassan M. (2007) Population Geography, Rawat Publication, Jaipur.
4. Kayastha S. L. (2006) Geography of Population, Rawat Publication, Jaipur.

Web References:

1. https://www.studysmarter.co.uk/explanations/human-geography/population-geography/
2. http://www.eolss.net/sample-chapters/c01/e6-14-03-01.pdf
3. https://ofm.wa.gov/washington-data-research/population-demographics/population-estimates/components-population-change#:~:text=The%20main%20components%20of%20population,between%20live%20births%20and%20deaths.
4. https://www.nature.com/scitable/knowledge/library/introduction-to-population-demographics-83032908/
5. https://www.census.gov/newsroom/blogs/random-samplings/2016/03/growth-or-decline-understanding-how-populations-change.html
6. https://egyankosh.ac.in/bitstream/123456789/43759/1/Unit-3.pdf
7. https://hdr.undp.org/data-center/human-development-index#/indicies/HDI
8. https://www.geogalot.com/myp-humanities/year-10/population-patterns-and-trends/006-population-policies
9. https://ourworldindata.org/world-population-growth
10. https://www.jstor.org/stable/213996
11. http://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S000453PO/P001844/M029737/ET/1525155291PS_MU_15Lee_Migration_Theory__Push_and_pullModule15Paper10Ed.pdf

Course Title: Advanced Economic Geography
Course Code: PGMP –GEG-DSC- 406
Marks: 100
Credits: 3
Duration: 45 Hours

Prerequisite Courses: Nil

Course Objectives:

1. To understand the ways in which economic activities are organized
2. To analyse the rapidly increasing integration of economies processes such as globalization, trade and transportation and their impacts on economic, cultural and social activities
3. To evaluate economic processes operating at different geographical scales are depending on the complex economic-political-social interactions that are framed at the global level.
4. Apply various statistical techniques, relevant to research in economic geography

Course Learning Outcomes:

At the end of this course, students will be able:

CLO1: Understand and contrast on the theories related to economic geography with an emphasis on alternative viewpoints.

CLO2: Recognize the significance of geographic concepts for understanding socio-economic processes and outcomes.

CLO3: Apply and compare the global economic patterns with local economic scenarios

CLO4: Apply, analysing and interpreting statistical data.

Module I	Introduction to Economic Activities Models in economic geography: Trends in economic geography, Approaches in Economic Geography, Factors of location of economic activities (Physical, social, economic and cultural).	(15 hours)
Module II	Models in economic geography: Von Thunen's model and its modifications, Potential Population Surfaces, Labor Theory of Value- Karl Marx , Behavioral Location Theory – Cyert and March\Economic development Models-Rostow Model, Friedmans Model.	(20 hours)
Module III	Modes of transportation and transport cost; accessibility and connectivity: international, inter and intraregional; comparative cost advantages. Typology of markets and market system. Globalisation and Markets (labour, resource, capital)	(10 hours)

References:

Mandatory:

1. Saxena, H. (2016): "Economic Geography", Rawat Publishers, Jaipur
2. Datt, G. And Mahajan, A. (2016): "Datt and Sundaram's Indian Economy", S. Chand Publishing, New Delhi
3. Singh K. & Siddiqui A. R. Economic Geography, Pravalika Publisher, Allahabad. 2016.
4. Roy, P. K. Economic geography: A Study of Resources, New Central Book Agency Ltd. Kolkata, 2014.
5. Saxena, H. M. Economic geography. Rawat Publication. New Delhi. 2013.
6. Sharm, T.C. Economic geography of India, Rawat Publication. New Delhi. 2013.
7. Gautam, A. (2010): "Advanced Economic Geography", ShardaPustakBhawan, Allahabad
8. Berry, Conkling & Ray (1988): Economic Geography Prentice Hall of India, New Jersey.

Supplementary:

1. Haninkdean M. (2012) Principles and Applications of Economic Geography: Economy, Policy, Environment, John Wiley& Sons
2. Miroslav N. Jovanovic(2009)Evolutionary Economic Geography, Location OfProduction And The European union Routledge, London And New York
3. M. Sokol (2011) Economic Geography. Undergraduate Study In Economics, Management, Finance And The Social Sciences, University Of London.
4. Pachurapiotr (2011) The Economic Geography Of Globalization,(Ed) Intech Pub.
5. Sharmistha Bagchi-Sen AndHelenlawton Smith (2006) Economic Geography Past, Present And Future (Edited). Routledge, USA.
6. Hegget Peter, Cliff A.D. et. al. (2001) Locational Methods, Locational Analysis in Human Geography, Vol. II Arnold – Heinemann Pub. (India)

Web Based:

1. http://dl.booktolearn.com/ebooks2/science/economy/9781138924512_An_Introduction_to_Economic_Geography_0868.pdf
2. https://london.ac.uk/sites/default/files/uploads/gy2164-economic-geography-study-guide.pdf
3. https://transportgeography.org/?page_id=5260
4. https://web.ccsu.edu/faculty/kyem/GEOG110/Economic_Geography/Economic%20Geography.htm
5. https://www.networkideas.org/wp-content/uploads/2020/11/STEP_Report.pdf
6. https://www.thoughtco.com/reillys-law-of-retail-gravitation-1433438
7. https://www.geographyforyou.com/2019/09/maximum-positive-deviation-crop.html
8. http://sajms.com/wp-content/uploads/2017/10/paper_2-1.pdf
9. http://gswb.in/wp-content/uploads/2012/08/v2n1jully2012_18.pdf

Course Title: Advanced Economic Geography (Practical)
Course Code: PGMP –GEG-DSC- 406
Credits: 01
Marks: 25
Duration: 30 Hours

Module I

Agricultural Regions: (15 sessions)

Jasbir Singh's modified method

Gibbs Martins Index

Maximum Positive Deviation method of

Raffiullah(1956)

Athawale's method of crop combination (1966)

Sapre and Deshpande

Module II

Transport Network: (15 sessions)

I) Graph Theoretical measures of whole transport

network,

a) Non-ratio measures cyclomatic number
diameter

b) Ratio measures: Eta, Theta, Iota, Pi

c) Measurement of route

II) Measures of Individual elements of transport

a) Associated number

b) Degree of connectivity network

c) Dispersion

d) Accessibility Index

References:

Mandatory:

1. Saxena, H. (2016): "Economic Geography", Rawat Publishers, Jaipur
2. Datt, G. And Mahajan, A. (2016): "Datt and Sundaram's Indian Economy", S. Chand Publishing, New Delhi
3. Singh K. & Siddiqui A. R. Economic Geography, Pravalika Publisher, Allahabad. 2016.
4. Roy, P. K. Economic geography: A Study of Resources, New Central Book Agency Ltd. Kolkata, 2014.
5. Saxena, H. M. Economic geography. Rawat Publication. New Delhi. 2013.
6. Sharm, T.C. Economic geography of India, Rawat Publication. New Delhi. 2013.
7. Gautam, A. (2010): "Advanced Economic Geography", ShardaPustakBhawan, Allahabad
8. Berry, Conkling & Ray (1988): Economic Geography Prentice Hall of India, New Jersey.

Supplementary:

1. Haninkdean M. (2012) Principles and Applications of Economic Geography: Economy, Policy, Environment, John Wiley& Sons
2. Miroslav N. Jovanovic(2009)Evolutionary Economic Geography, Location OfProduction And The European union Routledge, London And New York
3. M. Sokol (2011) Economic Geography. Undergraduate Study In Economics, Management, Finance And The Social Sciences, University Of London.
4. Pachurapiotr (2011) The Economic Geography Of Globalization,(Ed) Intech Pub.
5. Sharmistha Bagchi-Sen AndHelenlawton Smith (2006) Economic Geography Past, Present And Future (Edited). Routledge, USA.
6. Hegget Peter, Cliff A.D. et. al. (2001) Locational Methods, Locational Analysis in Human Geography, Vol. II Arnold – Heinemann Pub. (India)

Course Title: Introduction to Geographic Information System
Course code PGMP –GEG-DSC- 407
Credits: 2
Marks: 50
Duration: 30 hours

Prerequisite courses: NIL

Course objective:

1. The course focuses on the fundamentals concept Geographical Information System, and Global Positioning System
2. Introducing the spatial data, non- spatial data, hardware and software used in collection, processing and analysis of geospatial data.

Course outcome:

After successful completion of the course the students will be able to

CLO1: Students will demonstrate proficiency and conceptual understanding in using software and automated techniques to carry out thematic maps and analysis through a series of laboratory exercises and creation of reports.

CLO2: Personal effectiveness and workplace competencies are practiced through engagement in discussion boards, following course guidelines, and interactions with the instructor and other students in the class.

CLO3: To be able use these skills to identify and analysed real world problem and preparing them for a successful career in geospatial industry and research institute.

Module I	Introduction to GIS: Definition, Development and Applications: elements of GIS; geographic objects: point, line and area; coordinate systems and map projections Geographic Data, Input, Storage and Editing: spatial and attribute data, vector and raster-based models, digitization; storage and manipulation of GIS data bases, presentation of GIS output	(15 hours)
Module II	Introduction to GPS: History of Positioning System GPS System Description, Error Sources & Receiver Introduction to DGPS and TOTAL Station, GPS Performance and Policy Applications**,** Introduction to open-source GIS	(15 hours)

References

Mandatory:

1. Bhatta, B. (2008) Remote Sensing and GIS, Oxford University Press, New Delhi.

2. Burrough, P.A. and McDonnell, R.A. (1998) Principles of geographical information systems. OxfordUniversity Press, Oxford, 327 pp.
3. Campbell, J.B. (2002). Introduction to remote sensing, 3rd ed., The Guilford Press. ISBN 1-57230-640-8.
4. Chang, K., 2009.Introduction to Geographic Information System, 4th Edition. McGraw Hill.
5. Jensen J. R., 2004: Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall.
6. Wolf P. R. and Dewitt B. A., 2000: Elements of Photogrammetry: With Applications in GIS, McGrawHill.

Supplementary:

1. Elangovan,K (2006) GIS: Fundamentals, Applications and Implementations. New India Publishing Agency, New Delhi.
2. Heywood, I., Cornelius, S., and Carver, S. (2006) An Introduction to Geographical Information Systems. Prentice Hall. 3rd edition.
3. Jensen, J.R. (2000). Remote sensing of the environment: an Earth resource perspective. Prentice Hall. ISBN 0-13-489733-1.
4. Thurston, J., Poiker, T.K. and J. Patrick Moore. (2003) Integrated Geospatial Technologies: A Guide to GPS, GIS, and Data Logging. Hoboken, New Jersey: Wiley.
5. Wise, S. (2002) GIS Basics. London: Taylor & Francis.

Web references:

1) https://www.nrsc.gov.in/
2) https://www.iirs.gov.in/
3) http://www.undp.org/popin/wdtrends/wdtrends.htm
4) https://www.isprs.org/proceedings/xxxiii/congress/part7/1609_XXXIII-part7.pdf
5) http://www.tric.u-tokai.ac.jp/ISPRScom8/TC8/TC8_CD/headline/JAXA_Special_Session%20-%206/JTS64_20100608144600.pdf
6) https://www.semanticscholar.org/paper/Role-of-Remote-Sensing-in-Disaster-Management-Nirupama-Simonovic/da84562b2057ca5866d933d47ee8815a06f0229c

Course Title: Introduction to Geographic Information System (Practical)
Course code PGM-GEG.C10
Credits: 02
Marks: 50
Duration: 60 hours

Module I	Introduction to GIS Software Geo-referencing, Digitization and data joining, Vector & raster conversion, Geoprocessing tools, Query and Proximity Analysis, Overlay Analysis & Layout Preparation.	(30 sessions)
Module II	Data Analysis; Data joining, query analysis, Geo-database creation: point, line, area, Geoprocessing tools, Spatial analysis tools, Network analysis, shortest path, location-allocation, Environmental modelling with GIS & Case study with sample GIS database.	(30 sessions)

References

Mandatory:

1. Burrough, P.A. and McDonnell, R.A. (1998) Principles of geographical information systems. OxfordUniversity Press, Oxford, 327 pp.
2. Campbell, J.B. (2002). Introduction to remote sensing, 3rd ed., The Guilford Press. ISBN 1-57230-640-8
3. Chang, K. (2007) Introduction to Geographic Information System, 4th Edition. McGraw Hill.
4. Jensen J. R., 2004: Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall.
5. Wolf P. R. and Dewitt B. A., 2000: Elements of Photogrammetry: With Applications in GIS, McGrawHill.

Supplementary:

1. Elangovan,K (2006) GIS: Fundamentals, Applications and Implementations. New India Publishing Agency, New Delhi.
2. Heywood, I., Cornelius, S., and Carver, S. (2006) An Introduction to Geographical Information Systems. Prentice Hall. 3rd edition.
3. Jensen, J.R. (2000). Remote sensing of the environment: an Earth resource perspective. Prentice Hall. ISBN 0-13-489733-1.
4. Thurston, J., Poiker, T.K. and J. Patrick Moore. (2003) Integrated Geospatial Technologies: A Guide to GPS, GIS, and Data Logging. Hoboken, New Jersey: Wiley.
5. Wise, S. (2002) GIS Basics. London: Taylor & Francis.

Web references:

1) https://www.nrsc.gov.in/
2) https://www.iirs.gov.in/
3) http://www.undp.org/popin/wdtrends/wdtrends.htm
4) https://www.isprs.org/proceedings/xxxiii/congress/part7/1609_XXXIII-part7.pdf
5) http://www.tric.u-tokai.ac.jp/ISPRScom8/TC8/TC8_CD/headline/JAXA_Special_Session%20-%206/JTS64_20100608144600.pdf
6) https://www.semanticscholar.org/paper/Role-of-Remote-Sensing-in-Disaster-Management-Nirupama-Simonovic/da84562b2057ca5866d933d47ee8815a06f0229c

Course Title: Field Techniques and Village Survey
Course Code: PGMP –GEG-DSC- 408
Credits: 02
Marks: 50
Duration: 30 hours

Pre-requisite Courses: Students must have knowledge of cartography skills such as scales and map types.

Course Objectives:

1. Understand what a survey, pre-requisites and post field work practices.
2. Apply various field-based methods for data collection.
3. Design and formulate survey plans and questionnaires.

Course Learning Outcomes: After successful completion of the course the students will be able to:

CLO1: Will be able to perform survey techniques in different terrain and conditions.
CLO2: Will be able to prepare and test questionnaire.
CLO3: Enhancement of skills in using of various field instruments like GPS & DGPS in survey.
CLO4: Able to create plans and map layouts using cartography skills.

Module I	Introduction to Field Survey and Village Survey: Methods of data Collection preparation of questionnaires and schedule, Types of Survey Sampling Techniques. Introduction to village survey. Importance of survey - scope and purpose, principles and application of selected survey instruments.	(15 hours)
Module II	Sampling Techniques Questionnaire Formulation: Pre-field work, survey Strategies, Pilot Survey, Data Collection Report Writing	(15 hours)

References:

Mandatory:

1. Clendinning , J., 1958, Principles and use of Surveying Instruments. 2nd edition,Blockie.
2. Stoddard, Robert H. 1982. Field Techniques and Research Methods in Geography, Kendall/Hunt for National Council for Geographic Education
3. Lunsbury J.F. and Aldrich, F.T. 1979. Introduction to Geographic Field Methods and Techniques, Charles E. Mercill Publishing Company, Columbus.
4. Hay. I. 2010. Qualitative Research Methods in Human Geography, 3rd ed. Oxford University Press, South Melbourne, Australia,

Supplementary

1. Singh &Karanjta.,1972. Map work and Practical Geography Central Book Dept Allahabad 1972.
2. Singh, R.L.andDutt, P.K., 1968. Elements of Practical Geography, Students Friends, Allahabad.

Web references:

1. http://uregina.ca/~sauchyn/geog411/
2. https://www.arcgis.com/home/item.html?id=12bde0260dd84c148446072c52c7c9d2
3. https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1015&context=geographyfacpub
4. https://www.sciencedirect.com/topics/earth-and-planetary-sciences/field-survey
5. https://methods.sagepub.com/reference/encyclopedia-of-survey-research-methods/n187.xml

Course Title: Field Techniques and Village Survey (Practical)
Course Code: PGMP –GEG-DSC- 408
Credits: 02
Marks: 50
Duration: 60 hours

Module I	Introduction to Field Survey and Survey instruments: Chain Survey Plane Table Survey (Radiation Method) Plane Table Survey (Intersection Method) Prismatic Compass Dumpy level: traverse survey, contour plan preparation	(30 sessions)
Module II	Types of Socio Economic survey and Web based Applications in data collection: Interview, Questionnaire, Telephonic survey. Geographic data collection through web-based app's and processing and mapping of the data through computer techniques.	(30 sessions)

References:

Mandatory:

1. Clendinning , J., 1958, Principles and use of Surveying Instruments. 2nd edition, Blockie.
2. Stoddard, Robert H. 1982. Field Techniques and Research Methods in Geography, Kendall/Hunt for National Council for Geographic Education
3. Lunsbury J.F. and Aldrich, F.T. 1979. Introduction to Geographic Field Methods and Techniques, Charles E. Mercill Publishing Company, Columbus.
4. Hay. I. 2010. Qualitative Research Methods in Human Geography, 3rd ed. Oxford University Press, South Melbourne, Australia,

Supplementary:

1. Singh &Karanjta.,1972. Map work and Practical Geography Central Book Dept Allahabad 1972.
2. Singh, R.L. and Dutt, P.K., 1968. Elements of Practical Geography, Students Friends, Allahabad.

Web references:

1. http://uregina.ca/~sauchyn/geog411/
2. https://www.arcgis.com/home/item.html?id=12bde0260dd84c148446072c52c7c9d2
3. https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1015&context=geographyfacpub
4. https://www.sciencedirect.com/topics/earth-and-planetary-sciences/field-survey
5. https://methods.sagepub.com/reference/encyclopedia-of-survey-research-methods/n187.xml

Discipline Specific Electives

Course Title: Techniques of Disaster Management, Mitigation and Resilience
Course Code: PGMP –GEG-DSE- 406
Credits: 02
Marks: 50
Duration: 30 hours

Prerequisite Courses: Nil

Course Objectives

1. To provide basic conceptual understanding of disasters.
2. To understand approaches of Disaster Management
3. To build skills to respond to disaster

Course Outcomes

After successful completion of the course the students will be able to

CLO1: Gain a perspective of disasters different than the Nature and Causes of Disaster.

CLO2: Pursue a profession in Disasters can do so by addressing real life issues of vulnerability of people.

Module I	Meaning and concept of disaster, Types of Disaster a) Natural Disasters: Earthquakes, floods, drought, landside, land subsidence, cyclones, volcanoes, tsunami, avalanches, global climate extremes. b) Man-made disasters: Terrorism, gas and radiations leaks, toxic waste disposal, oil spills, forest fires. c)Social Economics and Environmental impact of disasters	(15 hours)
Module II	Mitigation and Resilience techniques of Disaster; Concept of disaster management Disaster Management cycle, Disaster management policy, National and State Bodies for Disaster Management: (NDRF), Early Warming Systems, building design and construction in highly seismic zones, retrofitting of buildings.	(15 hours)

References

Mandatory:

1. Kapur, A. (2010) Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
2. Modh, S. (2010) Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, Delhi.
3. Singh, R.B. (2005) Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi. Chapter 1, 2 and 3
4. Singh, R. B. (ed.), (2006) Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi.
5. Sinha, A. (2001). Disaster Management: Lessons Drawn and Strategies for Future, New Moduleed Press, New Delhi.

Supplementary:

1. Damon, P. Copola, (2006) Introduction to International Disaster Management, Butterworth Heineman.
2. Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi.
3. Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication PVT. Ltd. New Delhi.

Course Title: Geographical Thought
Course Code: PGMP –GEG-DSE- 407
Credits: 02
Marks: 50
Duration: 30 hours

Prerequisite Courses: Nil

Course Objectives:

1. The course aims to develop a basic understanding and critical thinking of the various contributions from numerous scholars.
2. To gain grounding knowledge in the history, philosophy and scope in the discipline of geography.

Course outcome:
After successful completion of the course the students will be able to

CLO1: At the end of this course, student will gain sense of chronological organization and areal variation in human activities.
CLO2: The students will be able to evaluate theoretical concepts from geography and elsewhere and demonstrate an understanding of the dynamic and contested nature of the discipline and its contemporary issues.

Module I	Development of Geography: Geographical knowledge of the Ancient, Medieval & Modern period. Period. Contributions of explorers. Indian Schools of Thought, Contribution of Herodotus, Eratosthenes**,** Strabo, Ptolemy etc**.** Scientific explanations: Routes to scientific explanations Arab School of thought, Dark age, Age of Discovery, Contribution of Marco Polo, Columbus, Vaso-De-Gama and Captain Cook etc. Foundations of modern geography, German, French, British and American schools of thought, Contributions of Kant, Humboldt, Ritter, W. M. Davis, Charles Darwin etc.	(15 hours)
Module II	Dualism in Geography & Geography in 21st Century: Systematic & regional geography; physical & human geography, the myth and reality about dualisms, Determinism and possibilism, Neo-determinism, Positivism, behaviorism, postmodernism. Conceptual and methodological developments and changing paradigms, Scientific methods,	(15 hours)

Quantitative revolution, Quantification and application of statistical techniques in Geography, Computer applications in geography.

References:

Mandatory

1. Arentsen M., Stam R. and Thuijis R., 2000: Post-modern Approaches to Space, eBook.
2. Martin Geoffrey J., 2005: All Possible Worlds: A History of Geographical Ideas, Oxford.
3. Holt-Jensen A., 2011: Geography: History and Its Concepts: A Students Guide, SAGE
4. Hubbard, Phil., Kitchin, Rob., Bartley Brendan and Duncan Fuller, (eds) 2002.Thinking Geographically: Space, Theory and Contemporary Human Geography, Continuum

Supplementary

1. Cresswell, Tim, 2013. Geographic Thought: A Critical Introduction, Wiley Blackwell.
2. Nayak, Anoop & Jeffrey Alex, 2011. Geographical Thought: An Introduction to Ideas in Human Geography, Harlow: Prentice Hall.
3. Gregory, Derek; Johnston, Ron; Pratt, Geraldine; Watts, Michael; Whatmore, Sarah, 2009. The Dictionary of Human Geography, Wiley-Blackwell.
4. Bonnett, Alastair, 2008. What is geography? Sage Publications.

Course Title: Advanced Urban Geography
Course Code: PGMP –GEG-DSE- 408
Credits: 02
Marks: 50
Duration: 30 Hours of 1 hour each

Pre-requisite Courses:

1. **Basic knowledge about geomorphic concepts**

Course Objectives:

1. To critically understand the complexities of urban cities and the experience of living in these cities.
2. To critically understand a broad range of issues that cities face today.
3. To provide a basic social, cultural, political and economic understanding of cities.

Course Learning Outcomes:

CLO1: To understand the linkages between urban cities and the societal forces that shapes it.
CLO2: Critically analyse contemporary urban issues from a geographical perspective.
CLO3: Understand urban issues in order to engage with possible and effective planning and policy interventions.

Module I	Meaning, Scope and Development of Urban Geography; Factors of Urban Growth –City as Centre of Change; Models of Urban Growth – Concentric Zone, Sectoral and Multinuclei; Conurbations and Megalopolis; Urban Umland Periurban and Urban Fringe; Functional Classification of Urban Settlements ~~Centres~~; Nelsons Classification, Urban Hierarchy and Rank Size Relationship, Metropolis and Megacities; Morphology of Urban Settlement; Indian Urban Scenario	(15 hours)
Module II	Urban Structure, Problems and Perspectives; Demographic Structure and Characteristics of Urban Population, Trend of Urbanization, Occupational Pattern, Urban Amenities, Urban Land Use Problems, City Problems and Urban Planning; the Role of Geographer in Town Planning; Special Study Smart City, AMRUT scheme– Residential Problems, Morphological Characteristics and Functional Characteristics. Urban Mitigation and Resilience	(15 hours)

References:

Mandatory:

1. Ramachandran, R., 1992: The Study of Urbanisation, Oxford University Press, Delhi
2. Michael, P. 2009. Urban Geography: A Global Perspective, Taylor & Francis, Great Britain.
3. Carter, H. (2010) The Study of Urban Geography, Arnold Publishers, London
4. Misra , R.P. (2013) Urbanisation in South Asia, Cambridge University Press, New Delhi
5. Singh, R. B. (ed.) 2015. Urban Development Challenges, Risks and Resilience in Asian Mega Cities, Springer, Japan.
6. Singh, Savindra 2015. ParyavaranBhoogol, PrayagPustakBhavan, Allahabad
7. Sharma, P. and Rajput, S. (Eds.) (2017). Sustainable Smart Cities in India; Challenges and Future Perspectives, Springer Nature AG, Switzeland
8. Singh, S and Saroha, J. (2021) Urban Geography, Pearson Education.
9. Fyfe, N. R. and Kenny, J. T. (2020). The Urban Geography Reader. London, UK: Routledge.

Supplementary:

1. Fyfe N. R. and Kenny J. T., 2005: The Urban Geography Reader, Routledge.
2. Graham S. and Marvin S., 2001: Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition, Routledge.
3. Hall T., 2006: Urban Geography, Taylor and Francis.
4. Kaplan D. H., Wheeler J. O. and Holloway S. R., 2008: Urban Geography, John Wiley.
5. Knox P. L. and McCarthy L., 2005: Urbanization: An Introduction to Urban Geography, Pearson Prentice Hall New York.
6. Knox P. L. and Pinch S., 2006: Urban Social Geography: An Introduction, PrenticeHall.
7. Pacione M., 2009: Urban Geography: A Global Perspective, Taylor and Francis.
8. Sassen S., 2001: The Global City: New York, London and Tokyo, Princeton University Press.
9. Ramachandran R (1989): Urbanisation and Urban Systems of India, Oxford University Press, New Delhi

Course Title: Soil and Water Resource Management
Course Code: PGMP –GEG-DSE- 409
Credits: 02
Marks: 50
Duration: 30 hours

Prerequisite Courses: Nil

Course Objectives:

1. To develop and understand the importance of water and watershed management.
2. To analyze different practices involved in watershed management.

Course Learning Outcomes: After successful completion of the course the students will be able to:

CLO1: Will be able to understand importance of water as a resource.
CLO2: Will be able to classify different techniques and methods depend on the location and availability of resources.
CLO3: Will be able to apply modern techniques in preparation of watershed management plans.

Module I	Introduction to Watershed Management and Management Practices: Concept of watershed Erosion control measures for non-agricultural lands, Contour and Staggered Trenching, Gully Control Structures, Sediment Retention Structures, Gully and Ravine Reclamation, Bunding, Check Dams, Loose boulder Dams.	(15 hours)
Module II	Groundwater and Issues related to Water conservation and harvesting: Movement of Groundwater, Factors affecting movement of groundwater, Soil Erosion, Soil Salinity, Siltation, Runoff, Deforestation, Water Scarcity, Groundwater depletion, Flooding etc. Methods, Potential, Assessment. Treatment of Catchments, Small Storage Structures, Planning Earth Dams, Agronomic measures in soil and water conservation problem and techniques of soil water conservation, Rainwater Harvesting, Rooftop Harvesting. Role of Government and NGO's- Case Studies	(15 hours)

References:

Mandatory:

1. Jain, S.K., Aggarwal, P.K. and Singh, V.P. 2007. Hydrology and Water Resources of India, Springer, The Netherlands.
2. Beach, Tim and Jonathan, M.F. 2017. Wetland Hydrology: The International Encyclopaedia of Geography, Wiley Online Library
3. Mutreja K.N. (1987) – Applied Hydrology, Tata Mckraw Hill.
4. Vir Singh, Raj ,(2000) Watershed Planning and Management, YashPublishing House, Bikaner, 2000.

Supplementary:

1. Rai, S.C. 2017. Hydrology and Water Resources: A Geographical Perspective, Ane Book Pvt. Ltd., New Delhi.
2. Tideman E.M. (1996) – Watershed Management : Guidelines for Indian conditions, Omega, N. Delhi 1996.
3. Todd D.K.(1959)- Ground Water Hydrology, John wiley, New York.
4. Pereira H.C. (1973) – Land use and water Resources Cambridge University Press, Cambridge

Web references:

1. http://www.yourarticlelibrary.com/watershed-management/watershed-management-meaning-types-steps-and-programmes/77309
2. http://agritech.tnau.ac.in/agriculture/agri_majorareas_watershed_watershedmgt.html
3. https://dep.wv.gov/WWE/watershed/Pages/watershed_management.aspx
4. https://www.rdrwa.ca/node/27
5. https://www.teriin.org/blog/watershed-management-and-development

Course Title: Geography of India
Course Code: PGMP –GEG-DSE- 410
Credits: 02
Marks: 50
Duration: 30hrs

Course objective:

1. To develop an understanding of regional geography of India in context of location, Physiography, drainage and climate.
2. To appreciate the unique regional diversity of India and the unification.
3. To enable to analyze and establish relationship between various factors in India's physical and cultural dimension.

Course Learning Outcomes:

1. **CLO1**: Students will understand the issues related of disparities in various regions of India.
2. **CLO2**: Students will able to differentiate various regions in India and its resource distributions, particularly from the perspective of physical, environmental and human perspective.
3. **CLO3:** Students will apply their knowledge to identify different types of soils and vegetation found in India.

Module I	Location, Physiography, Drainage and Climate: Location importance, Extent and Geopolitical Significance Major Physiographic Regions and their Importance, Drainage System of India and their characteristics, Climate and Seasons	(15 hours)
Module II	Resources in India and Contemporary Issues: Types of Soils, natural vegetation and Mineral resources distribution and degradation. Energy Resources: Conventional and Non- Conventional. Regional disparity, Poverty, Globalization, Demographic issues in India. India and Development- Global perspective	(15 hours)

References:

Mandatory:

1. Sharma, T. C. 2003: India - Economic and Commercial Geography. Vikas Publ., New Delhi.
2. Pathak. C.R. 2002, Spatial Structure and Process of Development in India, Regional Science Association. Kolkata.
3. Sen. P.K. and Prasad, N. 2002, An Introduction to Geomorphology of India. Allied publishers. Delhi.
4. Johnson, B. L. C., ed. 2001. Geographical Dictionary of India. Vision Books, New Delhi.
5. Deshpande C. D., 1992: India: A Regional Interpretation, ICSSR, New Delhi.

Web references:

1. https://www.patnauniversity.ac.in/e-
2. https://www.toppr.com/guides/geography/drainage/drainage-system-of-india/
3. https://www.tutorialspoint.com/geography/geography_india_drainage_system.htm
4. https://www.researchgate.net/publication/227467090_India's_Water_Resources_Contemporary_Issues_on_Irrigation
5. https://econpapers.repec.org/bookchap/oxpobooks/9780195682168.htm

SEMESTER III Level 500 Discipline Specific Elective (DSE)

Course Title: Tropical Climatology
Course Code: PGMP –GEG-DSE-501
Credits: 04
Marks: 100
Duration: 60 Hours of 1 hour each

Pre-requisite Courses:

- Basic knowledge about tropics and climatic concepts.

Course Objectives:

1. To understand the nature and scope of tropical climatology.
2. To learn about the factors that affect the energy balance, temperature distribution, and atmospheric circulation in tropical areas.
3. To gain knowledge about tropical cyclones, tropical rainfall, and heavy precipitation events in tropical areas.
4. To understand the different types of tropical climates and their suitability for agriculture, as well as the challenges of human adaptation to tropical climates and the impact of global warming on tropical climates and biomass.

Course Learning Outcomes (CLOs):
After successful completion of the course the students will be able to:
CLO1: Cognizance of tropical heat balance and its global consequences.
CLO2: Enrichment of knowledge about circulation pattern and dynamics of Monsoon climates.
CLO3: Acquaintance with dynamics and distribution of rainfall in tropics.
CLO4: Awareness about the impact of global warming on tropical climates and their relationship with agriculture.

Module I	Introduction to Tropical Climatology: 1. Nature and scope and significance of Tropical Climatology. 2. Energy balance in tropical areas 3. Temperature distribution in tropical areas.	(15 hours)
Module II	Atmospheric Circulation in Tropical Areas: 1. Atmospheric Pressure and circulation in tropical areas-Hadley Cell 2. Walker Circulation, ENSO. 3. Monsoons-Theories of origin and characteristics and areas of influence.	(15 hours)
Module III	Tropical Cyclones & Rainfall: 1. Tropical Cyclones-Origin and characteristics. 2. Tropical Rainfall-Dynamics and distribution. 3. Heavy Precipitation events in tropical areas	(15 hours)
Module IV	Characteristics of Tropical Climates: 1. Tropical Climates-Classification and characteristics. 2. Tropical Climates and agriculture: Human Adaptation to	(15 hours)

Tropical Climates.

3. Impact of Global Warming on Tropical Climates and Biomass

References:

Mandatory:

1. Ahrens, C. D. (2016). Essentials of meteorology: An introduction to atmospheric science (3rd ed.). Pearson.
2. Barry, R. G., & Chorley, R. J. (2013). Atmosphere, weather, and climate (8th ed.). Routledge.
3. Ritchie, H., & McVicar, T. R. (2017). Climate science: The science of climate change (2nd ed.). Wiley.
4. Eagleson, P. S. (2015). Meteorology: The dynamic science of the atmosphere. Pearson.
5. Stull, R. B. (2017). Meteorology today: An introduction to weather, climate, and the environment (12th ed.). Cengage Learning.
6. Chang, C. P., & Krishnamurti, T. N. (2000). Monsoon meteorology: Processes, models, and impacts. Oxford University Press.
7. Pachauri, R. K., & Dadi, S. K. (2001). Tropical climatology. Narosa Publishing House.
8. Ramanathan, V. (2010). The climate system: Physical processes, climate variability and climate change. Cambridge University Press India.
9. Gupta, S. K. (2009). Atmospheric circulation and climate. Narosa Publishing House.
10. Hodges, K. E. (2000). Tropical cyclones: Nature's most powerful storms. Oxford University Press India.
11. Emanuel, K. A. (2005). Atmospheric convection. Oxford University Press India.

Supplementary:

1. Trenberth, K. E. (2011). Physical climate: Atmospheric and oceanic. Elsevier.
2. Parenti, C (2011) Tropic of Chaos: Climate Change and New Geography of Violence, Nation Books, New
3. York
4. Wallace, J. M., & Hobbs, P. V. (2006). Atmospheric science: An introductory survey (2nd ed.). Elsevier.
5. Sellers, P. J. (1998). The Earth's atmosphere: An introduction (6th ed.). Addison-Wesley.
6. Nitta, Y. (2000). Monsoons: Processes, predictability, and climate change. Springer.
7. Gupta, S. K. (2004). Tropical meteorology. Narosa Publishing House.
8.

Web References:

1. https://ral.ucar.edu/hot/introduction-tropical-meteorology
2. https://earthobservatory.nasa.gov/features/EnergyBalance
3. https://climatedata.org/tropical-climate/
4. https://www.noaa.gov/resource-collections/climate-hadley-cell
5. https://www.cpc.ncep.noaa.gov/climate/enso_index.shtml
6. https://mausam.imd.gov.in/imd_latest/contents/monsoon.php
7. https://www.nhc.noaa.gov/climo/
8. https://www.nationalgeographic.com/environment/article/climate-change-tropical-rainforests

SEMESTER III Level 500 Discipline Specific Elective (DSE)

Course Title: Biogeography
Course Code: PGMP –GEG-DSE-502
Credits: 04
Marks: 100
Duration: 60 Hours of 1 hour each

Pre-requisite Courses:

- Basic knowledge about Biogeographic and environmental concepts.

Course Objectives:

1. To understand the factors that influence the distribution of plants and animals.
2. To identify and explain patterns of biodiversity.
3. To predict the effects of environmental change on biodiversity.
4. To conserve biodiversity.

Course Learning Outcomes (CLOs):

After successful completion of the course the students will be able to:

CLO1: Understanding basic ecological principles.

CLO2: Enrichment of understanding about distribution of plants and animals' life on the earth.

CLO3: Awareness about conservation of biotic resources and effects of industrial effluents on ecosystems.

CLO4: Acquaintance with environmental hazards and enactment of forest and wildlife policy in India.

Module I	Understanding Biogeography: 1. Nature, scope, and significance of biogeography. 2. Basic ecological principles: Bio-energy cycle in territorial ecosystem; energy budget of the earth; trophic levels and food web. 3. Origin of fauna and flora: major gene centers; domestication of plants and animals and their disposal agents and roots.	(15 hours)
Module II	Distribution of Life: 1. Distribution of plant life on the earth and its relation to soil, climate, and human activities. 2. Geographical distribution of animal life on the earth and its relation to vegetation types, climate, and human activities.	(15 hours)
Module III	Communities and Ecosystems: 1. Communities: nature of communities and ecosystems: bio-diversities; human induced communities' change; habitat decay and conservation of biotic resources. 2. Industrial effluent and its effect on fresh water and marine biology. Field Report- Study of Ecosystem-River, Lake, Creek, Forest or Hill.	(15 hours)

	Hazards and Conservation	
Module IV	1. Environmental hazards: Ecological consequences, human perception, and adjustment with respect to floods, drought, and earthquake. 2. Bio-Reserves in India. 3. National forest and wildlife policy of India.	(15 hours)

References:

Mandatory:

1. Murray, T. H. (2007). Biogeography: An Introduction to the Study of Plants and Animals. Oxford University Press.
2. Odum, E. P. (2005). Fundamentals of Ecology (5th ed.). W. H. Freeman.
3. Chase, M. W., & Soltis, D. E. (2003). The Origin and Evolution of Plants. Academic Press.
4. Dawkins, R. (2004). The Origin and Evolution of Animals. Oxford University Press.
5. Crawley, M. J. (2007). The Ecology of Plant Communities (2nd ed.). Wiley-Blackwell.
6. Begon, M., & Townsend, C. R. (2005). Animal Biogeography (3rd ed.). Wiley-Blackwell.
7. Pearson, R. G., & Raven, P. D. (2000). Ecosystem Ecology (2nd ed.). Elsevier.
8. Soulé, M. E., & Wilson, D. A. (2005). Conservation Biology: A Global Perspective (2nd ed.). Island Press.
9. Wood, J. M. (2006). Environmental Pollution (3rd ed.). Routledge.
10. Maskrey, A. (2006). Disaster Risk Reduction. Routledge.
11. Ministry of Environment and Forests, Government of India. (2008). National Bio-Diversity Action Plan: India. Ministry of Environment and Forests, Government of India.

Supplementary:

1. Currie, D. J. (2011). Biogeography: Past, Present, and Future. Wiley-Blackwell.
2. Begon, M., Townsend, C. R., & Harper, J. L. (2006). Essentials of Ecology (4th ed.). Wiley-Blackwell.
3. Diamond, J. (2005). Island Biogeography. Princeton University Press.
4. Smith, D. M., & Wootton, M. J. H. (2007). Plant Biogeography (2nd ed.). Wiley-Blackwell.
5. Wilson, E. O. (2006). The Diversity of Life (2nd ed.). W. W. Norton & Company.
6. Jones, D. J. T. (2007). Global Change and Animal Migration. Cambridge University Press.
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8. Burton, I., Kates, R. W., & White, G. F. (2007). Environmental Hazards: Assessing Risk and Reducing Disaster (2nd ed.). Routledge.
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1. https://www.nationalgeographic.org/encyclopedia/biogeography/
2. https://www.epa.gov/ecology/ecological-principles
3. https://oceanservice.noaa.gov/education/tutorial_corals/coral09_ecosystem.html
4. https://www.worldwildlife.org/threats/human-activities
5. https://www.ecologyglobalnetwork.com/community-ecology/
6. https://www.britannica.com/technology/pollution-environment
7. https://india.gov.in/topics/environment/national-forest-and-wildlife-policy

SEMESTER III Level 500 Discipline Specific Elective (DSE)

Course Title: Geography & Disaster Management
Course Code: PGMP –GEG-DSE-503
Credits: 04
Marks: 100
Duration: 60 Hours of 1 hour each

Pre-requisite Courses:

- Basic knowledge about environmental and anthropogenic hazards and disasters.

Course Objectives:

1. Understand the different types of natural disasters and their causes.
2. Identify the social and economic impacts of disasters.
3. Develop skills in disaster risk reduction and management.
4. Become familiar with the different policies and strategies for disaster management.

Course Learning Outcomes (CLOs):

After successful completion of the course the students will be able to:

CLO1: Understanding about the spatial dimensions and distribution of disasters.
CLO2: Enrichment of knowledge about natural and human induced disasters.
CLO3: Acquaintance with the concepts of disaster management, vulnerability, and mitigation.
CLO4: Awareness about the role of geospatial technology in disaster management.

Module I	Fundamentals of Disasters and Hazards: 1. Disasters and hazards: definition, nature, and classification. 2. Geography and disasters: major disasters of world, disaster profile of India.	(15 hours)
Module II	Types of Disasters 1. Tectonic disasters: volcanoes, earthquakes, tsunamis, landslides. 2. Hydrological disasters: floods and droughts. 3. Climatic disasters: cyclones and heavy precipitation events. 4. Human induced disasters: epidemics, industrial and transport disasters; wars and terrorism induced disasters.	(15 hours)
Module III	Disaster Management & Preparedness: 1. Disaster management in India: policy and organizational structure setup. 2. Disaster vulnerability and affecting factors. 3. Planning for disaster mitigation measures and preparedness.	(15 hours)
Module IV	Recovery, Impacts, and Technology Applications: 1. Post disaster recovery and rehabilitation. 2. Impacts of disaster on society and economy. 3. Geospatial technology applications in disaster prevention	(15 hours)

and monitoring.

References:

Mandatory:

1. Alexander, D. (2012). Natural disasters. 2nd ed. Abingdon, Oxon: Routledge.
2. Gaillard, J.-C., & Debris, M. (2012). Disaster geography: A reader. London: Routledge.
3. Pelling, M. (2003). The vulnerability of cities: Natural disasters and social resilience. London: Earthscan.
4. Cannon, S., & Fujita, K. (2010). Volcanoes and society: The human dimension of volcanic hazards. Cambridge: Cambridge University Press.
5. Sieh, K., & Schwartz, S. Y. (2010). Tectonics of earthquakes. 2nd ed. Malden, MA: Wiley-Blackwell.
6. Krishna, R., & Singh, V. P. (2008). Water resources planning and management: Theory and practice. 2nd ed. Berlin: Springer.
7. Pender, G., & Blöschl, G. (2011). Floods: Processes, impacts and management. Chichester, UK: Wiley.
8. Sivapalan, M., & Demeritt, D. (2007). Droughts: A global assessment. Berlin: Springer.
9. Kronenberg, B., & Wetmore, J. M. (2011). The Routledge handbook of terrorism and counter-terrorism. London: Routledge.
10. Government of India. (2019). National disaster management framework. New Delhi: Ministry of Home Affairs.

Supplementary:

1. Emanuel, K. A. (2005). Disasters of the sea. New York: Oxford University Press.
2. Foster, G., & Rahmstorf, S. (2012). Global warming and extreme weather events. New York: Cambridge University Press.
3. Alexander, D. (2013). Man-made disasters. 3rd ed. Abingdon, Oxon: Routledge.
4. Finkel, M. J. (2005). The biological weapons threat: An assessment. Westport, CT: Praeger Security International.
5. Government of India. (2016). National disaster management guidelines. New Delhi: Ministry of Home Affairs.
6. Birkmann, J. (2006). Measuring vulnerability to natural hazards: Towards disaster resilient societies. Tokyo: United Nations University Press.

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1. https://www.undrr.org/terminology
2. https://www.worldatlas.com/articles/the-10-most-destructive-earthquakes-tsunamis-and-volcanic-eruptions.html
3. https://ndma.gov.in/en/disaster-profile-of-india.html
4. https://www.who.int/environmental_health_emergencies/disease_outbreaks/epidemics/en/
5. https://ndma.gov.in/en/policy-dm-acts.html
6. https://www.undp.org/content/undp/en/home/what-we-do/post-crisis-and-post-disaster-recovery.html
7. https://earthdata.nasa.gov/esds/patterns/remote-sensing

SEMESTER III Level 500 Generic Elective (GE)

Course Title: Regional Perspectives of Geopolitics
Course Code: PGMP –GEG-GE-501
Credits: 04
Marks: 100
Duration: 60 Hours of 1 hour each

Pre-requisite Courses:

- Basic knowledge about concepts of politics, nation, geopolitics, etc.

Course Objectives:

1. To understand the relationship between geography and politics.
2. To understand the spatial dynamics of political power.
3. To analyze the relationship between states and their territory.
4. To examine the role of geography in international relations.
5. To explore the impact of globalization on political geography.

Course Learning Outcomes (CLOs):

After successful completion of the course the students will be able to:

CLO1: Familiarization with the conceptual framework of geo-political issues.
CLO2: Augmentation of knowledge about state and nation in geographic perspective.
CLO3: Enhancement of knowledge about global strategic views and geo-politics in post-cold war era.
CLO4: Awareness about contemporary geo-political situation and issues in India.

Module I	Political Geography: An Introduction 1. Nature and scope of political geography, its approaches, and recent trends. 2. School of thoughts: political economy, world system, globalization.	(15 hours)
Module II	The State and Territory: The Spatial Dimensions of Politics 1. Concept of nation, state and nation-state, nationalism and nation building, emergence and growth of territorial state, globalization, and the crisis of the territorial state forms of governance: unitary and federal. 2. Distinction between frontiers and boundaries, demarcation of boundaries, classification, and functions of boundaries. 3. Landlocked state: advantages and disadvantages.	(15 hours)
Module III	Geopolitics: The Geography of Power 1. Global strategic views: The Revisionist Powers, The Hybrid Warfare, The Geoeconomics, Neoclassical realism, Constructivism, The Rise of Non-State Actors 2. Geo-politics in the post-cold war world- S.B. Cohen's model of geo-politics. 3. The rise of China and its implications for the global order, The war on terror and the reconfiguration of US foreign	(15 hours)

policy, The conflict in Ukraine and the resurgence of great power competition, The role of international organizations in the post-Cold War world.

Module IV	India in the World: A Geopolitical Perspective 1. Emergence of India as regional power: geo-political significance of Indian and Pacific Ocean. 2. Geo-political issues in India with special reference to water disputes and riparian claims. 3. Gerrymandering and electoral abuse in India. 4. Kashmir problem and Indo-Pak relations.	(15 hours)

References:

Mandatory:

1. Agnew, J. (2003). Geopolitics: Re-visioning world politics. Routledge.
2. Sassen, S. (2006). Globalization: A critical introduction (2nd ed.). Wiley-Blackwell.
3. Paasi, A. (2009). Borderland: The changing nature of borders and boundaries. Routledge.
4. Mearsheimer, J. J. (2014). The tragedy of great power politics (2nd ed.). W. W. Norton & Company.
5. Agnew, J. (2003). Geopolitics: Re-visioning world politics. New Delhi: Oxford University Press India.
6. Taylor, P. J. (2001). Political geography: World-economy, nation-state and locality (4th ed.). New Delhi: Oxford University Press India.
7. Sassen, S. (2006). Globalization: A critical introduction (2nd ed.). New Delhi: Prentice Hall of India.
8. Paasi, A. (2009). Borderland: The changing nature of borders and boundaries. New Delhi: Routledge India.
9. Wolf, A. T., Nathwani, J., & Kramer, A. (2003). Water conflicts and international law. New Delhi: Macmillan India.

Supplementary:

1. Johnston, R. J. (2016). The dictionary of human geography (7th ed.). Wiley-Blackwell.
2. Agnew, J., & Corbridge, S. (1995). Geopolitics: A critical introduction. Routledge.
3. Newman, D. (1999). Boundaries: The making of boundaries and the breaking of boundaries. Frank Cass.
4. Johnston, R. J. (2016). The dictionary of human geography (7th ed.). New Delhi: Oxford University Press India.
5. Held, D., McGrew, A., Goldblatt, D., & Perraton, J. (1999). Global transformations: Politics, economics and culture. New Delhi: Prentice Hall of India.
6. Klabbers, J. (2010). The law of international watercourses: Non-navigational uses. New Delhi: Macmillan India.
7. Sadoff, C. W., & Grey, D. (2005). Water wars: Ensuring water security in the 21st century. New Delhi: Macmillan India.
8. Freedman, L. (2017). The future of war: A new history. Public Affairs.

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1. https://www.britannica.com/science/political-geography
2. https://www.globalpolicy.org/nation-state.html
3. https://www.thoughtco.com/international-boundaries-and-borders-1435336
4. https://www.geographical.co.uk/places/item/2175-the-ups-and-downs-of-being-landlocked
5. https://www.belfercenter.org/neoclassical-realism
6. https://www.fletcherforum.org/home/2019/9/26/a-brief-overview-of-post-cold-war-geopolitics
7. https://www.rand.org/content/dam/rand/pubs/research_reports/RR300/RR392/RAND_RR392.pdf
8. https://thediplomat.com/2020/09/indias-role-in-the-indian-and-pacific-oceans/

SEMESTER III Level 500 Generic Elective (GE)

Course Title: Geography of Wellbeing with Special Reference to India
Course Code: PGMP –GEG-GE-502
Credits: 04
Marks: 100
Duration: 60 Hours of 1 hour each

Pre-requisite Courses:

- Basic knowledge about the different ecosystems of our planet earth.

Course Objectives:

1. To introduce students to the concepts of social well-being, development, and human welfare.
2. To examine different approaches to studying human welfare and the use of social indicators.
3. To analyze the state of well-being in India, with a focus on poverty, inequality, and gender issues.
4. To explore the relationship between education, health, and development in India.

Course Learning Outcomes (CLOs):

After successful completion of the course the students will be able to:

CLO1: Understanding the concept of social wellbeing in spatial context.
CLO2: Enhancement of knowledge about human welfare issues and their identification.
CLO3: Acquaintance with educational infrastructure and policies in India.
CLO4: Enrichment of knowledge about spatial pattern of hunger, health, and nutritional security.

Module I	Welfare Geography: 1. Welfare geography: concept of social well-being, development, and approaches to study human welfare. 2. Human beings: needs and wants, quality of life, level of living and state of well-being in India, identification of social indicators, their data sources and problem.	(15 hours)
Module II	Indexes of Well Being: 1. Human Development Index, poverty and its measures, poverty, and inequality in India. 2. Gender issues in the process of development and gender development index.	(15 hours)
Module III	Structure of Education in India 1. Structure of education in independent India, regional patterns of educational development; enrolment and dropouts with reference to school education. 2. Financing education and education policy in India.	(15 hours)
Module IV	Geography of Health 1. Geography of health: concept of disease, ecology, and epidemiology. 2. Health programmes and National Health Policy in independent India. 3. Nutritional security in India.	(15 hours)

References:

Mandatory:

1. Desai, S. (2013). Social well-being: Concepts and measurement. Springer.
2. Bhatia, B. M. (2003). Quality of life in India: Concepts and measurement. Sage Publications India.
3. Kundu, A. (2006). Human development and quality of life in India: A state level analysis. Oxford University Press.
4. UNDP. (2022). Human development report 2022: The inequality challenge. United Nations Development Programme.
5. Dreze, J., & Sen, A. (2013). India: Development and participation. Oxford University Press.
6. Tilak, J. B. G. (2005). Education for all in India: Achieving the MDGs. Sage Publications India.
7. Panda, P. K. (2012). Financing education in India: Issues and challenges. Sage Publications India.
8. Govinda, R. (2012). Education and development in India: Achieving social justice through quality education. Oxford University Press.
9. Cliff, A. D., Haggett, P., & Smallman-Raynor, M. (2012). The geography of disease: An introduction. Blackwell.
10. Government of India. (2017). National health policy 2017. Ministry of Health and Family Welfare.
11. Ramachandran, V. K. (2017). Nutrition and health in India: From policy to practice. Springer.

Supplementary:

1. Sen, A. (1999). Development as freedom. Oxford University Press.
2. Haq, M. U. (1995). Reflections on human development. Oxford University Press.
3. Bhalla, S. (2002). Imagined destinies: India's economic policies from Nehru to Modi. Penguin Books India.
4. Srivastava, P. (2010). Education in India: Issues and challenges. Pearson.
5. McMichael, A. J. (2013). Planetary health: A once and future discipline. Nature, 494(7439), 169-172.
6. Ramachandran, V. K. (2018). Health and development in India: From policy to practice. Springer.
7. Ghosh, A. (2018). Malnutrition in India: Issues, challenges, and solutions. Springer.

Web References:

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2. http://hdr.undp.org/en/indicators/137506
3. https://www.education.gov.in/
4. https://www.mohfw.gov.in/
5. https://www.icmr.gov.in/

SEMESTER III Level 500 Generic Elective (GE)

Course Title: Cultural Geography
Course Code: PGMP –GEG-GE-503
Credits: 04
Marks: 100
Duration: 60 Hours of 1 hour each

Pre-requisite Courses:

- Basic knowledge about different cultures, races, etc.

Course Objectives:

1. To enhance the understanding of culture using key concepts of geography.
2. To develop analytical skills to decode culture.
3. To provide a critical understanding of contemporary issues and the politics underlying it.

Course Learning Outcomes (CLOs):

After successful completion of the course the students will be able to:

CLO1: Enrichment of knowledge about the main civilizations of world.
CLO2: Enhancement of knowledge about factors and processes of cultural diversity.
CLO3: Acquaintance with racial classification and distribution in the world.
CLO4: Develop analytical capability to read contemporary issues of culture

Module I	The Evolution of Human Civilizations: 1. Definition, nature, and scope of Cultural Geography; cultural elements and components of culture. 2. The evolution of Human Civilizations with special reference to: Mesopotamia, the Nile Valley, the Indus Valley, and the Hwang Ho Valley.	(15 hours)
Module II	Cultural Diversity & Landscape: 1. Bases of cultural diversity and cultural transformation-race, religion, and language. 2. Cultural landscape and cultural ecology. 3. The speed and efficiency of operation of cultural processes.	(15 hours)
Module III	Evolution of Races: 1. Race, evolution of race, criteria of racial classification, theories of the classification of Races-Zones and Strata or Migration Zone Theory of race evolution. 2. Classification of Races: Major races of the world: Nordics, Mongoloids, Negroids and Caucasoids. 3. Racial Classification in India-Sri Risley, A.C. Haddon, B.S. Guha.	(15 hours)
Module IV	Tribal India: A Case Study 1. Tribes of India with main emphasis on Naga, Khasis, Todas, Bhils and Santhals. 2. Patterns of livelihood: Various economic activities,	(15 hours)

cultural adaptations; agriculture, industrialization and modernization, technological changes, and their geographical implications.

References:

Mandatory:

1. Anderson, K., Domosh, M., Pile, S., & Thrift, N. (eds.). 2002. Handbook of cultural geography, Sage.
2. Blunt, A. 2005. Cultural geography: cultural geographies of home. Progress in human geography, 29(4), 505-515.
3. Cavallaro, D. 2001. Critical and Cultural Theory: Thematic Variations, Athlone Press, London and New Brunswick, NJ.
4. Duncan, J. S. 2005. The city as Text: The Politics of Landscape Interpretation in the Kandyan Kingdom, Cambridge University Press.
5. Lorimer, H. 2005. Cultural geography: the busyness of being more-than representational'. Progress in human geography, 29(1), 83-94.
6. Mitchell, D. 2000. Cultural Geography: A Critical Introduction, Blackwell
7. Valentine, G. 2014. Social geographies: space and society, Routledge.

Supplementary:

1. Hirsch, E and Hanlon, M. 2003. The Anthropology of Landscape: perspectives on space and Place, Oxford: Clarendon press.
2. Rose, G. 2008. Looking at Landscape: The Uneasy Pleasures of Power. In The Cultural Geography Reader (pp. 183-187), Routledge.
3. Whatmore, S. 2006. Materialist returns: practicing cultural geography in and for a more-than human world, Cultural geographies, 13(4), 600-609.
4. Mitchell, D. 1996. 'California: The Beautiful and the Damned' from the 'Lie of the Land: Migrant Workers and the California Landscape, 13-35, Minneapolis: University of Minnesota Press

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2. https://www.ancient.eu/Mesopotamia/
3. https://www.bbc.co.uk/bitesize/guides/zbgj6sg/revision/1
4. https://www.ancient.eu/Indus_Valley_Civilization/
5. https://www.nationalgeographic.org/encyclopedia/cultural-diversity/
6. https://www.worldatlas.com/articles/what-are-the-main-human-races.html
7. https://www.thoughtco.com/cultural-ecology-4771727
8. https://www.culturalindia.net/indian-tribes/index.html
9. http://www.icssr.org/changing-patterns-of-livelihood-in-rural-india

SEMESTER III Level 500 Discipline Research Specific Elective (DRSE)

Course Title: Fundamentals of Research Methodology
Course Code: PGMP–GEG-DRSE- 501
Credits: 04
Marks: 100
Duration: 60 Hours of 1 hour each

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Pre-requisite Courses:

1. A bridge course is compulsory for those who have not completed Research Methodology at the Under Graduate level.

Course Objectives:

1. To familiarize students with the fundamentals of research.
2. To comprehend the methods used to identify research gaps by examining existing literature and formulating research questions.
3. To integrate knowledge of theoretical research with practical abilities that will aid students in undertaking research.

Course Learning Outcomes:

At the end of this course, students will be able to:

CLO1: Acquire knowledge of research processes such as reading, evaluating and developing.
CLO2: Compare and contrast the significant differences between different research types.
CLO3: Define and devise specialized research design.
CLO4: Develop and draft a comprehensive research paper (containing citations, references, an abstract, etc.).

Module I	Fundamentals of Research: 1. Definition, Characteristics, Objectives, and relevance of research. Types and Methods of research. 2. Research Problem selection and formulation: Types, Components and Sources, Formulating and stating the problem, Research Gap, Formulation of Research Questions and Objectives. 3. Sources of Information: Gathering information for research, using library and electronic database.	(15 hours)
Module II	Formulation of Research Design: 1. Meaning, Definition, Advantages, Essentials, Importance of research plan, and kinds of research designs. 2. Preparation of research design, steps, Characteristics of good research design, Evaluation of research design. Cross sectional, longitudinal, experimental, and non-experimental study design. 3. Formulation of Hypothesis: Definition, need, types, functions, sources. Testing of hypothesis and types of errors.	(15 hours)
Module III	Methods of Data Collection and analysis: 1. Concept and types of data collection and sources, methods, and types.	

	2. Sampling Design: Methods of Sampling- Census Sampling method, Random Sampling Methods (Simple, Stratified, Systematic, Multi-Stage, Area, and Sequential sampling). Non-Random Sampling Methods (Accidental, Quota, Purposive, Convenience sampling) and Sample Size. 3. Processing and analysing of data (Qualitative and Quantitative).	(15 hours)
Module IV	Reviewing and Refining a Research Paper: 1. Review of Literature: Need, Strategies, methods, and organization of literature of review. 2. References and Citations: Referencing, in-text citations, styles, Paraphrasing and Summarising. 3. Reference Management Software and Tools: EndNote, Mendeley, Zotero etc. Ethical issues in collecting data. 4. Editing a research paper, developing objectives and research statements, Editing the research paper and Proofreading techniques. 5. Format of writing a research Proposal/Paper/Dissertation.	(15 hours)

References:

Mandatory:

1. Kothari, C. R. & Garg G. (2019) Research Methodology: methods and Techniques (4) New Age International Publishers, New Delhi.
2. Kabir S. M. S (2016) Methods of Data Collection, Basic Guidelines for Research: An Introductory Approach for All Disciplines, (1), Chapter: 9, Book Zone Publication, Chittagong-4203, Bangladesh, pp.201-275.
3. Saravanavel, P. (2014). Research Methodology, Kitab Mahal Publishers, Ansari Road, Daryaganj, New Delhi- 110002.
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5. Kumar, R. (2005). Research Methodology-A Step-by-Step Guide for Singapore: Pearson Education.
6. Somekh B. and Lewin C (2005), Research Methods in the Social Sciences, Sage Publications, Prentice Hall.
7. Kothari, C. R. (2004). Research Methodology: Methods and Techniques. New Delhi: New Age International.

Supplementary:

1. Succheti D.C. and Kapoor V.K. (2010) Statistics: Theory, Methods and Application, Sultan Chand and Sons, New Delhi.
2. Sharma A.K. (2005) Textbook of Elementary Statistics, Discovery Publishing Pvt. Ltd, New Delhi-110055.

3. Creswell J.W. (2005) Research Design: Qualitative, Quantitative and Mixed Methods Approaches, (2), Thousand Oaks, CA: Sage Publications.
4. P.K. Majumdar (2002) Statistics: A Tool for Social Sciences, Rawat Publications, Jaipur & New Delhi.
5. Tripathi P C (2002) A textbook of Research Methodology, (4), Sultan Chand and Sons, New Delhi.

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1. https://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/law/09._research_methodology/01._basics_of_research/et/8148_et_et.pdf
2. https://www.accountingnest.com/articles/research/basic-research
3. https://ccsuniversity.ac.in/bridge-library/pdf/MPhil%20Stats%20Research%20Methodology-Part1.pdf
4. https://www.kharagpurcollege.ac.in/studyMaterial/53718FORMULATION-OF-RESEARCH-DESIGN-CC11-Unit-1-02-09-2020.pdf
5. https://www.scribbr.com/methodology/research-design/
6. https://www.questionpro.com/blog/data-collection-methods/#:~:text=Some%20common%20data%20collection%20methods,about%20the%20study's%20subject%20matter.
7. https://www.simplilearn.com/what-is-data-collection-article
8. https://www.uvm.edu/~ngotelli/Bio%20264/Gotelli&EllisonChapter4disputed.pdf
9. https://www.g2.com/categories/reference-management

SEMESTER III Level 500 Discipline Research Specific Elective (DRSE)

Course Title: Quantitative Techniques
Course Code: PGMP–GEG-DRSE- 502
Credits: 04
Marks: 100
Duration: 60 Hours of 1 hour each

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Pre-requisite Courses:

1. Basic knowledge of statistics.
2. Bridge course is compulsory for those who have not completed statistics at Under Graduate level.

Course Objectives:

1. To introduce statistical techniques, relevant to research studies.
2. To acquaint students about the potentials and applications of statistical techniques.

Course Learning Outcomes:

At the end of this course, students will be able to:

CLO1: Acquire knowledge on formulation of multiple statistical representations.
CLO2: Develop an understanding and appreciation of the mutual dependence of different techniques and their relevance.
CLO3: Formulate and test the hypothesis.
CLO4: Use of open source software for Statistical analysis.

Module I	Frequency Distribution, Measures of Central tendency & Dispersion: 1. Introduction to Statistics, Graphical and Diagrammatic representation of statistical data. 2. Mean, Median, Mode, Quartiles, Deciles, Percentiles, Range, Mean deviation, Quartile deviation, Standard deviation, and Lorenz curve.	(15 hours)
Module II	Correlation and Regression Analysis. Moments, Skewness and Kurtosis: 1. Scatter diagram, Karl Pearson's correlation coefficient. Bi-variate regression. 2. Rank correlation: Spearman's and Kendal's rank correlation coefficient. 3. Moments, Concept, measures of skewness and kurtosis.	(15 hours)
Module III	Time series analysis &Testing of hypothesis in Geographic context: 1. Moving averages, Matrices, Chi square test and T-Test, Analysis of variance (ANOVA). 2. Bi-variate and multi-variate correlation and Regression, Principal Component Analysis (PCA).	(15 hours)
Module IV	Introduction to R-Statistical Analysis Tool: 1. Introduction to R-Tool Software, Generate Linear Regression Models and Correlation coefficients and	(15 hours)

its application.

References:

Mandatory:

1. Mahmood A. (2020). Statistical Methods in Geographical Studies, Rajesh Publications, Ansari Road, New Delhi- 110002 (7).
2. Bagavathi and Pillai R.S.N (2009) Statistics Theory and Practice, S. Chand and Company Ltd, Ram Nagar, New Delhi-110055.
3. Gupta S.C (2008) Fundamentals of Statistics, Himalaya Publishing House, Delhi -110055.
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5. Alvi Z. (2000) Statistical Geography: Method and Applications, Rawat Publications, New Delhi.

Supplementary:

1. Succheti D.C. and Kapoor V.K. (2010) Statistics: Theory, Methods and Application, Sultan Chand and Sons, New Delhi.
2. Sharma A.K. (2005) Textbook of Elementary Statistics, Discovery Publishing Pvt. Ltd, New Delhi-110055.
3. P.K. Majumdar (2002) Statistics: A Tool for Social Sciences, Rawat Publications, Jaipur & New Delhi.

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1. Olsen A (n.d.) Introduction to R Statistical Software, Retrieved from: https://archive.epa.gov/nheerl/arm/web/pdf/irss_2.6.pdf
2. Lane M. D. et al. (n.d.) Introduction to Statistics, Retrieved from: https://onlinestatbook.com/Online_Statistics_Education.pdf
3. _____(n.d.) Fundamentals of Statistics, Retrieved from: https://www.pearsonhighered.com/assets/samplechapter/0/1/3/1/0131467573.pdf
4. Hon K. (n.d.) An Introduction to Statistics, Retrieved from: https://www.fd.cvut.cz/department/k611/pedagog/THO_A/A_soubory/statistics_firstfive.pdf
5. Alredaisy, S. M. (2014, January) Research Gate (University of Khartoum Faculty of Distant Education) doi:10.13140/2.1.4332.1923
6. Darthmouth Library. (2020, April 4). Retrieved from Geography: Statistics/Data for Geography: https://researchguides.dartmouth.edu/geography/statistics
7. eGyanKosh. (n.d.). Retrieved from Measures of Skewness and Kurtosis: http://egyankosh.ac.in/bitstream/123456789/19499/1/Unit-6.pdf
8. Rogerson, P. A. (2001). Sage Research Methods. doi: https://dx.doi.org/10.4135/9781849209953

SEMESTER IV Level 500 Research Specific Elective (RSE)

Course Title: Digital Cartography in Geographical Research
Course Code: PGMP–GEG-RSE- 501
Credits: 02
Marks: 50
Duration: 30 Hours of 1 hour each

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Pre-requisite Courses:

1. Basic knowledge of computers and Microsoft Office.
2. Should have successfully completed a course on Introduction to Geographic Information System.

Course Objectives:

1. To apply computer aided cartographic concepts and skills in geographical data presentation.
2. To analyze and interpret cartograms for effective inferences and communication of geographical data.

Course Learning Outcomes:

At the end of this course, students will be able to:

CLO1: Acquire knowledge on the concepts related to map making using digital technology and cartographic design.
CLO2: Employ mind mapping and collective mapping tools to determine the relationships between several topics visually.
CLO3: Develop practical skills in creating accurate, engaging, and informative maps and graphs.
CLO4: Apply and analyze relevant geospatial data from digital archives in geographic research.

Module I	Computer Cartography Technology in Geographic Research: History and development of Digital Cartography, cartographic visualization and Geo-visualization. Digital Cartography: Hardware and Software. Digital mapping, designing and analysis, Overlay and network analysis, map elements and layout.	(15 hours)
Module II	Application of Computer Cartography: Role of computer cartography in various fields- Environmental and earth sciences, natural and water resources, regional development and planning, management, agriculture, forestry, disaster management, demography, urban planning etc.	(15 hours)

References:

Mandatory:

1. Patil S. (2020) Use of Computer Technologies in Geographical Research: An Integrated focus on Google Services, SPSS and Microsoft Word, Application of Research Methods and Techniques in Geography, Universal Publishing House, (pp.25-32).
2. Jones C. (2014) Geographical Computer Systems and Computer Cartography, Routledge Publishers, Taylor and Francis Group.

3. Peterson, Gretchen N. (2014) GIS Cartography, A Guide to Effective Map Design, 2nd ed., CRC Press, Taylor & Francis Group, New York.
4. Ganesh, A., (2007) Computer Basics for Young Scientists, Dept. of Geography, Bharathidasan University, Tiruchirappalli.
5. Ramesh, P.A. (2004) Fundamentals of Cartography, Concept Publishing Co., New Delhi.
6. Misra, R.P. & A. Ramesh (2002) Fundamentals of Cartography. Concept Publishing Co., New Delhi.

Supplementary:

1. Slocum, T.A., et al. (2009). Thematic Cartography and Geo-visualization. Upper Saddle River, NJ: Prentice Hall.
2. Dent, Borden, D., Torguson, Jeff, and Thomas W. Hodler, (2008) Cartography, Thematic Map Design, 6th ed., McGraw-Hill Higher Education, Toronto.
3. Brewer, C.A. (2005). Designing Better Maps. Redlands, CA: ESRI Press.
4. Mahmood, Aslam (2002) Statistical Methods in Geographical Studies. Rajesh Publications New Delhi-110002.
5. Kraak, Menno-Jan and Allan Brown (2001) Web Cartography, Taylor & Francis, London.
6. Zhong-ren peng and Ming. Hsiang (2001) Internet GIS, John Wiley & Sons, New Jersey.

Web references:

1. https://www.igntu.ac.in/eContent/IGNTU-eContent-403493872964-BA-GeographyandRegionalDevelopment-4-Dr.RichaChaturvedi-CartographicTechniqueinGeography-4.pdf
2. http://www.cbmahavidyalaya.ac.in/studyMaterial/0384CBM__PART-III-H__Computer-Application-in-Geography-16-05-2020.pdf
3. https://www.degruyter.com/document/doi/10.1515/9783839445198-024/html?lang=en
4. https://www.britannica.com/science/map/Modern-mapmaking-techniques
5. https://www.e-education.psu.edu/geog160/node/1882
6. https://www.unescap.org/sites/default/files/Epicollect5_Field_Data_Collection.pdf
7. https://support.microsoft.com/en-gb/office/get-started-with-3d-maps-6b56a50d-3c3e-4a9e-a527-eea62a387030
8. https://support.microsoft.com/en-us/office/get-geographic-location-data-287b4cf2-3d7d-4bc1-b412-3d00f45dbbd6

Course Title: Digital Cartography in Geographical Research (Practical)
Course Code: PGMP–GEG-RSE- 501
Credits: 02
Marks: 50
Duration: 60 Hours
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Module I	Application of Microsoft Office and Open Source software in Geographic Research: Presentation and analysis of geographic data using Microsoft Word, Excel and PowerPoint. Presentation and illustration of geographic data using QGIS or Open Source Software: Map Layouts and presentations.	(30 sessions)
Module II	Use of Digital application and Collective Mapping: EpiCollect5 (mobile-based application) for data collection: Location specific (Dot-Density, Cluster and Hot-spot analysis). Presentation of flow charts and tree-diagrams. Iconography for mapping, Field-based activity on Collective Mapping and Field Report.	(30 sessions)

References:

Mandatory:

1. Patil S. (2020) Use of Computer Technologies in Geographical Research: An Integrated focus on Google Services, SPSS and Microsoft Word, Application of Research Methods and Techniques in Geography, Universal Publishing House, (pp.25-32).
2. Sawant N.N., Ferro A., Desai A., and D'Souza D. (2018). Collective Critical Cartography- A Tool in Geographical Study, 5/45, Scholarly Research Journal for Interdisciplinary Studies, pp:1-5.
3. Jones C. (2014) Geographical Computer Systems and Computer Cartography, Routledge Publishers, Taylor and Francis Group.
4. Peterson, Gretchen N. (2014) GIS Cartography, A Guide to Effective Map Design, 2nd ed., CRC Press, Taylor & Francis Group, New York.
5. Ganesh, A., (2007) Computer Basics for Young Scientists, Dept. of Geography, Bharathidasan University, Tiruchirappalli.
6. Ramesh, P.A. (2004) Fundamentals of Cartography, Concept Publishing Co., New Delhi.
7. Misra, R.P. & A. Ramesh (2002) Fundamentals of Cartography. Concept Publishing Co., New Delhi.

Supplementary:

1. Slocum, T.A., et al. (2009). Thematic Cartography and Geo-visualization. Upper Saddle River, NJ: Prentice Hall.
2. Dent, Borden, D., Torguson, Jeff, and Thomas W. Hodler, (2008) Cartography, Thematic Map Design, 6th ed., McGraw-Hill Higher Education, Toronto.

3. Brewer, C.A. (2005). Designing Better Maps. Redlands, CA: ESRI Press.
4. Mahmood, Aslam (2002) Statistical Methods in Geographical Studies. Rajesh Publications New Delhi-110002.
5. Kraak, Menno-Jan and Allan Brown (2001) Web Cartography, Taylor & Francis, London.
6. Zhong-ren peng and Ming. Hsiang (2001) Internet GIS, John Wiley & Sons, New Jersey.

Web references:

1. https://docs.qgis.org/3.28/en/docs/training_manual/basic_map/index.html
2. https://gisgeography.com/how-to-make-a-map-gis-free/
3. https://www.qgistutorials.com/en/docs/making_a_map.html
4. https://www.businesscomputerskills.com/tutorials/excel/the-ultimate-guide-to-excel-charts-and-graphs.php
5. https://support.microsoft.com/en-us/office/create-a-map-chart-in-excel-f2cfed55-d622-42cd-8ec9-ec8a358b593b#:~:text=Create%20a%20Map%20chart%20with,tab%20%3E%20Data%20Types%20%3E%20Geography.
6. https://www.igntu.ac.in/eContent/IGNTU-eContent-403493872964-BA-GeographyandRegionalDevelopment-4-Dr.RichaChaturvedi-CartographicTechniqueinGeography-4.pdf
7. http://www.cbmahavidyalaya.ac.in/studyMaterial/0384CBM__PART-III-H__Computer-Application-in-Geography-16-05-2020.pdf
8. https://www.degruyter.com/document/doi/10.1515/9783839445198-024/html?lang=en
9. https://www.britannica.com/science/map/Modern-mapmaking-techniques
10. https://www.e-education.psu.edu/geog160/node/1882
11. https://www.unescap.org/sites/default/files/Epicollect5_Field_Data_Collection.pdf
12. https://support.microsoft.com/en-gb/office/get-started-with-3d-maps-6b56a50d-3c3e-4a9e-a527-eea62a387030
13. https://support.microsoft.com/en-us/office/get-geographic-location-data-287b4cf2-3d7d-4bc1-b412-3d00f45dbbd6

SEMESTER IV Level 500 Research Specific Elective (RSE)

Course Title: Dissertation/Internship
Course Code: PGMP-GEG-DSD/I -501
Credits: 16
Marks: 400
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1. The purpose of a dissertation or internship is for students to gain additional knowledge, develop abilities, augment theoretical knowledge, and improve their research or professional skills.
2. Dissertation work shall be carried out individually by students.
3. Topics for dissertations or industrial projects shall be finalized by the student in consultation with the guiding teacher.
4. The student shall declare, in the prescribed pro-forma, that the dissertation/industrial project work is his/ her own work and that all the sources used are duly acknowledged.
5. The guiding teacher shall certify, in the prescribed pro-forma, that the dissertation/industrial project is an original work of the candidate completed under his supervision.
6. Students shall submit the dissertations/industrial projects to the Postgraduate Department through the guiding teacher not later than 2 weeks before the end of the term. Ordinarily, no student shall be allowed to submit the dissertation/industrial project after the due date.
7. Every student shall submit one soft copy and two bound copies of the dissertation/industrial project to the Co-coordinator in an appropriate format, preferably as per the format given by the department/ institution.
8. The 16 credits of the dissertation/internship will be evaluated in Semester IV but the students will start working on dissertation from Semester III. Students will be assigned a Research Mentor/Guide.
9. Assessment of the dissertation/internship will be done by the Guide and the faculty members of the concerned discipline as follows :
    a. 4 credits (100 Marks) – The student shall make a presentation of the research conceptualization (identification of the research problem, Objectives, Hypotheses, literature review, research design and methodology etc.) before the DFC. 50% of the marks shall be awarded by the Research Mentor/Guide and 50% marks shall be awarded by the DFC. Evaluation is to be done at the beginning of the 4th Semester.
    b. 4 credits (100 Marks) – Research Mentor/Guide shall maintain the record of attendance of the student and assign the marks based on students attendance, commitment in carrying out the research work, Field work, Data Collection etc. 100 marks shall be awarded by the Research Mentor/Guide. However, 50% of the marks shall be awarded by the Research Mentor/Guide and 50% of the marks shall be awarded by the External Mentor/Guide for collaborative work.

c. 8 credits (200 Marks) – Research Report - The research report shall have two CAs of 25% of marks each assessed by the Research Mentor/Guide and may comprise Viva-Voce, Seminar presentation or written reports. The SEE component of 50% marks shall be in the form of a presentation by the student to be assessed by the faculty members of the Discipline.
d. Under internship and dissertation, option to pursue internship/dissertation at international level to be kept open.
e. To pass in the dissertation / internship, a student has to secure a minimum grade of "P".
f. A student who does not secure a minimum grade of "P" in the dissertation / internship, may be allowed to re-submit the dissertation / internship after incorporating suitable modifications under the guidance of the dissertation / internship Mentor/Guide.
g. There shall be no revaluation in case of dissertations / internship which are based on laboratory/field/experimental work.