COURSE STRUCTURE

FOR

CHOICE BASED CREDIT SYSTEM (CBCS)

OF

M. A. / M. Sc. GEOGRAPHY

(2017 Onwards)

Department of Geography and Regional Development
University of Kashmir

(2017 onwards)

CHOICE BASED CREDIT SYSTEM (CBCS)

Program Outcome: The program has been conceptualized with the aim of preparing geographers who are adequately trained to address the problem and issues being faced in the contemporary times. The curriculum is being continuously updated so that new concepts, innovations, methodologies and approaches are incorporated to keep the subject in line with the changing trends at the global level. The students are expected to have a clear understanding of conceptual framework of the subject field of geography. The program prepares our students to place themselves as regional and urban planners, environmental managers, resource planners and cartographers etc. The program prepares our students for various competitive examinations so that they can carve a niche for themselves in the civil services.

The theoretical and practical training in various geospatial technologies adequately trains the students to make their careers as Remote Sensing and GIS professionals. Modern tools, techniques and introduction of latest instrumentation in surveying has largely enhanced the employability of our students. The program provides enough opportunities to the students to select their field of specialization for pursuing research degrees and contribute to the extension of knowledge pertaining especially to our region. The program develops the competence to facilitate development of inter-disciplinary approach for an easy shift over from curricular work to research activity which would be able to help the process of socio-economic development of Jammu & Kashmir state. The emphasis of this programme is to produce applied geographers who are able to work in a multidisciplinary environment and contribute their share in providing solutions to our day to day problems.

Course Description: The M. A / M. Sc Post Graduate Programme in Geography is of two year duration, based on 96 credits comprising of four semesters. All the 96 credits will spread over 6 different components viz: I) Teaching, II) Tutorial, III) Seminar, IV) Practical, V) Field Tour & VI) Project Work/ Dissertation. The students are offered (47) Papers Comprising of (12) Core Courses, which are compulsory, along with (19) Discipline Centric Theory Courses (8) Generic Elective & (8) Open Elective Courses.

- ✓ A credit means one hour of teaching/work or two hours of practical work/tutorial per week for 16 weeks in a semester.
- ✓ A candidate compulsorily has to obtain 24 credits per semester i.e., 48 credits in one year Programme (2 semesters), 96 credits in two year Programme (4 semesters).
- ✓ A candidate has to obtain minimum of 24 credits in a semester; 12 credits compulsorily are to be opted from "Core Courses", while the remaining 12 credits can be obtained in either of the following two ways:
- ✓ 8 credits are to be obtained from Discipline centric courses
- ✓ At least 2 credits are to be obtained from Generic Elective courses, however a candidate has an option to take 4 credits from the GE Courses
- ✓ A candidate has a choice to take a maximum of 2 credits if required from Open Elective courses.

NOTE: The student shall have to prepare the Dissertation comprising of four credits for the course No. GG17404DCE in fourth semester. The Dissertation is to be prepared under the supervision of a faculty member of the department. A faculty member shall have to supervise/guide a maximum of five students of the same batch for the preparation of the dissertation of the student.

The students shall have to prepare a field studies report (Geomorphic and Socio-economic) for course No.GG17303CR comprising of 4 credits. Two faculty members shall be in charge of field tour which shall be conducted within or outside the State. The student shall have to deposit an amount of Rs.5000/- as a part of fee towards the field studies.

Course Code	Course Name	Category	Hours per week			Credits
			L	T	P	
GG17101CR	Geomorphology	Core	4	2	0	4
GG17102CR	Evolution of Geographic Thought	Core	4	2	0	4
GG17103CR	Advanced Quantitative and Cartographic Techniques	Core	0	0	8	4
GG17104DCE	Geography of Tourism	Discipline Centric Elective	2	2	0	2
GG17105DCE	Geography of Health & Healthcare	Discipline Centric Elective	2	2	0	2
GG17106DCE	Oceanography	Discipline Centric Elective	2	2	0	2
GG17107DCE	Fluvial Geomorphology	Discipline Centric Elective	2	2	0	2
GG17108DCE	Sustainable Development	Discipline Centric Elective	2	2	0	2
GG17109GE	Geography of Jammu & Kashmir	Generic Elective	2	1	0	2
GG17110GE	Climatology	Generic Elective	2	1	0	2
GG17111OE	Study of Maps and Globe	Open Elective	2	1	0	2
GG17112OE	Global Positioning System	Open Elective	2	1	0	2
	Total contact hours = 52		Total Credits =30			

Course Code	Course Name	Category	Hours per week			Credits
			L	T	P	
GG17201CR	Climatology	Core	4	2	0	4
GG17202CR	Remote Sensing & GIS	Core	4	2	0	4
GG17203CR	Remote Sensing & GIS (Practical)	Core	0	0	8	4
GG17204DCE	Urban Geography	Discipline Centric Elective	2	2	0	2
GG17205DCE	Glacial Geomorphology	Discipline Centric Elective	2	2	0	2
GG17206DCE	Agricultural Geography	Discipline Centric Elective	2	2	0	2
GG17207DCE	Hydrology	Discipline Centric Elective	2	2	0	2
GG17208DCE	Watershed Management	Discipline Centric Elective	2	2	0	2
GG17209GE	Natural Hazards	Generic Elective	2	1	0	2
GG17210GE	Geography of Himalaya	Generic Elective	2	1	0	2
GG17211OE	Geography of India	Open Elective	2	1	0	2
GG17212OE	Disaster vulnerability in India	Open Elective	2	1	0	2
	Total contact hours = 52		Total Credits = 30			

M.A./M.Sc. Geography: 3rd Semester

Course Code	Course Name	Category	Hours per week			Credits
			L	T	P	
GG17301CR	Social & Cultural Geography	Core	4	2	0	4
GG17302CR	Regional Planning & Development	Core	4	2	0	4
GG17303CR	Field Studies (Geomorphic and Socio-Economic)	Core	0	0	8	4
GG17304DCE	Ecology and Environment	Discipline Centric Elective	2	2	0	2
GG17305DCE	Natural Resource Management	Discipline Centric Elective	2	2	0	2
GG17306DCE	Soil Geography	Discipline Centric Elective	2	2	0	2
GG17307DCE	Environment Impact Assessment	Discipline Centric Elective	2	2	0	2
GG17308DCE	Disaster Management	Discipline Centric Elective	2	2	0	2
GG17309GE	Geopolitics of Indian Sub-Continent	Generic Elective	2	1	0	2
GG17310GE	Glaciology	Generic Elective	2	1	0	2
GG17311OE	World Geography	Open Elective	2	1	0	2
GG17312OE	Disaster Profile of India	Open Elective	2	1	0	2
	Total contact hours = 52		Total Credits = 30			

M.A./M.Sc. Geography: 4th Semester

Course Code	Course Name	Category	Hours per week			Credits
			L	T	P	
GG17401CR	Population and Settlement Geography	Core	4	2	0	4
GG17402CR	Economic Geography	Core	4	2	0	4
GG17403CR	Advanced Surveying & GPS Applications	Core	0	0	8	4
GG17404DCE	Dissertation (Project Writing)	Discipline Centric Elective	4	2	0	4
GG17405DCE	Political Geography	Discipline Centric Elective	2	2	0	2
GG17406DCE	Applied Geomorphology	Discipline Centric Elective	2	2	0	2
GG17407DCE	Bio-Geography	Discipline Centric Elective	2	2	0	2
GG17408GE	Fundamentals of Remote Sensing	Generic Elective	2	1	0	2
GG17409GE	Fundamentals of GIS	Generic Elective	2	1	0	2
GG17410OE	Study of Topographic Maps	Open Elective	2	1	0	2
GG17411OE	Geography of Asia	Open Elective	2	1	0	2
	Total contact hours = 50		Total Credits = 30			

The course has been designed to provide learners an understanding of fundamental principles, theories and surface process in geomorphology and the evolution of landforms in various environmental settings. After the completion of this course, students are expected to possess the skills to quantitatively use and evaluate Geomorphological data with numerical, statistical and spatial technological methods. They are also expected to possess the ability to analyze relationships between physical and human aspects of environments and landscape.

Credit-I

1. Development of Geomorphology
2. Fundamental Concepts of Landform Evolution
3. Plate Tectonics
4. Seafloor Spreading
5. Wilson Cycle of Evolution of Landforms

Credit-II

1. Epeirogenic and Orogenic Earth Movements
2. Theory of Mountain Building – Kobler
3. Geo-syncline Theory -Hall and Dana
4. Multi-cyclic and Polygenic Evolution of Landscapes
5. Evolution and Structure of Himalaya

Credit-III

1. Exogentic Processes
2. Gradation Processes
3. Types and Classification of Weathering
4. Types and Classification of Mass Movements
5. Slope Elements and Slope Evolution

Credit-IV

1. Karst cycle of Erosion
2. Krast- Erosional Landforms &Depositional Landforms
3. Tectonic Landforms
4. Volcanic Landforms
5. Cycle of Erosion – Davis Vs. Penk

Suggested Readings:

1. A. H. Strahler, & A. N. Strahler., Modern Physical Geography, John Willy & Sons, Inc. 2001.
2. A. K. Barua., Climatology, Dominant Publishers and Distributors, 2005.
3. Barry, R. G. & Chorley, R.J., Atmosphere, Weather and Climate, Routiedge, 1998.
4. Critchfield, H., General Climatology, Prentice Hall, New York, 1975.
5. D.S. Lal., Physical Geography, Sharda Pustak Bhawan. 2009.
6. Grald, S., General Oceanography-An Introduction, John Wiley & Sons, New York, 1980.
7. King, C.A.M., Oceanography for Geographers, Earnold, London, 1975.
8. Majid Hussain, Physical Geography, Anmol Publications Pvt. Ltd. 2007.
9. Paul R. Pinet, Oceanography, Jones and Bartelett Publishers, 1998.
10. S.A, Qazi., Principals of Physical Geography, AHP Publishing Co.2004.
11. S.K. Paneersalvam., Global warming and Climate Change, AHP Publishing Co.2012.
12. Satopa Mukherjee.,Understanding Physical Geography, Oriental Longman. 2002.
13. Savindra Singh., Physical Geography, Prayag Pustak Bhawan, 2000.
14. Singh,S., Geomorphology, Prayag Pustakalaya, Allahabad, 1998.
15. Sparks, B.N., Geomorphology, Prayag Pustakalaya, Allahabad, 1998.
16. Stringer, E.T., Foundation of Climatology, Surjeet Publication, Delhi, 1982.

The course provides a broad overview of the development of Geographical thought. It appreciates the diverse subject matter of Geography which has incorporated and developed theories and ideas from interdisciplinary contexts and also focuses on the evaluation of core elements which make up geographical thought and how these have emerged as a result of debate, controversy and innovations in geographical research. The course aims to enable the learners to evaluate and articulate the strengths and weaknesses in the philosophical basis of Geographical research and also equip them with the abilities to formulate and articulate their own perspectives on issues related to thought and practice in geography.

Credit-I

1. Changing Nature of Geography
2. Paradigm Shift in Geography-Modern Period
3. Paradigm Shift in Geography- Postmodern Period
4. Development of Geography in India
5. Quantitative Revolution in Geography

Credit-II

1. Recent Concepts- Areal Differentiation, Spatial Organization, Spatial Diffusion
2. Space and Place- Location and Region
3. Concept of Positivism, Pragmatism, Idealism, Realism
4. Recent approaches- Radical, Humanistic and Behavioral – Concept of Social Wellbeing
5. Darwin's Impact on Geography

Credit-III

1. British School of Thought- J.H. Mackinder, Geddes, Stamp
2. Soviet Union School of Thought- V.V. Dokuchaiev, Voeikov and Anuchin
3. American School of Thought- E. Churchill Semple , Huntington and Hartshorne
4. Contribution of William Morris Davis

Credit-IV

1. Development of Scientific Geography. (Immanuel Kant, Bernhard Varineus,)
2. Development of Modern Geography. (Humboldt, and Carl Ritter)
3. German School of Thought- Contribution of Ratzel, Alfred Hettner and Penk
4. French School of Thought- Contribution of Vidal-de-la Blache, Jean Brunches
5. Arab School of Geography (Al Masudi –Al Biruni)

Suggested Readings

1. Dickenson, R.E., The Makers of Modern Geography, Routledge, London. 1969.
2. Dikshit, R.D., Geographical Thought, A Contextual History of Ideas, IPH, New Delhi. 1999.
3. Dikshit, R.D., Art and Science of Geography, 1994.
4. Freeman T.W., Hundred Years in Geography, 1961.
5. Hartshone, R., The Nature of Geography, Lancaster, 1935.
6. Hartshone, R., Perspectives on Nature of Geography. Rondo Macrolly, Chicago, 1959.
7. Husain, M., Evolution of Geographical Thought, Rawat Publications, Jaipur. 1984.
8. James, P.E., All Possible World - A history of Geographical Ideas, The Odyssy Press, New York, 1972.
9. Jenson, H., Geography-Its History and Concepts, Harper Publishers, New York, 1981.
10. Lalita, R., Geographical Thought – A Systematic record of evolution, Concept Publishing Company, New Delhi, 2008.
11. Stodard, D.R. Darwin's impact on Geography, A.A.A.G.Vol.58, 1966.
12. Tozer, H.F., History of Ancient Geography, Cambridge, 1951.

GG17103CR ADVANCED QUANTITATIVE AND CARTOGRAPHIC TECHNIQUES

The course focuses on the theoretical understanding of statistics and cartographic techniques and provides opportunities for advanced research by using GIS and SPSS software. The advanced cartographic techniques combines science and technical ability that is capable of communicating information effectively and quickly. The students would be adequately trained in map making, statistical analysis using advanced software's.

Credit-I

1. Multiple Correlation
2. Partial Correlation
3. Linear Regression Analysis
4. Multiple Regression
5. Principle Component Analysis

Credit-II

1. Lorenz Curve and Gini's Coefficient
2. Location Quotient
3. Time series: Moving Average, Least Square Method and Drawing of Line of Best Fit, Second Degree Equation
4. The Exponential Curve, Logistic Curve
5. Interpolation

Credit-III

1. Sampling: Its Laws & Types
2. Hypothesis and its Types
3. Hypothesis Testing: T -Test, Z Test, Chi -Square Test
4. Mann Kendall and ANOVA Test
5. Mann Whitney Test

Credit-IV:

1. Use of Software for Statistical Analysis : SPSS, Mini Tab & " R"
2. Wentworth, Robinsons and Smiths Slope Analysis
3. Crop Combination Analysis (Weaver's, Thomson's, and Rafiullah's, method)
4. Mapping of Socio–Economic Data (Construction of Composite Index)
5. Principles of Thematic Map Making – Choro-Chromatic & Choro-Schematic

Suggested Readings

1. Archer, J.E and Dalton, T. H., Field Work in Geography, E. T. Bastsford Ltd., London, 1968.
2. Johnston, R. J., Multivariate Statistics in Geography. Longman, London, 1978.
3. Jones, P. A,. Field work in Geography, Longman, London, 1968.
4. Keates, J. S., Cartographic Design and Production, Longman, London, 1973.
5. Monkhouse, F. J., Maps and Diagrams, Methuen & Co., London, 1967.
6. Summer, G., Mathematics for Physical Geographers, 1978.
7. Yeats, M. H., An Introduction to Quantitative Analysis in Human Geography, 1974.

To study the relationship of geography and tourism. To prepare the learners with knowledge and skills essential to understanding and manage the needs of destination. Develop strategies for ongoing personal and professional development as a recreation and leisure services professional. To facilitate the assessment of the tourism potential of a destination and prepare tourism development plan as well as marketing techniques.

Credit-I

1. Tourism: Elements, Nature & Characteristics
2. Typology of Tourism – Classification of Tourists
3. Tourism Motivation
4. Tourism Resources
5. Theories of Tourism Development (Buttler)

Credit-II

1. Sustainable Tourism: Eco-tourism & Carrying Capacity
2. Tourism Planning and its Approaches- National Tourism policy
3. Tourism in J&K – Resources, Flow and Distribution Pattern
4. Impact of Tourism: Environmental; Economic; Social and Cultural
5. Application of GIS in Tourism Development

Suggested Readings

1. Bhatia, A. K., International Tourism - Fundamentals and Practices, Sterling Publisher, New Delhi, 1991.
2. Bhatia, A. K., Tourism Development: Principles and Practices, Sterling Publisher Ltd., New Delhi, 1996.
3. Das, M., India: A Tourist Paradise, Sterling Publishers, New Delhi, 1999.
4. Kaul, R. K., Dynamics of Tourism and Recreation, Inter India, New Delhi, 1985.
5. Lew, A. A., Hall, C. M. and Williams, A. M., (ed). Tourism, Wiley-Blackwell, Hoboken, 2014.
6. Pearce, D., Tourism Today: A Geographical Analysis, Longman Scientific and Technical, New York, 1987.
7. Pearce, D. G., Tourism Today: A Geographical Analysis, Longman, Harlow, 1987.
8. Robinson, H. A., Geography of Tourism, Macdonald and Evans, London, 1996.
9. Smith, L. J. S., Practical Tourism Research, CABI, Wallinford, 2010.
10. Smith, L. J. S., Tourism Analysis: A Handbook, Halstead Press, Sydney, 2010.

This course is envisaged to make the students understand the spatial dimensions of various health related issues. It also critically evaluates the spatial distribution of various health care facilities especially in the environmentally disadvantageous regions. The student is prepared to contribute to health care planning in terms of spatial location of health units and facilities.

Credit-I

1. Relevance of Health & Healthcare Geography in Contemporary World
2. Development of Healthcare Geography
3. World Health Organization and its Mandate
4. Medical Pluralism
5. Disease Diffusion and Types

Credit-II

1. Socio – Cultural and Economic Factors Affecting Human Health
2. Geo-ecology and Spatial Pattern of Cardiovascular Diseases, Malaria and Cancer at National and Regional Level
3. Morbidity Pattern of Tuberculosis, and Goiter in Jammu and Kashmir
4. Health and Healthcare Behavior in Developing Countries
5. Regional Inequalities in Healthcare in Jammu and Kashmir

Suggested Readings:

1. A. Learmoth., Disease Ecology; Blackwell Pub, 1987.
2. Akhtar, R. and A.T.A. Learmonth., Geographical Aspects of Health and Disease in India, Concept Publishing Company, New Delhi, 1985.
3. Akhtar, R., Environment and Health, Ashish Pub. House, 1991.
4. Gerald, F. Pyle., Applied Medical Geography, V.H. Winston, 1979.
5. Melinda S., Medical Geography, Guilford Press, 2010.

GG17106DCE OCEANOGRAPHY

This course explores how interconnected ocean characteristics (bathymetry, seawater chemistry, biological diversity) and processes (plate tectonics, surface and deep-water circulation, biological production) shape global patterns across multiple scales. The curriculum has been developed with the aim of generating interest in the field of Oceanography and pursue career/ research opportunities in this applied field.

Credit-I

1. Introduction to Oceanography
2. Marine Biological Environment
3. Waves and Their Types
4. Ocean Currents and Their Significance
5. Ocean Conveyer Belts

Credit-II:

1. Coral reefs: Theories of Formation (Darwin and Dally)
2. Oceans as Store-houses of Non-conventional Sources of Energy.
3. Food Resources & Mineral Resources of the Oceans
4. Law of the Sea & Exclusive Economic Zone
5. Climate Change and Oceans; Sea Level Change and its Implications

Suggested Readings:

1. Davis, R.J.A., Oceanography-An Introduction of the Marine Environment. Win C. Brown, Lowa, 1986.
2. Douglas A. Segar., Introduction to Ocean Science, Wadsworth Pub., London, 1998
3. Hussain, T. and Tahir, M., Oceanography, Jawahar, New Delhi, 2012.
4. Kings, C.A.M., An Introduction to Oceanography, McGraw, New York, 1969.
5. Siddhartha, K., Oceanography-A Brief Introduction, Kisalya Pub., New Delhi, 2013.
6. Singh, S., Physical Geography, Prayag Pub., Allahabad, 2013.
7. Trujillo, A.P & Thurnman, H.V., Essentials of Oceanography, Prentice Hall, 2016.
8. Trujillo, A.P. & Thurnman, H.V., Introductory Oceanography, Prentice Hall, 2010.
9. Strahaler, A.H., Introducing Physical Geography, Wiley Pub, 2013.

The students develop an understanding of various fluvial processes responsible for the formation of landforms on the surface of the earth.. This course is expected to develop an interest among the students to pursue this branch of Physical Geography which has considerable applications in numerous fields.

Credit-I

1. Introduction to Fluvial Geomorphology
2. Drainage Basin – as a Geomorphic unit
3. Drainage pattern, Evolution and Types
4. Channel Pattern: Straight, Meandering and Braided
5. Morphometry of Drainage Basins

Credit-II

1. Fluvial Processes and Related Landforms
2. Stream Flow Sources : Surface, Subsurface and Groundwater Flow
3. Sediment Transport: Dissolved, Suspended & Bed Load
4. Stream Gradation: Modern Theories, Graded Stream
5. Humans and Fluvial systems

Suggested Readings:

1. David Knighton., Fluvial Forms and Processes- A New Perspective (2nd edition), Hodder Arnold Publication, 2014.

2. G. Mathiaskondolf and Hervepiegay., Tools in Fluvial Geomorphology, Wiley-Blackwell, 2016.

3. Ramakrishna Maiti., Modern Approaches to Fluvial Geomorphology, Ratnasagar Private Limited, 2015.

4. Lun. B. Leopold, M. Gordon Wolmanand, & John P. Miller., Fluvial Processes in Geomorphology, Dover Publications Inc., 1995.

5. David A. Sear, Malcolm D. Newson and Colin R. Thorne, Guide Book of Applied Fluvial Geomorphology, Thomas Telford Ltd, 2009.

GG17108DCE SUSTAINABLE DEVELOPMENT

The course introduces the students to the concept of Sustainable Development. It comprehensively discusses the Man- Environment relationship that exists under different environmental settings. It is expected to inculcate the habit of sustainable living among the students and at the same provide theoretical understanding to them so that they could pursue their careers as environmental and regional planners.

Credit-I

1. Concept and Characteristics of Sustainable Development
2. Principles of Ecological and Environmental Economics-Scope and Usefulness
3. Natural Resources Accounting and Valuation of Ecosystem Services
4. Landmark Events in Sustainability (Agenda 21)
5. Moving Towards Sustainability: An Indian Perspective

Credit – II

1. Limits To Growth
2. Carrying Capacity
3. Ecological Foot-Print Analysis
4. Kuznets Environmental Curve
5. Millennium Development Goals- Sustainable Development Goals

Suggested Readings

1. Jaffrey D. Sachs., The Age of Sustainable Development, Columbia University Press, 2015.
2. Jennifer A. Elliot., An Introduction to Sustainable Development, Routledge Publishers, 2015
3. K.V. Sundaram., Sustainable Development and Sustainable Life Styles, Northern Book Centre, 2003.
4. M.C Dash., Concepts of Environmental Management for Sustainable Development, I.K International Publishing House Pvt. Ltd. 2013.
5. Peter Rogers., An Introduction to Sustainable Development, Routledge Publishers, 2007
6. R.B Singh., Environment and Sustainable Development: Emerging Challenges, World Focus. 2017
7. Teri., Global Sustainable Report 2015: Climate Change and Sustainable Development, Oxford University Press, 2015.

GG17109GE GEOGRAPHY OF JAMMU AND KASHMIR

This course introduces the students to the distinct geographical characteristics of the Jammu & Kashmir state. It provides the necessary inputs to the students belonging to various disciplines of earth and environmental sciences to explore their interests within the broad geographical domain of the state. This course has been conceptualized to address the requirements of a large segment of students interested in various competitive examinations.

Credit-I

1. Jammu and Kashmir State – Space Relationships
2. Relief and Physiography
3. Climate
4. Natural Vegetation
5. Drainage System

Credit-II:

1. Population: Distribution, Density and Composition
2. Population Growth and Trends in Urbanization
3. Horticulture of J&K with respect to Apple, Saffron and Walnuts
4. Tourism in Jammu and Kashmir
5. Energy Resources of Jammu and Kashmir (Hydel and Geothermal)

Suggested Readings:

1. Drew, F .K., The Territories of India, Kashrnir State. Standard Press London, 1979.
2. Gazetter of Kashmir and Ladakh, 1890.
3. Lawrence, S.W., The Valley of Kashrnir, Oxford University Press, 1895.
4. Raina, A.N., Geography of Jammu and Kashrnir, National Book Trust, New Delhi, 1971.
5. Qazi, S.A., Geography of India with Special Reference to J&K State, APH Publishing Co. 2000.
6. Majid Hussain., Systematic Geography of Jammu and Kashmir, Rawat Publications, 2000.
7. R. L. Singh., India- A Regional Geography, National Geographical Society of India, 2003.

GG17110GE CLIMATOLOGY

The course focuses on various aspects of climate and its Genesis. It analyses the impact of climate on human beings. It enables the student to learn various adaptation and mitigation strategies in this regard. It also provides practical inputs about various climatologically/ meteorological parameters and imparts skill in students regarding their measurement.

Credit-I

1. Meteorology and its Relation with Climatology
2. Evolution of Earth's Atmosphere- Structure and its Role
3. Heat Budget and Latitudinal Heat Balance
4. Pressure Belts-Global Circulation system
5. Climatic Classification; Koppen

Credit II

1. Climatic Change and Climatic Variability – Evidences &Indicators
2. Climate of India & Its Controls
3. Western disturbances - Nature and Significance
4. Classical Theory of Indian Monsoon
5. Modern Theory of Indian Monsoon

Suggested Readings

1. A.K. Barua., Climatology, Dominant Publishers and Distributors, 2005.
2. Anthony J. Vega & Robert V. Rohil., Climatology, 2008.
3. Critchfield, H., General Climatology, Prentice Hall, NewYork, 1975.
4. Edward Aguada: & J. E. Brat., Understanding Weather and Climate- Pearson International 2016.
5. Fedrick K. Lutgen., The Atmosphere: An introduction to Meteorology, Princeton Hall, 2006.
6. Grald, S., General Oceanography-An Introduction, John Wiley & Sons, New York, 1980.
7. J.T. Houghton., Global warming a complete briefing (5^{th} Ed.), Cambridge University Press, 2015.
8. S.K. Paneersalvam., Global warming and Climate Change, AHP Publishing Co, 2012
9. Stringer, E.T., Foundation of Climatology, Surjeet Publication, Delhi, 1982.

This course has been conceived in general for all the students in order to understand the basic concept of the world, its location, different types of maps, determination of coordinates and time zones etc. It is quite helpful to the needs of one's day to day life and also relevant for competitive examinations.

Credit-I

1. Maps- Significance and Types
2. Elements of Map
3. Difference Between Map and Site Plan
4. Scale- Meaning and Types
5. Essential of Map Making

Credit-II

1. Study of Topographic & Thematic Maps
2. Cadastral Maps and their Utility
3. Globe vs. Map
4. Determination of Coordinates- Latitude & Longitude
5. Time Zones and their Determination

Suggested Readings:

1. Ishtiaq, M., A text Book of Practical Geography, Heritage Publishing House, New Delhi, 1989.

2. Mishra, R. P. & Ramesh, A., Fundamentals of Cartography, Concept Publishing Company, New Delhi, 1969.

3. Nayer, N. B., Encyclopedia of Surveying, Maps and Remote Sensing, Rawat Publishers, New Delhi, 1996.

4. Sarkar, A., Practical Geography, Sangam Books, New Delhi, 1997.

5. Singh, L.R., Elements of Practical Geography, Kalyani Publishers, New Delhi, 1997.

GG17112OE GLOBAL POSITIONING SYSTEM

This course aims to provide learners an understanding of satellite based navigation system (GPS). It covers deliberations on the structure, functioning mechanism, and applications of the technology in varied fields.

Credit-I

1. GPS-Fundamentals
2. GPS- Functioning
3. GPS –Segments
4. GPS- Positioning types
5. DGPS – Functions

Credit-II

1. Limitations of GPS Positioning
2. Sources of Error in GPS positioning
3. Land Survey- Location and Measurement
4. GPS- Applications in Traffic and Navigation
5. DGPS- Applications in Surveying

Suggested Readings

1. C. Panda., Remote Sensing- Principles and Applications, Viva Books, 2008.
2. Gopal Singh., Map World and Practical Geography, Vikas Publishing House, 2000.
3. Jensen, R., Fundamentals of Remote Sensing, Shree Maitree Printech Pvt. Limited Noida, 2007.
4. Kali Charan Sahu., Textbook of Remote Sensing and Geographic Information System, Atlantic Publishers and Distributors, 2008.

GG17201CR CLIMATOLOGY

The course focuses on various aspects of climate and its Genesis. It analyses the impact of climate on human beings and also focuses on various causes of climatic variability and climate change. It enables the student to learn various adaptation and mitigation strategies in this regard.

Credit-I

1. Climatology and Paleo-Climatology
2. Evolution of Earth's Atmosphere
3. Insolation, Heat budget & Latitudinal Heat Balance
4. Vertical and Horizontal Distribution of Temperature
5. Stability and Instability of Atmosphere

Credit-II

1. Global Circulation System
2. Jet Streams
3. Tri-cellular Meridonial Pattern of Atmosphere
4. Global Circulation Models
5. Climatic Classification; a) Koppen b) Thornthwaite

Credit-III

1. El- Nino, Southern Oscillation, La – Nina; NAO
2. Climatic Changes; Evidences & Indicators
3. Possible Cause and Related Theories

   (a). Karoll Milankovitch Theory, (b) Carbon Dioxide Hypothesis, (c) Tectonic Hypothesis
4. Global Warming: Greenhouse Effect
5. Environmental Impact of Climatic Change & Response of Society

Credit-IV

1. Tropical Cyclones
2. Temperate Cyclones
3. Climate of India & Its Controls
4. Western Disturbances Origin and Significance
5. Theories of Indian Monsoon: a) Classical Theory b) Modern Theory

Suggested Readings

1. A.K. Barua., Climatology, Dominant Publishers and Distributors, 2005.
2. Anthony J. Vega & Robert V. Rohil., Climatology, 2008.
3. Critchfield,H., General Climatology, Prentice Hall, New York, 1975.
4. Edward Aguada & J. E. Brat., Understanding Weather and Climate, Pearson International 2016.
5. Fedrick K Lutgen., The Atmosphere an introduction to Meteorology, Princeton Hall, 2006.
6. Grald, S., General Oceanography-An Introduction, John Wiley & Sons, New York, 1980.
7. J.T. Houghton., Global Warming A Complete Briefing (5^{th} Ed.), Cambridge University Press, 2015.
8. S.K. Paneersalvam., Global Warming and Climate Change, AHP Publishing Co., 2012.
9. Stringer, E.T., Foundation of Climatology, Surjeet Publication, Delhi, 1982.

This comprehensive course has been devised to provide the students the theoretical understanding of various geospatial technologies like Remote Sensing and GIS. It deals with the fundamental aspects and at the same time discusses the various applications of these technologies in various applied fields. The students are prepared to carve a place for themselves in the ever expanding world of opportunities that these technologies have to offer at the global level.

Credit-I

1. Fundamentals of Remote Sensing –EMR & EMS
2. Interaction of EMR with the Atmosphere & Earth Surface Features
3. Resolution in Remote Sensing - Spatial, Spectral, Temporal and Radiometric
4. Sensors and Platforms: Their Types and Characteristics
5. Mechanism of Remote Sensing data Acquisition

Credit-II

1. Aerial Photographs and Their Types
2. Fundamentals of Aerial Photograph and Image Interpretation and its Elements
3. Image Interpretation keys; Items, Subject, Regional and Analogous Key
4. Search Methods: Fishing Expedition Method and Logical Search method
5. Multi Concept in Remote Sensing

Credit-III

1. High Resolution and Hyper Spectral Remote Sensing
2. Microwave Remote Sensing : RADAR Basics
3. Digital Images Processing
4. Pre Processing: Radiometric & Geometric Errors
5. Image Enhancement Techniques

Credit-IV

1. Definition, Scope and Development of GIS
2. Components of GIS
3. Geographic Data: Types and Characteristics
4. Data Models: Raster and Vector, Processing and Analysis
5. GIS DBMS: Concepts, Components and Quality

Suggested Readings:

1. Campbell, J.B., Introduction to Remote Sensing, (2nd ed.), Taylor and Francis, London, 1996.
2. Curran, P., Principles of Remote Sensing, Longman, London, 1985.
3. Fazal S. and Rahman A., GIS Terminology, New Age International Publishing, New Delhi, 2007.
4. Jenson, J.R., Remote Sensing and Environment. Pearson India, 2013.
5. Joseph George., Fundamentals of Remote Sensing, (2nd ed.) University Press, Hyderabad, 2005.
6. Kumar, S., Basics of Remote Sensing and GIS, Laxmi Pub, 2005.
7. Lo, C.P. and Yeung AKW., Concepts and Techniques of GIS (2nd ed.), Prentice Hall of India, New Delhi, 2006
8. Leick. A., GPS Satellite Surveying (2nd ed.), John Wiley and Sons, New York, 2003.
9. Lillesand T.M and Keifer R.W., Remote Sensing and Image Interpretation (6th ed.) John Wiley and Sons, New York, 2008.
10. N. K. Agarwal., Essentials of GPS, Spatial Network Pvt. Ltd, 2004.
11. Sabins, J.F.F., Remote Sensing: Principles and Interpretation, W.H. Freeman & Co., New York, 1997
12. Sabins, F.F., Remote Sensing: Principles and Interpretation. Freeman, New York, 1986.
13. Siegal, B.S. and A.R Gillespie., Remote Sensing in Geology, Wiley, New York, 1980.

This course provides the necessary skills, aptitude and trainings to the students in various geospatial technologies. It prepares the students adequately in different techniques of image interpretation and analysis. The practical course provides hands on exposure to our students in various remote sensing and GIS softwares. The student is professionally well equipped to work independently or in team for providing solutions to problems in a GIS environment

Credit-I

1. Aerial Photographs: Understanding Marginal Information of Photographs,
2. Determining Scale of Aerial Photographs, Photo (stereo-pair) Interpretation using Stereoscopes.
3. Image Processing: Pre-processing- Geometric Correction, Geo-referencing
4. Image Enhancements: Spatial (Resolution Merge), Spectral (Principal Components Analysis), and Radiometric (Histogram Equalization), Filtering
5. Visual Interpretation of Remote Sensing Data

Credit-II

1. Image Classification (Supervised, Unsupervised)
2. Comparing Classifier Results
3. Accuracy Assessment
4. LULC Change Detection
5. Using Indices-NDVI, NDSI and NDWI

Credit-III

1. Creating Vector Layers- Point, Line, Polygon
2. GIS Data Format Conversions
3. Spatial Zonation
4. Overlay and Suitability Analysis
5. Map Designing and Layout

Credit-IV

1. Generating Digital Elevation Model (DEM)
2. Spatial Interpolation
3. Topographic Analysis: Hypsometry, Bathymetry, Slope, Aspect
4. Morphometric Analysis: Watershed Delineation, Drainage Generation, Stream Order Calculation
5. Landslide Hazard Zonation

Suggested Readings:

1. Campbell, J.B., Introduction to Remote Sensing (2nd ed.) Taylor and Francis, London, 1996.
2. Curran, P. Principles of Remote Sensing, Longman, London, 1985.
3. Fazal S. and Rahman A. GIS Terminology., New Age International Publishings, New Delhi, 2007.
4. Jenson, J.R., Remote Sensing and Environment, Pearson India, 2013.
5. Joseph George., Fundamentals of Remote Sensing, University Press, Hyderabad, 2005.
6. Kumar, S., Basics of Remote Sensing and GIS, Laxmi Pub, 2005.
7. Lo, C.P. and Yeung AKW., Concepts and Techniques of GIS, Prentice Hall of India, New Delhi, 2006
8. Leick. A., GPS Satellite Surveying (2nd ed.), John Wiley and Sons, New York, 2003.
9. Lillesand, T.M and Keifer, R.W., Remote Sensing and Image Interpretation (6th ed.), John Wiley and Sons, New York, 2008.
10. N.K. Agarwal., Essentials of GPS, Spatial Network Pvt. Ltd, 2004
11. Sabins, J.F.F., Remote Sensing: Principles and Interpretation. W.H. Freeman & Co., New York, 1997.
12. Sabins, F.F., Remote Sensing: Principles and Interpretation. Freeman, New York, 1986.
13. Siegal, B.S. and A.R Gillespie., Remote Sensing in Geology, Wiley, New York, 1980.

GG17204DCE URBAN GEOGRAPHY

The course comprises of two credits which allows students exposure to the emerging urban scenario at national and international level. Indian cities are growing at a rapid pace in terms of their demographic and spatial size and functional activities. Urban growth has been lopsided one skewed in favour of large metropolitan cities associated with serious environmental problems. They need constant attention for their future expansion and management to improve liveability. This course helps students to develop professional capacities and skills to address these complex problems like delimitation of city limits and influence areas ,land use planning with a focus on locational planning of urban utilities, preparation of town plans and spatial analysis of environmental problems to improve quality of urban life.

Credit-I

1. Nature Trends and Recent Approaches in Urban Geography.
2. Urbanization Growth-Global Trends & Patterns - Emerging Patterns of Urbanization in India.
3. Urbanization Policy & Programmers - Concept of Green Belts, Satellite Towns, Smart Cities.
4. Urban Environmental Problems- Urban Heat Island Effect and Solid Waste.
5. Urban Environment and Health Related Issues - Air Pollution, Water Pollution.

Credit-II

1. Primate City and Rank Size Rule
2. Central Place Theory of Christaller & Losch
3. Central Business District; Delimitation and Characteristics
4. Rural Urban Fringe; Delimitation and Characteristics -City Region
5. Urban Development through Master Plans- Case study of Chandigarh/ Srinagar.

Suggested Readings:

1. David, Herbert., Urban Geography – A Social Perspective, David and Charles, Newton Abbot London-Vancouver, 1972.
2. Gans J. Herbert., The Urban Villagers: Group and Class in the Life of Italian-Americans, Blackwell Publications, New York, 1982.
3. Hall, Tim., Urban Geography, Routledge Contemporary Human Geography Series, 2011.
4. Kaplan, D.H, and Hollaway Steven., Urban Geography, Wiley Publishers, 2012.
5. Knox, Paul L., and McCarthy, Linda M., Urbanization: An Introduction to Urban Geography, Pearson New International Edition, 2011.
6. Laves, Lowenstein K., Urban Studies – An Introductory Reader (2nd Edition), the Free Press Collier Macmillan Publisher, Third Avenue, New York, 10022, 1977.
7. Mandal, R.B., Urban Geography – A Text Book, Concept Publishers, New Delhi – 110054, 2001
8. Markanday, K and Reddy G., Urban Growth Theories and Settlement Systems of India, Concept Publishing Company, 2011.
9. Mehta, A., Economic theory and Planning, University Oxford Press, 1974.
10. Mumford, Lewis. The City in History: Its Origins, Its Transformations, and Its Prospects 1972.
11. Pascoe, Michel., Urban Geography – A Global Perspective, Rutledge, New Fetter Lane, London. 2001
12. Peter Geoffrey Hall., Cities of Tomorrow: An Intellectual History of Urban Planning and Design in the Twentieth Century, Willey Blackwell, London. 2011
13. Philipp Rode., Governing Compact Cities, Blackwell publishers, 2011
14. Ray, Northam. M., Urban Geography (2nd Edition), John Willey and Sons, 1979.
15. Siddhartha, K and Mukherje, S., Cities, Urbanization and Urban System, Kasalaya Publications, New Delhi, 2001.
16. Siddhartha, K., Models in Regional Planning, Kasalaya Publications, New Delhi, 2008.
17. Verma, L.N., Urban Geography, Black Swan Publications, New Delhi, 2001.
18. Weng, Qahio and Quattrochi, D.A., Urban Remote Sensing, CRC Press, Taylor and Francis Group, London, 2007.
19. Wilson, A.G., Urban and Regional Models in Geography and Planning, John Willey and Sons, London. 1975.

This course is a specialized course of Physical Geography which introduces students to glacial Geomorphology. The valley of Kashmir is home to hundreds of glaciers and the landscape of the region has been largely worked and shaped upon by glaciers. The course is expected to generate interest among the students to pursue their careers in the field of glaciology.

Credit-I

1. Glaciers: Origin and Classification
2. Glacial Ice Movement -Basal flow , Internal Deformation
3. Ice Ages: Causes & Evidences
4. Pleistocene Glaciations in South Asia
5. Hazards in Glacial Environment: Glacial Surges and Glacial Lake Out-bursts

Credit-II

1. Glacial Erosion.
   a) Ice and Melt water. b. Mechanical and Chemical Processes of Erosion.
2. Glacial Erosion and Related Landforms.
3. Glacial Deposition and Related Landforms.
4. Himalayan Glaciers; Mass Balance and Response to Climate Change
5. Case Studies of Glaciers- Gangotari and Kolhai

Suggested Readings:

1. Kaushik Pradepika., Geomorphological Studies of the Himalayan Glaciers in Brief, Lambat Academic Press, 2013.
2. Naseerudin ahmad and Sarwar, Rais., Himalyan Glaciers, APH Publishing House, 1998.
3. Micheal Hambrey and Jueg Alean., Glaciers (2nd edition), 2004.
4. Doug Benn and David J.A.Evans., Glaciers and Glaciation (2nd ed.), Hodder Arnold Publication, 2010.
5. Ireneo Peter Martui., Geomorphological and Geology, 2001.

This course focuses specifically on farming, production of food, fibre, fuel and livestock resources. The main focus is how to increase farm house holds income and livelihood concerns. The students understand the various factors involved in agricultural production and also the locational or regional imbalances. The course provides a good knowhow to the students about the geographical limitations to agriculture and is quite applicable in providing extension services.

Credit-I

1. Development of Agricultural Geography -Approaches to the study of Agricultural Geography: Commodity, Systematic and Regional Approaches
2. Role of Physical and Socio-economic, Institutional and Technological Factors in Agriculture
3. Delimitation of Agricultural Regions
4. Crop Combinations and Agricultural Diversification in India
5. Agriculture Land Classification and Land Capability Survey

Credit-II

1. Concept of Location of Agricultural Activities-Von Thunen's Model
2. Whittlesey's Classification of Agricultural Systems of World
3. National Agricultural Policy
4. Irrigation Potential and its Utilization in India
5. Problems and Prospects of Indian Agriculture

Suggested Readings:

1. Hussain, M., Systematic Agricultural Geography, Rawat Publications, Jaipur, 1996.
2. Ilbery. B. W., Agricultural Geography, Oxford University Press, Oxford, 1985.
3. Singh, J. and Dhillon, S.S., Agricultural Geography, Tata McGraw Hill, New Delhi, 1984.
4. Singh, Jasbir., Agricultural Geography, 3rd edition, Oxford, New Delhi, 2003.
5. Symons, L., Agricultural Geography, G. Bells, London, 1967.
6. Grigg, D.B., The Agricultural Systems of the World: An Evolutionary Approach, Cambridge University Press, Cambridge, 1978.
7. Morgan, B.W. and Munton, J.C., Agricultural Geography, Methuen, London, 1971.
8. Shafi, M., Agricultural Productivity and Regional Imbalances, Concept, New Delhi, 1984.
9. Singh, Jasbir., Dynamics of Agricultural Change, Oxford, New Delhi, 1990.
10. Tarrant, J.R., Agricultural Geography, Davis and Charles, Newton Abbot, 1974.
11. Whealler, K.E., Ladley, A.M. and Leong, F.C., Studies in Agricultural Geography, Bland Educational, London, 1970.

Hydrology is the study of water's (i) movement, (ii) transport and storage of mass and energy, and (iii) distribution through, and exchange between, the biosphere processes and methods while also providing views and opinions to aid students in applying hydrological concepts to environmental careers.

Credit-I:

1. Hydrological Cycle and Global Water Balance
2. Groundwater: Origin, Occurrence, Quality and Movement
3. Aquifers and their Types
4. Rain Water Harvesting: Models and Feasibility
5. National Water Policy and Water Crisis in India

Credit-II:

1. Hydrograph Analysis- Factors Affecting Hydrograph, Unit Hydrograph – Derivation of unit Hydrograph
2. Water Flow and its Types
3. Drainage Basin as a Hydrological Unit (Indus System)
4. Run off: Controlling Factors--Infiltration, Evaporation and Transpiration; Run off Cycle
5. Interlinking of Indian Rivers- Problems and Prospects

Suggested Readings:

1. Andrew D. Ward and Stanley Trimble., Environmental Hydrology (2nd ed.), Lewis Publishers, 2004.
2. Chow V.T., Applied Hydrology, Tata McGraw Hill Publishing Co, 1988.
3. Hendriks Martin., Introduction to Hydrology. Oxford University Press, London, 2010.
4. Patra K.C., Hydrology and Water Resources Engineering, Narosa Publishing House, 2010.
5. , 1996.
6. Jain S.K., Agarwal P.K. and Singh V.P., Hydrology and Water Resources of India, Springer, The Netherlands, 2007.
7. Raghunath H.M., Hydrology, Newage International (P) Ltd., New Delhi, 2006.
8. Shaw E.M., Hydrology in Practice, 3rd Ed, Routledge, 2004.
9. Singh V.P., Elementary Hydrology, Prentice Hall, Englewood, New Jersey, 1993.
10. Suresh R., Watershed Hydrology, Standard Publishers Distributors, New Delhi, 2005.
11. Ward A.D. and Elliot W.J. (eds.) Environmental Hydrology, Lewis Publishers, 1995.
12. Madan Mohan das and Mimi Das Saikia., Hydrology, Prentice Hall of India, 2013.
13. Timothy, Davie., Fundamentals of Hydrology, Routledge, Taylor and Francis Group, U.K. 2003.
14. Todd, D.K., Groundwater Hydrology. John Wiley & Sons Inc. 2009.

The main aim of the course is to introduce students to concept of Watershed Management. The course emphasizes on identifying Watershed as an ideal planning unit wherein a student realizes the importance of equitable and judicious management of resources in a region.

Credit-I

1. Watershed: Meaning and Concept
2. Watershed as a Planning Unit
3. Watershed Characteristics
4. Watershed Delineation
5. Watershed Codifications

Credit-II

1. Watershed Management: Concept and Approaches, Integrative and Consortium Approach
2. Watershed Management Strategies. Preventive and Restorative
3. Watershed Modeling
4. Application of Remote Sensing and GIS in Watershed Studies
5. Two Case Studies of Watershed Management- National/ Local- National Watershed Management Plan

Suggested Readings

1. Asish Ghosh., Natural Resource Conservation and Environmental Management, APH Publishing Corporation, Ansari Road New Delhi, 2003.
2. M.K. Maitra., Watershed Management Project Planning, Development and Implementation, OMEGA Scientific Publishers, 2001.
3. S. Chandra., Water Resources of Himalaya in Himalayan Ecosystem, Ed DN Tiwari IBD Dehradun, 1995.
4. S.S. Negi., Natural Resource Management in the Himalayas-Land Water and Environmental Management, APH Publishing Corporation, Ansari Road New Delhi, 2003
5. T.N. Khoshoo., Environmental Priorities in India and Sustainable Development, 1986.

The course intends to make learners understand various types of natural hazards.. The course has been devised so that it serves as an awareness program for the students in general. This course is expected to sensitize our students to various natural hazards to which this region is vulnerable and at the same time encourage them to play their role in mitigating the after effects of these natural events.

Credit: I Hydro-meteorological Hazard

1. Cyclone
2. Flood
3. Drought
4. Avalanche
5. Wild fires

Credit: II Geological Hazard

1. Earthquake
2. Tsunami
3. Landslide
4. Volcanic Eruption
5. Land subsidence

Suggested Readings:

1. Bryant Edwards., Natural Hazards, Cambridge University Press, U.K, 2005.
2. Carter, W. Nick., Disaster Management, Asian Development Bank, Manila,1991.
3. Damon P. Coppola., Introduction to International Disaster Management, 2010.
4. H.K. Gupta., Disaster Management, 2003.
5. Jolly., Surface History of the Earth.
6. Patrick L. Abbott., Natural Disasters, McGraw-Hill Higher Education, 2004.

GG17210GE GEOGRAPHY OF HIMALAYA

The course focuses on geological, physiological, climatic and socio-economic framework of Himalayas. It provides detailed information about the fragile mountain environment and also focuses on adaptation and mitigation measures to ensure prosperity and safety of the inhabitants of the region. It is quite useful to the students interested in working on various aspects of Himalaya.

Credit-I

1. Evolution and Structure of Himalaya
2. Physical Divisions
3. Climate
4. Drainage Systems
5. Biodiversity

Credit-II

1. Himalayan States of India- Demography and Economy
2. Linguistic and Ethnic Diversity of Himalaya
3. Himalayan Agriculture & Tourism
4. Hydrological Significance of Himalaya
5. Emerging Environmental issues in Himalaya

Suggested Readings:

1. Harish Kapadia., High Himalaya Unknown Valleys, Indus Publishing Company, New Delhi, 1997.

2. J. S. Lall., The Himalaya- Aspects of Change, Oxford University Press, Delhi, 1981.

3. Manmohan Nath Kaul., Glacial and Fluvial Geomorphology of Western Himalaya, Concept Publishing Company, New Delhi, 1990.

4. P. S. Saklani., Structural Geology of the Himalaya, Today and Tomorrows Printers & Publishers, New Delhi, 1980.

5. S. C. Bose., Geography of Himalaya, National Book Trust, New Delhi, 1972.

This course deals with socio-economic-cultural-physical and environmental conditions of India and is related to investigate spatio-temporal changes taking place here. It introduces the students to physical and cultural diversities of the country. This is an open elective course very useful for students interested in civil services and other examinations.

Credit-I

1. Geo-Environmental Framework of India-Physiography, Relief & Drainage
2. Climate and Natural Vegetation
3. Bio-geographic Zones of India
4. Geo-Political Significance of India
5. Boundary Issues of India With its Neighbors

Credit-II

1. Population Dynamics & Distribution
2. Racial and Ethnic Composition- Cultural Regions
3. Agro-climatic Regions of India based on Planning Commission of India
4. Mineral Resource of India – Iron ore and Coal
5. Major Industrial Regions of India

Suggested Readings:

1. Chandra Vijay Purty., Geography of India, ABD Publishers.
2. D. R Khullar., India; A Contemporary Geography- Kalyani Publications New Delhi 2010.
3. Drew, F .K., The territories of India, Kashrnir State. Standard Press London, 1979.
4. Gazetter of Kashmir and Ladakh, 1890.
5. Lawrence, S.W., The Valley of Kashrnir, Oxford University Press, 1895.
6. Majid Hussain, Geography of India, 2nd Ed. Tata McGraw Hill, 2011.
7. Majid Hussain, Systematic Geography of Jammu and Kashmir, Rawat Publications, 2000.
8. Qazi, S.A., Geography of India with special reference to J&K State, APH Publishing Co. 2000.
9. R. L. Singh., India- A Regional Geography, National Geographical Society of India, 2003.
10. Raina, A.N., Geography of Jammu and Kashrnir, National Book Trust, New Delhi, 1971.
11. Singh, R.L., India, Regional geography, Banarus Hindu University, 1987.
12. Spate, O.H.K., India and Pakistan, Mac Million & Co. 1967.

GG17212OE DISASTER VULNERABILITY IN INDIA

The Course is designed to provide comprehensive understanding of disaster vulnerability of India. The students will develop knowledge and perception about factors governing Risk and Vulnerability towards different natural hazards such Earthquake, Floods, Droughts and Cyclones. The students will also comprehend the geographical controls on occurrence of these hazards.

Credit I

1. Vulnerability: Exposure and Risk
2. Perception of Vulnerability
3. Physical, Social and Economic Vulnerability
4. Vulnerability & Risk Assessment
5. Indicators of Vulnerability

Credit II

1. Hazard and Vulnerability Profile of India
2. Earthquake & GLOF
3. Floods & Droughts
4. Cyclones
5. Multi Hazard Zones of India

Suggested Readings:

1. Bryant Edwards., Natural Hazards, Cambridge University Press, U.K, 2005.
2. Carter, W. Nick., Disaster Management, Asian Development Bank, Manila, 1991.
3. Damon P. Coppola., Introduction to International Disaster Management, 2010.
4. H.K. Gupta., Disaster Management, 2003.
5. Jolly., Surface History of the Earth.
6. Patrick L. Abbott., Natural disasters, McGraw-Hill Higher Education, 2004

This course specifically focuses on the role of geography in influencing the socio-cultural milieu of communities living in different parts of the world. The students which the society faces. The course will make students aware about the current social problems and how to cope with them. Making a student aware about the society will impart a moral education to the students.

Credit-I

1. Nature and Development of Social and Cultural Geography
2. Concept of Space and Place, Process and Pattern and their Social Significance
3. Races: Types and Global Distribution
4. Tribes: Their Habitat, Economy and Society
5. Social Problems in India

Credit – II

1. Gender Discrimination and Empowerment
2. Role of Language, Religion and Tradition in the formation of Culture Regions
3. Environmental Related Health Problems in Developing Countries
4. Concept of Social Wellbeing and its Measurement
5. Impact of Modernization on Indian Society

Credit-III

1. Evolution of Culture
2. Cultural Convergence and Divergence Processes
3. Major Cultural Realms of the World
4. Culture Diffusion - Acculturation and Assimilation
5. Cultural Hearth - Classification and Distribution

Credit – IV

1. Society - Meaning, Types and Characteristics
2. Folk Culture - Folklore Regions
3. Classification of Indian Races- Huttons, Risleys & B. S. Guhas
4. Cultural Landscape
5. Tribal Areas in India and their Problems

Suggested Readings

1. Jones Emrys, and Eyles John., An Introduction to Social Geography, Oxford University Press, 1977.
2. Aijazuddin Ahmed., Social Geography, Rawat Publications, New Delhi, 1999.
3. Smith David., Geography - A Welfare Approach, Edward Arnold, 1977.
4. Knox P. L., Social Well-being: A Spatial Perspective, Oxford University Press, London, 1975.
5. Crong Mike., Cultural Geography, Routledge Publications, London, 1998.
6. Jordan and Lester, G., The Human Mosaic Harper Row, New York, 1978.
7. Massey et a., Human Geography today, Polity Press, Cambridge, 1999
8. Mukerjee, A. B. & Aijazuddin Ahmed., India Culture Society's Economy, Inter India Publications, New Delhi, 1985.

The course comprises of four credits. The course explores the current context and content of regional/spatial planning from perspective of developing countries and also investigates underlying theoretical debates. Course is designed to analyse the existing spatial distribution and exploitation pattern of regional resource structures, , levels of sectoral development and , regional imbalances and sustainable regional developmental strategies to address the issues of regional imbalances and disparities. The focus of the course is to impart knowledge, understanding and skills necessary to practise professionally as a regional/spatial planner. Course enables the students to formulate/prepare short term regional developmental planes at micro-spatial scale.

Credit-I

1. Regional Concepts in Geography: Conceptual & Theoretical Tramework
2. Approaches to Delineation of Region & their Utility in Planning
3. Types of Regions
4. Relevance of Regional Planning in Regional Development
5. Introduction of Regional Planning in India

Credit-II

1. Planning Processes; Sectoral and Spatial, b) Short Term and Long Term
2. Concept of Multi-Level Planning & Decentralized Planning
3. People's Participation in Decentralized Planning Processes
4. Developmental Strategies for; Hilly Regions & Tribal Regions
5. Developmental Strategies for; Regions of Drought & Flood

Credit-III

1. Development: Concept & Measurement
2. Rostow's Stage Theory of Growth
3. Growth Pole Theory
4. Regional Income Inequality Model
5. Core Periphery Model

Credit-IV

1. Measurement of Levels of Regional Development and Disparities
2. Construction of Composite Index
3. Levels of Regional Development and Disparities in India with special Reference to J&K
4. Emerging Corridors of Development in India
5. Application of Remote Sensing in Regional Planning

Suggested Readings:

1. Agarwal, A.G., Urban and Regional Models in Geography and Planning, John Wiley and Sons, 1974.
2. Campbell, S. and Frankenstein, S., Planning Theory, Blackwell Publishers, 1997.
3. Campbell, S., and Feinstein, S. Readings in Planning Theory, Blackwell Publishers, 1997.
4. Carter, Harold., The Study of Urban Geography, Edward Arnold Publishers Ltd., 1982.
5. Chadwick, George., A Systems view of Planning, Pergamum Press Oxford, New York., 1978.
6. Clout, H.D., Rural Geography, Pergamum Press Oxford, New York. 1984.
7. Gary Hack, et al. Local Planning: Contemporary Principles and Practice, Oxford Press London, 2009.
8. Heredero, J.M., Rural Development and Social Change, Monahan Press Gujarat, 1979.
9. Hugget, Richard., System Analysis in Geography, Clarendon Press Oxford, 1980.
10. Issard, Walter., Methods of Regional Analysis, The M.I.T Press, 1976.
11. Mehta, A., Economic theory and Planning, University Oxford Press, 1974.
12. Mishra, R.P., Regional Planning and Development, Heritage Publishers, New Delhi, 1990.
13. Mishra, R.P., Regional planning Concepts, Techniques, Policies and Case Studies, Concept Publishing Company, New Delhi, 1992.
14. Mumford, Lewis., The City in History: Its Origins, Its Transformations, and Its Prospects 1972.
15. Siddhartha, K., Models in Regional Planning, Kasalaya Publications, New Delhi, 2008.
16. Siddhartha, K., Regional Planning of India, Kasalaya Publications, New Delhi, 2007.
17. Singh, R.L., India- A Regional Geography, National Geographical Society of India, Varanasi, 2003.
18. Sundram, K.V., Geography and Planning, Concept Publishing Company, New Delhi, 1985.
19. Todara, Michel P., and Smith, Stephen, C. Economic Development (12th ed.), Pearson Publishers, 2014.
20. Wilson, A.G., Urban and Regional Models in Geography and Planning, John Willey and Sons, London. 1975.

GG17303CR FIELD STUDIES (GEOMORPHIC AND SOCIO-ECONOMIC)

Field studies termed as geographic laboratories leads to learning experiences outside of the classroom and allow students to gather their own experience about physical and social elements. Students are trained in the field about the conduct of Socio-economic Field survey. Students are also trained about Geomorphic field investigations during the field survey.

Credit-I

1. Identification and Mapping of major Geomorphic Features and Associated Process
2. Use of Topographic Maps and Satellite Imageries for Geomorphic Mapping
3. Identification of Relationship between Physical Setting and Land-use Pattern
4. Identify the Landforms in the field. Also note the Agents of Erosion, Transportation and Deposition Associated with the Landforms.

Credit-II

1. Observe the Relationship of various Landforms, with Land-use, Settlement Structure and Life-style of People.
2. Based on Observations of the above Characteristics, Prepare a Field Survey Report. The Report need to be Supplemented with Maps, Sketches, Photographs etc.

Credit-III

1. Procure a Topographic Map of 1:50,000 or 1:25,000 and Prepare a Map of the Settlements in the Study Region.
2. Collect Demographic, Social and Economic Data of the Village/Town from Census Reports to Study the Temporal Changes in the Profile of Such Characteristics.
3. Prepare a Cadastral Map of the Village/Town for Field Mapping of the Features of Land-use and Land Quality. Procure/ Prepare the Settlement –Site Map through Rapid Survey to Map the Residential, Commercial, Recreational (Parks, Playgrounds), Educational, Religious and other Prominent Features.

Credit-IV

1. Preparation of a Structured / Non Structured Questionnaire and Conduct a Socio-economic Survey. Supplement the Information by Personal Observations and Perceptions
2. Based on Results of the Geomorphic, Land-use and Socio-Economic Field Survey of the Study Area; Prepare a Field –survey Report. Photographs and Sketches, in Addition to Maps and Diagrams, may supplement the Report.

Suggested Readings:

1. Gopal Singh., Map World and Practical Geography, Vikas Publishing House, 2000.
2. Pal, S.K., Statistics for Geographers- Techniques and App1ications, Concept, New Delhi, 1998.
3. Robinson, et al., Elements of Cartography, John Wiley and Sons, U.S.A, 1995.
4. Sarkar, A.K., Practical Geography: A Systematic Approach, Oriental Longman, Calcutta, 1997.
5. Singh, R.L, and Dutt, P.K., Elements of Practical Geography, Kalyani Publishers, New Delhi, 1979.

GG17304DCE ECOLOGY AND ENVIRONMENT

This course focuses on Man environment interaction and helps the student to understand the concept of sustainable Development. it also imparts training in EIA and Environmental Management which enhances the employability of the student

Credit-I

1. Ecosystem concept and components
2. Ecosystem form and functions
3. Tropical Levels, Ecological Niche, Ecological Pyramid
4. Energy flow Models (U Shaped and Y Shaped Energy Flow Model)
5. Ecological Adaptations

Credit-II

1. Carbon Cycle
2. Biodiversity; Significance, Spread and its Conservation
3. Threats to Biodiversity
4. Preservation and Conservation of Ecosystem Through Resource Management
5. Ecological Footprint and Concept of Green Economy

Suggested Readings:

1. Chapman and Reiss; Ecology Principles and Applications, Cambridge University Press, 1999.
2. E.P. Odum, Fundamentals of Ecology, Thomas Business Information India Pvt. Ltd. 2006
3. John L. Harper., Ecology-From Individuals to Ecosystems, Wiley Blackwell.
4. P.D. Sharma., Ecology and Environment (11th Edition), Rastogi Publications, 2005.
5. Paul Lauris and W.G. Mosely., An Introduction to Human - Environmental Geography, Whiley Blackwell, 2013.

The course aims to introduce students to the concept and philosophy of Natural Resources Management. Its importance and significance in the present scenario in light of the tremendous pressure on these precious resources. The students learn about the various approaches that have been adopted for effective and judicious utilization of these resources.

Credit-I

1. Natural Resource Management- Concept and Need
2. Approaches of NRM (Classic, Neo Liberal and Populistic approach).
3. Classification of Natural Resource
4. Natural Resource Management and Development
5. Natural Disasters and their Impact on Resources

Credit-II

1. Meaning and Principles of Conservation and Management
2. Methods of Conservation of Natural Resources:-(i) Water (ii) Forests (iii) Soils (iv) Minerals
3. Natural Resources Management –Indian Scenario- National Forest Policy
4. Uses and Misuses of Resources: Global and Indian Scenario
5. Application of RS & GIS for Natural Resource Management

Suggested Readings:

1. Sundaram.M, and M. Mrityunjay., Natural Resources Management and livelihood Security –Survival Strategies and Sustainable Policies, BhoovigyanVikas Foundation, 2004.
2. Harikesh N. Misra., Managing Natural Resources- Focus on Land and Water, Prentice Hall India Learning Private Limited, 2014.
3. Konnethd, Frederick and Norman J. Rosenberg., Assessing the Impacts of Climate Change on Natural Recourses Management, Springer, 1994.
4. Russell D. Taylor., Natural Resources Management and Local Development, Springer, 2010.
5. Jana, Bipal, & KR. Majumder, Impact of Climatic change on Natural Resource Management, Mrinmoy Publishing House, 2012.

It focuses on formation, distribution and conservation of soil resources and also provides certain technical inputs which could improve soil health and boost productivity to ensure food security.. The course has theoretical, field and laboratory aspects, and the resulting maps and data can be interpreted in many ways, particularly for land use planning.

Credit-I

1. Soil: An Introduction
2. Factors Influencing Soil Formation
3. Processes of Soil Formation – Soil Profile
4. Physical Properties of Soil
5. Chemical Properties of Soil

Credit-II

1. Soil Classification- Zonal Scheme
2. USDA System of soil Classification
3. Soil Loss Models-USLE
4. Soil Conservation and its Significance
5. Soil Conservation Methods –Biological, Mechanical

Suggested Readings:

1. Daniel Hillel., Soil in the Environment; Crucible of Terrestrial Life, Academic Press, 2007.
2. Edward J. Plaster; Soil Science & Management, Delmar Cengage Learning; 6th edition, 2013.
3. Garrison Sposito., The Chemistry of Soils, Oxford University, 1989.
4. James B. Nardi., Life in the Soil: A Guide for Naturalists and Gardeners, University of Chicago Press, 2007.
5. Nyle Briday., The Nature and Properties of soil, Macmillon Publishing Company USA 1990.

The EIA is a must and has to be undertaken early in the development of proposed projects, plans and programmes and must be completed before a decision to proceed is made. Thus during the course students will be provided a brief about the concept, approaches and legal provisions of EIA and the various methodologies applied while doing EIA.

Credit-I

1. Environment Impact Assessment: Concept, Objectives and Approaches
2. Baseline Data Generation and Strategic Environmental Assessment
3. EIA Guidelines 2006 and Amendments
4. Protocol for Environment Impact Statements
5. Public Participation in Environmental Decision Making

Credit-II

1. EIA Methodology
2. Air and Water quality Assessment
3. Ecological Assessment
4. Social Impact Assessment
5. EIA Case Studies: Hydel and Thermal Power Projects, Industrial Estates, Highways, Cement and Chemical Industries

Suggested Readings:

1. John Glasson, Riki Therivel, & Andrew Chadwick., Introduction To Environmental Impact Assessment, 2013.
2. Charles H. Eccleston., Environmental Impact Assessment: A Guide to Best, 2011.
3. Neil Craik., The International Law of Environmental Impact Assessment, 2010.
4. Alan Gilpin, Environmental Impact Assessment: Cutting Edge for the 21st, 1995.

GG17308DCE DISASTER MANAGEMENT

The course has been designed to deliver on basic concepts, principles, and significance of disaster management. The course would also cover best practices, changes, and new aspects of disaster management. The learners would get knowledge of frameworks adopted for disaster risk reduction over the period of time that has come up in the backdrop of various world disaster conferences. Moreover, the course covers disaster management policies as case studies from under developed, developing and developed nations.

Credit-I

1. Disaster Management: Meaning, Scope and Significance
2. Disaster Management Cycle
3. Approaches in Disaster Management
4. Disaster Management Strategies
5. Disaster Management Policy and its Significance

Credit-II

1. National Disaster Management Act 2005
2. Yokohama Declaration
3. Hyogo Framework of Action For Disaster Risk Reduction
4. Sendai Framework
5. Disaster Management and Developmental Planning

Suggested Readings:

1. Bryant Edwards., Natural Hazards, Cambridge University Press, U.K, 2005.
2. Carter, W. Nick., Disaster Management, Asian Development Bank, Manila, 1991.
3. Damon P. Coppola., Introduction to International Disaster Management, 2010.
4. H.K. Gupta., Disaster Management, 2003.
5. Jolly., Surface History of the Earth.
6. Patrick L. Abbott., Natural disasters, McGraw-Hill Higher Education, 2004.

GG17309GE GEOPOLITICS OF INDIAN SUB-CONTINENT

It helps to understand the geopolitical aspects of Indian subcontinent, its foreign policies, strategic location factors etc. A student gets well versed with the intricacies of geopolitical situation of the sub-continent. The course is expected to prove quite useful to students pursuing studies in international affairs and also to those who are appearing in competitive examinations.

Credit-I

1. Geopolitics: A Conceptual Framework
2. Global Strategic views of Heartland and Rim Land Theories
3. Concept of Boundaries, Frontier and Buffer zones
4. International Boundary: Conflicts of India with China and Pakistan.
5. CPEC and OROB and its Implication in South Asia

Credit-II

1. Indian Sub-continent: Geostrategic Importance
2. Geopolitical significance of Indian Ocean
3. Geopolitics of SAARC Region
4. Historical and Geopolitical Importance of Silk Route.
5. Disputes of sharing of Water Resources- Indus Water Disputes.

Suggested Readings:

1. Agnew J., Political Geography, A Reader London, Arnold, 1997.
2. Cox KR, Low M & Robinson J., Handbook of Political Geography, London, 2008.
3. Edward, F., Modern Political Geography, Brown Company Publishers, 1975.
4. Harvey, D., Justice, Nature and the Geography of difference, Oxford: Blackwell, 1996.
5. Hussain, M., Political Geography, Anmol Publishers, New Delhi, 1994.
6. John Agnew., Political Geography Reader, Arnold Hodder, 1995.
7. Johnston, R.J., Political, Electoral and Spatial Systems, Oxford Clarendon Press, 1979.
8. Painter, J., Politics, Geography and 'Political Geography': A Critical Perspective London', 1995.
9. Peter, J. Taylor., Political Geography, Long man Group, England, 1985.
10. Spykman, N. J., The Geography of the Peace New York: Harcourt, Brace and Co.1944
11. Sutton, I., 'The Political Geography of Indian Country' American Indian Culture and Research Journal, 1991.
12. Taylor P.J. & Flint C., Political Geography: World-Economy, Nation-state and locality Harlow, Pearson Education Limited, 2007

This course has been conceptualized as a general course for all the students so that they could learn more about the glaciers, their origin and classification, Erosional and depositional processes and glacial hazards etc. After completion of this course, the students are expected to explore multidisciplinary approaches to various environmental problems.

Credit-I

1. Glaciers: Origin and Classification
2. Glacial Ice Movement
    a. Basal flow
    b. Internal deformation
3. Ice Ages: Causes & Evidences
4. Himalayan Glaciers: Mass Balance and response to Climatic Changes
5. Case studies of glaciers:
    a. Gangotri glacier
    b. Kolahai glacier

Credit – II

1. Glacial Erosion.
    a. Ice and Melt Water.
    b. Mechanical and Chemical Processes of Erosion.
2. Development of Erosional Landforms.
3. Depositional Processes;
    a. Stratified and Non-stratified.
    b. Drifts –Morpho-Dynamics of Moraines
4. Depositional Features
5. Hazards in Glacial Environment: Glacial Surges and Glacial Lake Out-bursts**.**

Suggested Readings:

1. Doug, Benn and David J.A. Evans., Glaciers and Glaciation, (2nd edition), Hodder Arnold Publication, 2010.
2. Ireneo Peter Martui., Geomorphological and Geology, 2001.
3. Kaushik Pradepika., Geomorphological Studies of the Himalayan Glaciers in brief, Lambat Academic Press, 2013.
4. Micheal Hambrey and Jueg Alean., Glaciers (2nd edition), 2004.
5. Naseerudin ahmad and Sarwar Rais., Himalyan Glaciers, APH Publishing House, 1998.

This course deals with the comparison and critical assessment of socio-economic scenario of developed, developing and under developed societies. It studies the climatic changes and variations on the wellbeing of humans.

Credit-I: Geography of North America

1. Physiography
2. Drainage
3. Climate
4. Natural Vegetation
5. Population Distribution, Density and Growth

Credit-II: Geography of Europe

1. Physiography
2. Drainage and Climate
3. Industrial Setup
4. Mineral Resource
5. Demography

Suggested Readings:

1. Earl Clark & Danel Rockman Bergsmark., Modern World Geography, J.B. Lippincott Company, 2009.

2. John Hudgon Bradley., World Geography; Gin & Co.

3. Majid Hussain: World Geography; Rawat Publication, 2012.

4. Simon Adams: Geography of the world; Dorling Kindersly, 2006.

GG17312OE DISASTER PROFILE OF INDIA

India's unique geo-climatic position makes India particularly vulnerable to disasters. The Spatio-temporal variability of India with respect hazards, vulnerability, exposure, and risk would be covered in this course. The paper will also illustrate the causes and consequences of historical disasters in India.

Credit-I

1. India a Multi Disaster-Prone Country
2. Earthquake Distribution and Zonation
3. Earthquake Vulnerability Scenario of Himalayan Cities
4. Landslides: Implications and Zonation in Northern India
5. Snow Avalanche- Causes and Implications

Credit-II

1. Floods- Distribution Causes and Consequences
2. Cloudburst- Causes and Consequences
3. Drought Scenario of India
4. Cyclones and Their Implications in Coastal India.
5. Tsunami Exposure Scenario of India

Suggested Readings:

1. Bryant Edwards., Natural Hazards, Cambridge University Press, U.K, 2005.
2. Carter, W. Nick., Disaster Management, Asian Development Bank, Manila, 1991.
3. Damon P. Coppola., Introduction to International Disaster Management, 2010.
4. H.K. Gupta., Disaster management, 2003.
5. Jolly., Surface History of the Earth.
6. Patrick L. Abbott., Natural disasters, McGraw-Hill Higher Education, 2004.

GG17401CR POPULATION AND SETTLEMENT GEOGRAPHY

The course is expected to provide learners clear idea of the evolution and present scope of the discipline. Moreover, the course aims to focus on past, present and future scenario of population and sex-age structure of the world familiarizing students with basic concepts and approaches that can be applied for studying population phenomena would also be covered. The course also aims to impart knowledge of concepts and theoretical framework relating to settlement geography. Building capacity to use theoretical and empirical advancements to develop strategies, policies and programmes to meet challenges of housing problems is also the domain of this course.

Credit-I

1. Evolution of Population Geography as a Separate Branch and its Subject Matter
2. Population Theories: Malthus, Neo Malthusianism, Demographic Transition
3. Factors influencing Spatial Distribution and Density of Population
4. Population Dynamics of India and J&K
5. Population Projection Techniques

Credit-II

1. Nature and Scope of Settlement Geography
2. Evolution, Size and Growth of Human Settlement; Diffusion of Settlements
3. Site and Situation Factors in the Development of Settlements
4. Rural Settlement, Patterns and Forms
5. Urban Settlements

Credit-III

1. Population Problems in Developed and Developing Countries
2. Fertility: Determinants and World Patterns
3. Mortality: Determinants and World Patterns
4. Migration: Measures, Determinants & Consequence
5. Human Development; Concept of Human Development Index and its Components

Credit-IV

1. Classification of Settlements
2. Theories of the Morphological Structure of Cities: Concentric Zone, Sector Theory, Multi-Nuclei theory
3. Social Area Analysis Model and Exploitative Model
4. Settlement Hierarchy- Theories of Walter Christaller and August Losch
5. Settlement and Environmental Interface

Suggested Readings

1. Agarwala, S.N., India's Population Problems, Tata McGraw Hill, New Delhi, 1985.
2. Beaujeu Garnier, J., Geography of Population, Longman, London, 1966.
3. Bhende, A. A. and Kanetkar T., Principles of Population Studies, Himalaya Publishing House, Mumbai, 2003.
4. Bhende, A.A. and Kanetkar, T., Principles of Population Studies, Himalayan, 1978.
5. Bose, A. (ed.)., Population in India's Development, 1947-2000. Vikas Publications, New Delhi, 2001.
6. Carter, H., The Study of Urban Geography, Edward Arnold, London, 1975.
7. Champion, T. (ed.) Population Matters. Paul Chapman, London, 1993.
8. Chandna, R. C., Geography of Population. Kalyani Publishers., New Delhi, 2006.
9. Chandna, R.C., Geography of Population, Kalyani Publishers, New Delhi, 1986.
10. Clark, J. I., Population Geography. Pergamon Press, Oxford, 1972.
11. Daniel, P., Geography of Settlement. Rawat Publications., Jaipur and New Delhi, 2002.
12. Ehrlich, P.R. and Ehrlich, A.H. , Ecoscience: Population, Resources, Environment. 6th ed. W.H. Freeman and Company, San Francisco, 1996.
13. Eidt, R. C., Singh, K. N. and Singh, Rana, P.B., (eds.), Man, Culture and Settlement. Kalyani Publishers., New Delhi, 1977
14. Garnier, B.J., Geography of Population. 3rd edition. Longman, London, 1993.
15. Ghosh, S., A Geography of Settlements. Orient Longman, Kolkata, 1999.
16. Hassan, M.H., Population Geography, Rawat Publications, New Delhi, 2005.
17. Hudson, F. S., A Geography of Settlements. MacDonald and Evans, New York, 1976.
18. Jones, H. R., Population Geography. 3rd edition. Paul Chapman, London. Pathak, L. P. (ed.) (1998): Population Studies. Rawat Publications., Jaipur and New Delhi, 2000.
19. Mitra, A., Report on House Types and Village Settlement Patterns in India. Publication Division, Govt. of India, New Delhi, 1960.
20. Mosley, M.J., Rural Development: Principles and Practice. Sage Publication, London, 2005.
21. Oliver, P., Dwellings. The House across the World. University of Texas, 1987.
22. Ross, John A,. (ed.) International Encyclopaedia of Population. Free Press, New York, 1982.
23. Singh, K.N. and Singh, D.N., (eds.) Population Growth, Environment and Development. EDSC, Varanasi, 1992.
24. Singh, R.Y., Geography of settlements. Rawat Publications., Jaipur and New Delhi, 2003.
25. Srinivasan, K, and Vlassoff, M., Population Development Nexus in India: Challenges for the New Millennium. Tata McGraw Hill, New Delhi, 2001.
26. Trewartha, G.T., A Geography of Population. World Patterns. John Wiley and Sons, New York, 1985.
27. Trewartha, G.T., A Geography of Population- World Patterns, John Wiley, 1969.
28. Woods, R., Population Analysis in Geography, Longman, London, 1979.
29. Zelinsky, W., A Prologue to Population Geography. Prentice Hall, Englewood Cliffs, New Jersey. M.Sc. Geography SE, 1966.

GG17402CR ECONOMIC GEOGRAPHY

Economic geography is a dynamic, diverse and contested body of knowledge that aims to provide critical insights into the workings of contemporary societies and economies. It unfolds the disparities in economic and resources of a region thus information is employed in policymaking decisions.

Credit-I

1. Relation of Economic Geography with other Branches of Social Science
2. Factors of Location of Economic Activities
3. Theories of Industrial Location- Weber
4. Role of Iron & Steel Industries in the Economic Development of India
5. Growing Role of Tertiary and Quaternary Economic Activities in the Economic Development of India

Credit-II

1. Classification of Economic Activities
2. Concept of Knowledge Economy
3. Globalization and its Impact on Indian Economy
4. LPG Model- Liberalization, Privatization and Globalization
5. Economic Development of India- Through Successive Five Year Plans

Credit-III

1. Green Revolution and its Implications
2. Food Security Scenario in India
3. Regional Disparities in the Levels of Economic Development
4. Role of Infrastructure (Energy) in the Economic Development of India
5. Importance of IT and Automobile in the Modern Indian Economy

Credit-IV

1. Water Resources of India
2. Forest Resources of India
3. Marine Resources of India (EEZ)
4. Energy Security Scenario in India.
5. Prospects and Problems in Development of Non-conventional sources of Energy

Suggested Readings:

1) Trevor J. Barnes, Jamie Peck & Eric Sheppard., Economic Geography, Wiley Blackwell Companion.

2) Trevor J. Barnes., Reading Economic Geography, Wiley Blackwell Companion.

3) Chrales Redway Dryer., Elementary of Economic Geography, Wiley Blackwell Companion.

4) James Franklin Chamber., Geography: Physical, Economic, Regional, Wiley Blackwell companion

5) J G Bartholomew., Atlas of Economic Geography, Wiley Blackwell Companion

6) A.M. Bagulia., Encyclopedia of Economic Geography; Wiley Blackwell Companion

7) Cumbers Mackinnon., Introduction to Economic Geography: Globalization, Uneven Development & Place (2^{nd} edition), Wiley Blackwell Companion.

8) Uma Kapila., Indian Economy Performance and Policies (16^{th} edition), Academic Foundation, 2015.

9) T. C Sharma., Economic Geography of India, Rawat Publishers, 2013.

10) K. Siddhartha., Economic Geography; Kitab Mahal, 2016.

The course has been planned to provide practical training of various advanced instruments i.e., Total Station and Global Positioning System. In addition to setting-up of the instruments, the students are expected to make some fundamental measurements (distance, angle, height, area) of land surveying and layout designing in GIS.

Credit-I

1. Surveying Instruments –Total Station (TS)
2. Total Station -Functions and Characteristics
3. Handling and Setting-up TS: Leveling, Centering and Orientation
4. Measuring Angles, Distances, and Heights
5. Land Parcel Area Calculation

Credit-II

1. Global Positioning System (GPS)
2. GPS Structure (Segments)
3. Fundamentals of GPS positioning
4. Types of GPS Survey
5. Sources of Errors

Credit-III

1. Collecting Waypoints (Point, Line, and Polygon)
2. Adding Attributes to the Points
3. Preparation of Road Maps
4. Landscape/Land use Mapping
5. Data Transfer

Credit-IV

1. Real-time kinematic GPS Survey
2. Establishing GPS Base Station
3. Creating a Link Between Base and Rover
4. Creating River Profile and Cross-Sections
5. Generating Digital Elevation Model

Suggested Readings:

1. Kali Charan Sahu., Textbook of Remote Sensing and Geographic Information System, Atlantic Publishers and Distributors, 2008.
2. B.C. Panda., Remote Sensing- Principles and Applications, Viva Books, 2008.
3. Jensen., R Fundamentals of Remote Sensing. Shree Maitree Printech Pvt Limited Noida, 2007.
4. Gopal Singh., Map World and Practical Geography, Vikas Publishing House, 2000.

This is one of the important course which provides a real time situation to the students to apply their theoretical and practical knowledge in indentifying a research problem, setting objectives and then employing various data generation / analysis techniques to complete a dissertation on a given topic. This course helps the students to work independently under the supervision of a teacher and complete a given task within a stipulated timeframe.

The Student has to prepare the Dissertation on any of the topics elected in consultation with the concerned Supervisor/Guide. The Dissertation shall cover the following components

Credit-I & II Class Work

1. Statement of the Problem -Conceptual Framework
2. Objectives-Hypothesis/ Research Questions
3. Literature Survey

Credit -III & IV

1. Dissertation

Suggested Readings:

1. Kali Charan Sahu., Textbook of Remote Sensing and Geographic Information System, Atlantic Publishers and Distributors, 2008.
2. B.C. Panda., Remote Sensing- Principles and Applications, Viva Books, 2008.
3. Jensen., R Fundamentals of Remote Sensing. Shree Maitree Printech Pvt Limited Noida, 2007.
4. Gopal Singh., Map World and Practical Geography, Vikas Publishing House, 2000.

This course helps the students to understand the geographical aspects of national and international politics. This course has been prepared with the prime objective of encouraging students to pursue research in this important branch of geography and address their needs of various competitive examinations.

Credit-I

1. Political Geography and Geopolitics -Approaches to the study of Political Geography
2. Major Schools of Thought in Political Geography (German, British and American)
3. Global Strategic Views of Heartland and Rim-land Theories
4. Federalism and other forms of Governance
5. Concept of Boundaries, Frontier and Buffer zones

Credit-II

1. Geopolitical Significance of Indian Ocean
2. Political Geography of SAARC Region
3. International Boundary of India and Related Issues
4. Historical and Geopolitical Importance of Silk-route
5. Disputes of Sharing of Water Resources- Kaveri and Indus Water Disputes

Suggested Readings:

1. Agnew J., Political Geography: A reader London: Arnold, 1997.
2. Cox KR, Low M. & Robinson J., Handbook of Political Geography, London, 2008.
3. Edward, F., Modern Political Geography, Brown Company Publishers, 1975.
4. Harvey, D., Justice, Nature and the Geography of difference, Oxford Blackwell, 1996.
5. Hussain, M., Political Geography, Anmol Publishers, New Delhi, 1994.
6. John Agnew, Political Geography Reader, Arnold Hodder, 1995.
7. Johnston, R.J., Political, Electoral and Spatial Systems Oxford: Clarendon Press, 1979.
8. Painter, J., Politics, Geography and 'Political Geography': A Critical Perspective London, 1995.
9. Peter, J. Taylor., Political Geography, Long man Group, England, 1985.
10. Spykman, N. J., The Geography of the Peace, New York: Harcourt, Brace and Co.1944.
11. Sutton, I., 'The Political Geography of Indian Country' American Indian Culture and Research Journal, 1991
12. Taylor P.J & Flint C., Political Geography: World-Economy, Nation-state and Locality, Harlow: Pearson Education Limited, 2007

The course has been developed to provide learners an understanding of various application areas of geomorphology. The students are anticipated to have a thorough understanding of geochronology, morphometry, and application of geomorphic knowledge in hydrology, mineral exploration, urbanization, and civil engineering projects.

Credit-I

1. Nature of Applied Geomorphology
2. Role of Geochronology in Determining the age of Earth by: Dendritic Chronology
3. Geochronology, Radioactivity and C-14 Dating
4. Morphometry of Drainage Basins- Linear and Relief Aspects: Stream Ordering Bifurcation Ratio
5. Law of Stream Numbers and Dissection Index

Credit-II

1. Application of Geomorphic Knowledge to: Hydrology Studies & Mineral Exploration
2. Application of Geomorphic Knowledge to Petroleum Exploration
3. Applied Geomorphology and Ground Water Exploration
4. Role of Applied Geomorphology Civil Engineering Project
5. Geomorphology and Terrain Evaluation

Suggested Readings:

1. A.H. Strahler, & A.N.Strahler., Modern Physical Geography, John Willy & Sons, Inc. 2001.
2. A.K. Barua., Climatology, Dominant Publishers and Distributors, 2005.
3. Barry, R. G. & Chorley, R.J., Atmosphere, Weather and Climate, Routiedge, 1998.
4. Critchfield, H., General Climatology, Prentice Hall, New York, 1975.
5. D.S. Lal., Physical Geography, Sharda Pustak Bhawan. 2009.
6. Grald, S., General Oceanography-An Introduction, John Wiley & Sons, New York, 1980.
7. King, C.A.M., Oceanography for Geographers, Earnold, London, 1975.
8. Majid Hussain, Physical Geography, Anmol Publications Pvt. Ltd. 2007.
9. Paul R. Pinet, Oceanography, Jones and Bartelett Publishers, 1998.
10. S.A, Qazi., Principals of Physical Geography, AHP Publishing Co.2004.
11. S.K. Paneersalvam., Global warming and Climate Change, AHP Publishing Co.2012.
12. Satopa Mukherjee.,Understanding Physical Geography, Oriental Longman. 2002.
13. Savindra Singh., Physical Geography, Prayag Pustak Bhawan, 2000.
14. Singh,S., Geomorphology, Prayag Pustakalaya, Allahabad, 1998.
15. Sparks, B.N., Geomorphology, Prayag Pustakalaya, Allahabad, 1998.
16. Stringer, E.T., Foundation of Climatology, Surjeet Publication, Delhi, 1982.

The focus of this paper is to study the intricate relationship between geography and biology. it also broadens the understanding about Biodiversity, its conservation and management.

Credit-I

1. Principles of Biogeography
2. Components of Geographic Template (Climate, Soil, Aquatic Environment)
3. Phyto-Geographic and Zoo-Geographic Realms
4. Speciation, Diversification, Extinction, Dispersal (Mechanisms, Routes and Barriers)
5. Bio-geographic Patterns: Cosmopolitanism and Endemism

Credit-II

1. Biome: an introduction
2. Major Biomes of the World- Forest, Savannah, Monsoon, Grassland
3. Biotic Succession
4. Theory of Island Biogeography
5. Biodiversity: Its Gradients (Latitudinal, Elevational and Depth)

Suggested Readings:

1. E.O. Wilson and R. H Macarther., The Theory of Island Biogeography, Princeton University Press, 1976.
2. James Brown., Biogeography – An Ecological and Evolutionary Approach, Sinauer Associates Inc; 3rd edition, 2005.
3. M.V Limolinov, & B. R. Riddle, Biogeography, Sinauer Associates Inc. Massachusetts USA, 2005.
4. R. J. Huggett., Fundamentals of Biogeography, Routledge Park Square Abingdon, 2nd edition, 2004.

GG17408GE FUNDAMENTALS OF REMOTE SENSING

The course aims to make students understand basic theoretical concepts of Remote Sensing. The students would gain understanding of electromagnetic spectrum, active and passive systems, data resolutions, and image processing. In addition to that this course would include deliberations on applications of Remote Sensing.

Credit: I

1. Electromagnetic Spectrum: EMR-EMS
2. Energy Interaction
3. Remote Sensing Types-Passive and Active
4. Platforms and Sensors-Types and Characteristics
5. Remote Sensing Data Characteristics- Raw, Pre-Processing

Credit: II

1. Remote Sensing Need and Prospects
2. Image Processing
3. Resolution (Spatial, Spectral, Radiometric, Temporal, Hyper Spectral)
4. Advantages of Remote Sensing
5. Applications of Remote Sensing

Suggested Readings:

1. B.C. Panda., Remote Sensing- Principles and Applications, Viva Books, 2008.
2. Gopal Singh., Map World and Practical Geography, Vikas Publishing House, 2000.
3. Jensen, R., Fundamentals of Remote Sensing. Shree Maitree Printech Pvt Limited Noida, 2007.
4. Kali Charan Sahu., Textbook of Remote Sensing and Geographic Information System, Atlantic Publishers and Distributors, 2008.

The course aims to make students understand basic theoretical concepts of Geographic Information System (GIS). The students would gain understanding of quality, types, components and characteristics of GIS data. In addition to that this course would include study of remote sensing systems and digital image processing.

Credit-I:

1. Definition, Scope and Development of GIS
2. Components of GIS
3. Geographic Data: Types and Characteristics
4. Data Models: Raster and Vector, Processing and Analysis
5. GIS DBMS: Concepts, Components and Quality

Credit-II:

1. High Resolution and Hyper Spectral Remote Sensing
2. Microwave Remote Sensing : RADAR Basics
3. Digital Images Processing
4. Pre Processing: Radiometric & Geometric Errors
5. Image Enhancement Techniques

Suggested Readings:

1. B.C. Panda., Remote Sensing- Principles and Applications, Viva Books, 2008.
2. Gopal Singh., Map World and Practical Geography, Vikas Publishing House, 2000.
3. Jensen, R., Fundamentals of Remote Sensing. Shree Maitree Printech Pvt Limited Noida, 2007.
4. Kali Charan Sahu., Textbook of Remote Sensing and Geographic Information System, Atlantic Publishers and Distributors, 2008.

It helps to understand the basic concept of the topographical maps like meaning, significance, scope and uses etc. Students are trained how to study an area with the help of topographical map of the concerned area. A student can start his own consultancy of maps. They can also work in defence as map reader.

Credit - I

1. Topographic Maps
2. Scales
3. Indexing of Topographic Maps
4. Topographic Mapping Methods
5. Topographic Mapping Organization (Survey of India)

Credit-II

1. Symbolization in Topographic Maps
2. Reading and Interpretation of Topographic Maps
3. Geomorphic analysis (Watershed, Landforms, Elevation, Slope, Drainage)
4. Use of Topographic Maps in Utilities (Road making, Pipe laying, Canal Construction, Urban Planning)
5. Tourist, Trekking, and Recreational Guide

Suggested Readings

1. Ishtiaq, M., A Text Book of Practical Geography, Heritage Publishing House, New Delhi, 1989.
2. Mishra, R.P. and Ramesh, A., Fundamentals of Cartography, Concept Publishing Company, New Delhi, 1969.
3. Nayer, N.B., Encyclopedia of Surveying, Maps and Remote Sensing, Rawat Publishers, New Delhi, 1996.
4. Sigh, L.R., Elements of Practical Geography, Kalyani Publishers, New Delhi, 1997.

This course will make students aware about the potential geographical and environmental resources. This will help students in gaining the knowledge about the resource base of the state and how to conserve and preserve these resources for sustainable development.

Credit- I

1. Physiography
2. Climate
3. Natural Vegetation
4. Drainage
5. Biodiversity

Credit- II

1. Population- Distribution, Density, Composition and Growth
2. Indusial Setup
3. Mineral Resources
4. Agriculture
5. Levels of Economic Development

Suggested Readings

1. Earl Clark Case & Danel Rockman Bergsmark., Modern World Geography, J. B. Lippincott Company, 2009.
2. John Hudgon Bradley., World Geography, Gin & Co.
3. Majid Hussain, World Geography, Rawat Publication, 2012.
4. Simon Adams: Geography of the World, Dorling Kindersly, 2006.
5. Stamp. L.D., Asia: A Regional and Economic Geography, Methuen & Co, 1962.