

Maharaja Ganga Singh University, Bikaner

SYLLABUS



M.A./M. Sc. in GEOGRAPHY (Semester)

(Choice Based Credit System)

Session: - 2024-25

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Background

Considering the curricular reforms as instrumental for desired learning outcomes, all the members of the Board of Studies made rigorous attempts to revise the curricula of Postgraduate Programmes in alignment with National Education Policy-2020 and UGC Quality Mandate for Higher Education Institutions 2021. The process of revising the curriculum could be prompted with the adoption of "Comprehensive Roadmap for Implementation of NEP". The roadmap identified the key features of the Policy and elucidated the Action Plan with well-defined responsibilities and indicative timeline for major academic reforms.

The process of revamping the curriculum started with a series of webinars and discussions conducted by the University to orient the teachers about the key features of the Policy, enabling them to revise the curriculum in sync with the Policy. Proper orientation of the faculty about the vision and provisions of NEP-2020 made it easier for them to appreciate and incorporate the vital aspects of the Policy in the revised curricula focusing on creating holistic, thoughtful, creative, and well-rounded individuals equipped with the key 21st century skills 'for the development of an enlightened, socially conscious, knowledgeable, and skilled nation'.

With NEP-2020 in background, the revised curricula articulate the spirit of the Policy by emphasizing upon integrated approach to learning; innovative pedagogies and assessment strategies; multidisciplinary and cross-disciplinary education; creative and critical thinking; ethical and Constitutional values through value-based courses; 21st century capabilities across the range of disciplines through life skills, entrepreneurial and professional skills; community and constructive public engagement; social, moral and environmental awareness; Organic Living and Global Citizenship Education (GCED); holistic, inquiry-based, discovery-based, discussion-based, and analysis based learning; exposure to Indian knowledge system, cultural traditions and classical literature through relevant courses offering 'Knowledge of India'; fine blend of modern pedagogies with indigenous and traditional ways of learning; flexibility in course choices; student-centric participatory learning; imaginative and flexible curricular structures to enable creative combination of disciplines for study; offering multiple entry and exit points; breaking the silos of disciplines; integration of extra-curricular and curricular aspects; exploring internships with local industry, businesses, artists and crafts persons; closer collaborations between industry and higher education institutions for technical, vocational and science programmes; and formative assessment tools to be aligned with the learning outcomes, capabilities, and dispositions as specified for each course. The University has also developed consensus on adoption of Blended Learning with 10% component of online teaching and 90% face to face classes for each programme.

The revised curricula of various programmes could be devised with concerted efforts of the Faculty, Heads of the Departments, Members of the Board of Studies, and Deans of Schools of Study. The Vice Chancellor of the University conducted series of meetings with Heads and Deans to deliberate upon the vital parameters of the revised curriculum to formulate a uniform template featuring Background, Programme Outcomes, Programme Specific Outcomes, Postgraduate Attributes, Structure of Masters Course, Learning Outcome Index, Semester-wise Courses and Credit Distribution, Course-level Learning Outcomes, Teaching Learning Process, Blended Learning, Assessment and Evaluation, Keywords, References and Appendices.

To ensure the implementation of curricular reforms envisioned in NEP-2020, the University has decided to implement various provisions in a phased manner. Therefore, the curriculum may be reviewed annually so as to gradually include all relevant provisions of NEP-2020.

Programme Outcomes (PO)

Vision

To build responsive, responsible, sensitive, creative, and thoughtful citizens with a comprehensive understanding of regional, national, and international perspectives.

Mission

To strive towards the educational, cultural, economic, environmental and social advancement of the region and the nation at large by providing multidisciplinary liberal education involving arts, sciences, social sciences, education, law and commerce & management and quality programmes which inculcate and enhance students' creative and innovative insights, equipping them with both professional and vocational skills, leading to Bachelors', Masters', Professional, Vocational and Doctorate Programmes.

Program Objectives:

1. To disseminate knowledge of Earth's highly varied physical environment.
2. To provide an understanding of mankind's adaptation to, and settlement in, varied environmental settings.
3. To enhance an understanding of the spatial organization at local, regional, and global scales.
4. To provide practical training on the use of survey instruments and geo-spatial analytical techniques for Geographical analyses.
5. To sensitize students about the unprecedented pace and scale of adverse environmental impact of human activities during last 100 years.
6. To empower students with spatial analysis and decision making skill sets which help promotion of sustainable development and environmental conservation.
7. To prepare students for successful careers in academic and research institutes, as technical advisors to administrative departments dealing with spatial decision making, geo-spatial consultants to industries, businesses and NGOs.

Programme Outcomes (PO)

The PG Courses of Faculty of Social Science will be able:

PO	Description
PO1	To acquaint students with recent knowledge and techniques in social and applied spatial sciences.
PO2	To develop understanding of environmental and socio-cultural basis of life.
PO3	To provide insight into ethical implications of scientific research for sustainable development and environmental protection.
PO4	To develop problem solving innovative thinking with robust communication and writing skills in youth.
PO5	To understand application of spatial knowledge for human wellbeing and sustainable development.
PO6	To impart practical and project based vocational training for preparing youth for a career in research and entrepreneurship for self-reliance.

Program Specific Outcome (PSO)

PSO	Description
PSO-1	To contribute to sustainable development and wise use of resources for benefit of society through education and research on environment with an inter-disciplinary approach with focus on spatial relationships.
PSO-2	To provide knowledge on natural and built environments and their dynamic interaction for promotion of the quest of sustainability.
PSO-3	To create awareness on forest and biodiversity conservation, global warming and climate Change, and human adaptation possibilities and strategies.
PSO-4	To educate students on assessment of environmental footprint of human activities in simple to complex socio-economic setups.
PSO-5	To give knowledge on concepts, tools and modern techniques for mapping of Earth surface, change detection, modelling of environmental and socio-economic processes and scenario generations.
PSO-6	To educate students on urban and regional development and planning.

Post Graduate Attributes

The graduate attributes of our students shall be aligned with those of our University in terms of touching “the life of every student through inculcating virtues of empathy, ethics, efficiency, and respect for diversity, prudence and creativity with compassion”. We wish to achieve this through rigorous teachings and research effort, which remains the basic tenet of our teaching-learning philosophy. The following are the University’s graduate attributes which we emphasize.

- In-depth domain knowledge
- Interdisciplinary perspective

- Competence for research and innovation
- Analytical competence
- Critical thinking
- Problem solving competence
- Decision making
- Information technology skills
- Ability to work independently
- Capacity for creativity
- Contribute to societal well-being & sustainability.

Structure of Programme

Ist Semester: Four Core Compulsory Courses, One Foundation Course, and One Practical Course

GFC-100	Geography Foundation Course	Elementary Concepts of Geography
GCC-101	Geography Core Compulsory	Geo-tectonics and Geomorphology
GCC-102	Geography Core Compulsory	Climatology
GCC-103	Geography Core Compulsory	Oceanography
GCC-104	Geography Core Compulsory	Evolution of Geographical Thought
Practical 1 (Combine Practical for GCC 101 and GCC-102)		
Practical 2 (Combine Practical for GCC 103 and GCC-104)		

IInd Semester: Four Core Compulsory Courses, One Foundation Course, One Practical Course

GFC-200	Foundation Course	Human Values
GCC-201	Geography Core Compulsory	Economic Geography: Concepts, Principles and Techniques
GCC-202	Geography Core Compulsory	Population Geography
GCC-203	Geography Core Compulsory	Quantitative Methods in Geography
GCC-204	Geography Core Compulsory	Environmental Geography
Practical 3 (Combine Practical for GCC 201 and GCC-202)		
Practical 3 (Combine Practical for GCC 203 and GCC-204)		

IIIrd Semester: Two Core Compulsory, One Core Elective, One Elective Open, One Practical Course

GCC -301	Geography Core Compulsory	Geo-spatial Techniques for Earth Surface Observation
GCC -302	Geography Core Compulsory	India: Physical Setting and Geographical Issues
GCE-303	Geography Core Elective	(A) Eurasia: Physical Setting and Geographical Issues OR (B) Americas: Physical Setting and Geographical Issues
GEO-304	Geography Elective Open	(A) Agriculture Geography OR (B) Industrial Geography
Practical		

IVth Semester: Two Core Compulsory, One Core Elective, One Elective Open, One Practical Course

GCC-401	Geography Core Compulsory	Settlement Geography
GCC-402	Geography Core Compulsory	Political Geography
GCE -403	Geography Core Elective	(A) Cultural and Social Geography OR (B) Geography of Health
GEO -404	Geography Elective Open	(A) Rajasthan: Physical Setting and Geographical Issues OR (B) Regional Planning and Development
GCC-405	In lieu of paper GCE-403/ GEO-404	Dissertation
Practical		

Learning outcome Index of the courses

(i) Programme outcome (PO) and programme Specific Outcome (PSO)

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
PO1	✓	✓		✓	✓	✓
PO2	✓		✓	✓		✓
PO3		✓	✓		✓	
PO4	✓	✓		✓		✓
PO5			✓	✓		✓
PO6		✓			✓	

(ii) Programme Specific Outcome (PSO) and Core Courses

	GCC 101	GCC 102	GCC 103	GCC 104	GCC 201	GCC 202	GCC 203	GCC 204	GCC 301	GCC 302	GCC 401	GCC 404
PSO1	✓		✓	✓	✓		✓		✓	✓		✓
PSO2	✓	✓				✓			✓		✓	✓
PSO3		✓		✓				✓				✓
PSO4	✓		✓	✓		✓	✓			✓		✓
PSO5			✓		✓				✓		✓	✓
PSO6	✓	✓		✓	✓						✓	✓

(iii) Programme Specific Outcome (PSO) and Elective Courses

	GCE 303 A	GCE 303 B	GEO 304 A	GEO 304 B	GCE 402 A	GCE 402 B	GCO403A	GEO403 B
PSO1	✓	✓	✓	✓	✓	✓		✓
PSO2		✓	✓	✓	✓	✓		
PSO3	✓		✓	✓		✓	✓	
PSO4		✓		✓	✓			
PSO5	✓		✓		✓		✓	✓
PSO6	✓	✓				✓		✓

Semester Wise Credit Distribution as per

CHOICE BASED CREDIT SYSTEM (CBCS)

Paper Code	Paper Name	Course	L e c t u r e	T u t o r i a l	P r a c t i c a l	Total Credits	Maximum Marks		Minimum Passing Marks (%)
							Internal Marks	External Marks	
Semester-I									
Theory Papers									
GFC-100	Elementary Concepts of Geography	Foundation Course	2	2	-	2 (Non-CGPA)	-	-	S/NS
GCC-101	Geo-tectonics and Geomorphology	Core Compulsory	3	1	-	4	20	80	36
GCC-102	Climatology	Core Compulsory	3	1	-	4	20	80	36
GCC-103	Oceanography	Core Compulsory	3	1	-	4	20	80	36
GCC-104	Evolution of Geographical Thought	Core Compulsory	3	1	-	4	20	80	36
Total Theory Marks							80	320	
							400		72 (36% aggregate)
Practical									
GPC-105	Practical	Core Compulsory	-	-	12	8	40	160	36 (36% aggregate)
								200	
Total Credits						24	Grand Total	600	
Semester-II									
Theory Papers									
GFC-200	Human Values	Foundation Course	2	2	-	2 (Non-CGPA)	-	-	S/NS
GCC-201	Economic Geography: Concepts, Principles and Techniques	Core Compulsory	3	1	-	4	20	80	36
GCC-202	Population Geography	Core Compulsory	3	1	-	4	20	80	36
GCC-203	Quantitative Methods in Geography	Core Compulsory	3	1	-	4	20	80	36
GCC-204	Environmental Geography	Core Compulsory	3	1	-	4	20	80	36
Total Theory Marks							40	160	
							400		(36% aggregate)
Practical									
GPC-205	Practical	Core Compulsory	-	-	12	8	40	160	36 (36% aggregate)
								200	
Total Credits						24	Grand Total	600	

Paper Code	Paper Name	Course	L e c t u r e	T u t o r i a l	P r a c t i c a l	Total Credits	Maximum Marks		Minimum Passing Marks
							Internal Marks	External Marks	
Semester-III									
Theory Papers									
GCC-301	Geo-spatial Techniques for Earth Surface Observation	Core Compulsory	3	1	-	4	20	80	36%
GCC-302	India: Physical Setting and Geographical Issues	Core Compulsory	3	1	-	4	20	80	36%
GCE-303	(A) Eurasia: Physical Setting and Geographical Issues OR (B) Americas: Physical Setting and Geographical Issues	Core Elective	3	1	-	4	20	80	36%
GEO-304	(A) Agriculture Geography OR (B) Industrial Geography	Elective Open	3	1	-	4	20	80	36%
Total Theory Marks							80	320	
							400		36%
Practical									
GPC-305	Practical	Core Compulsory	-	-	12	8	40	200	36%
Total Credits						24	Grand Total	600	
Semester-IV									
Theory Papers									
GCC-401	Settlement Geography	Core Compulsory	3	1	-	4	20	80	36%
GCC-402	Political Geography	Core Compulsory	3	1	-	4	20	80	36%
GCC-403	(A) Cultural and Social Geography OR (B) Geography of Health	Core Elective	3	1	-	4	20	80	36%
GCC-404	(A) Rajasthan: Physical Setting and Geographical Issues OR (B) Regional Planning and Development	Elective Open	3	1	-	4	20	80	36%
GCC-405	Dissertation	In lieu of paper GCE-403/ GEO-404	-	-	-	4	20	80	36%
Total Theory Marks							80	320	
							400		36%
Practical									

GPC-405	Practical	Core Compulsory	-	-	12	8	40	160	36 (36% aggregate)
								200	
							Grand Total	600	
Total Credits						24			

- A candidate shall be required to obtain 36% marks to pass in theory, practical and internals separately.
- The marks of Internal Evaluation – 30 Marks (20 Marks theory paper, 10 Marks practical paper) should be given based on seminar/assignments/presentations/class tests/logical thinking/application of knowledge and skills, other activities etc. based on syllabus.

Scheme of End Semester DCCT (Theory) Paper Examination **(For Regular Students Only)**

1. English/Hindi shall be the medium of instructions and examination.
2. There will be semester end examination.
3. The evaluation scheme shall comprise external evaluation and internal evaluation. The internal evaluation will carry 30 (20T+10P) marks. Each theory paper will carry 80 marks. Practical paper will carry 40 marks.
4. The duration of the written examination for the theory paper shall be three hours.
5. A course will contain 5 units.
6. The question paper shall contain three sections.

Maximum Marks : 80

Duration: 3 Hrs.

Section A

(10 x 1 = 10 marks)

Section A (10 marks) shall contain 10 questions, two from each Unit. Each question shall be of 1 mark. All the questions are compulsory. Section A will be prepared such that questions (i) through (v) are multiple-choice questions, while questions (vi) through (x) will be fill-in-the-blank questions.

Section B

(5 x 5 = 25 marks)

Section B (25 marks) shall contain 5 questions (two from each unit with internal choice). Each question shall be of 5 marks. The candidate is required to answer all 5 questions. The answers should not exceed 150 words.

Section C

(3 x 15 = 45 marks)

Section C (45 marks) shall contain 5 questions, one from each Unit. Each question shall be of 15 marks. The candidate is required to answer any three questions by selecting these three questions from different units. The answers should not exceed 500 words.

Scheme of End Semester DCCP (Practical) Paper Examination
(For Regular Students Only)

1. Practical examination of each semester will carry 200 marks.
2. For practical papers of semesters, I and III, no external examiner will be appointed by the University. Instead, the examiner will be appointed by the respective head or principal of the college, and both marks and credits will be submitted to the University.
3. The duration of the practical examination shall be six hours.
4. Scheme: 8 periods (each of two hours duration) per week per batch of 40 students.

5. Distribution of marks: For Semester I, and III		Marks
1. Lab work/ Written work: 2 hrs duration		80
2. Record work & viva- voce: 2 hr duration		30+10=40
3. Field survey & viva-voce: 2 hr duration		30+10=40
4. Internal Evaluation		40
	Total	200

6. Distribution of marks: For Semester II and IV		Marks
7. Lab work/ Written work: 2 hours duration		80
8. Record work & viva- voce: 1 hours duration		30+10=40
9. Field survey & viva-voce: 2 hours duration		30+10=40
10. Internal Evaluation		40
	Total	200

Note: The candidate is required to answer/attend any 5 exercises (16 marks each) out of 10 exercises during Lab Work/ Written work and 40 candidates shall be examined in one batch.

M.A./M.Sc. First Semester

GFC-100	Elementary Concepts of Geography
GCC-101	Geo-tectonics and Geomorphology
GCC-102	Climatology
GCC-103	Oceanography
GCC-104	Evolution of Geographical Thought

Course Title: Elementary Concepts of Geography

Course Code: GFC – 100

Time: 3 Hours

M.M. 50

UNIT I

Subject matter of Geographical inquiry: description and explanation of spatial patterns of physical environment and cultural landscape as an interdisciplinary science.

UNIT II

Attributes of Place: Location and Locality, Geometry, Geographical Environment. Ascertaining location on Earth's Surface: Determination of latitude and Longitude, Concepts of Distance, Direction and Scale.

UNIT III

Evolution of mapping techniques. Age of Exploration and Discovery of Continents.

UNIT IV

The dynamic relationship between Man and Environment: Determinism vs Possibilism; Dualisms in Geography: Physical and Human Geography; Land use and occupations of Man.

UNIT V

Approaches to Regional study: Uniqueness of Region, Region as an Organism; Unit for Spatial Planning and Organization. Theoretical (agricultural, industrial, and central place models) and Applied Geography (spatial diffusion and GIS based mapping and environmental simulations).

Suggested Reading:

- Adhikari, S. (1992). Geographical Thought. Allahabad: Chaitanya Pub. House.
- Blis, H. J. (1971). Geography Regions and Concepts. New York: John Wiley of Sons INC.
- Board, C., Chorley, R., & Stoddart, D. (1974). Progress in Geography. International Reviews of Current Research Vol - 6.
- Bunge, W. (1962). Theoretical Geography. London: Glenerp.
- Chorley, R., & Haggett, P. (1965). Frontiers in Geographical Teaching. Oxford: OUP.
- Coffey, W. (1981). Geography - Towards a General Spatial System Approach. USA: British Library Cataloguing in Pub.Data.
- Dickinson, R. (1969). Makers of Modern Geography. Ludhiana: Lyall Book Depot.
- Dikshit, R. (2006). Geographical Thought - A Contextual History of Ideas. New Delhi: Prentice Hall of India Private Limited.

- Dikshit, R. (1994). *The Art and Science of Geography: Selected Reading*. New Delhi: Prentice Hall India Ltd.
- Dunbar, G. (1991). *Modern Geography: An Encyclopedic Survey*. Chicago: St. James Press.
- Freeman, T. (1971). *A Hundred Years of Geography*. London: Gerald Duckworth & Co. Ltd.
- Gregory, D., & Walford, R. (1988). *Horizons in Human Geography*. London: Macmillan.
- Hartshorne, R. (1968). *Perspectives on the Nature of Geography*. John Murray, London: Association of American Geographers, Great Britain.
- Hartshorne, R. (2002). *The Nature of Geography*. New Delhi: Rawat Pub. Co.
- Harvey, D. (2003). *Explanation in Geography*. New Delhi: Rawat Pub. Co.
- Harvey, D. (1979). *Social Justice and the City*. Great Britain: The Pitman Press, Bath.
- Harvey, E., & Holly, B. P. (2002). *Themes in Geographical Thought*. New Delhi: Rawat Pub. Co.
- Husain, M. (2007). *Models in Geography*. New Delhi: Rawat Pub. Co.
- Hussain, M. (1995). *Evolution of Geographical Thought*, 3rd edition. New Delhi: Rawat Pub. Co.
- Hussain, M. (1994). *Regional Geography*. New Delhi: Anmol Pub. Ltd.
- Johnston, R. (2000). *Geography and Geographers*. London: Oxford University Press, New York. Edward Arnold.
- Johnston, R., & Hemer, J. (1990). *Regional Geography: Current Developments and Future Prospects*. London & New York: Routledge Publishers. Legg, S. (2007). *Spaces of Colonialism*. UK: Blackwell Publishing.
- Massey, D. (1994). *Space, Place and Gender*. Minnesota: University of Minnesota Press.
- Messy, D., & Allen, J. (1984). *Geography Matters: A Reader*. Cambridge: Cambridge University Press.
- Moss, P. (2002). *Feminist Geography in Practice Research and Methods*. UK: Blackwell Pub. Co.
- Murdoch, J. (2006). *Post-Structuralist Geography*. New Delhi: Sage Publications Limited.
- Pandey, P. (1983). *Modern Geographical Trends*. New Delhi: Today's and Tomorrow's Printers and Publishers.
- Peet, R. (2003). *Radical Geography*. New Delhi: Rawat Pub. Co.
- Peet, R., & Thrift, N. (1989). *New Models in Geography*. Boston, Sydney, Wellington: Unwin Hyman.
- Raju, S., & Lahiri-Dutt, K. (2011). *Doing Gender Doing Geography Emerging Research in India*. UK: Routledge.

Course Title: Geo-tectonics and Geomorphology

Course Code: GCC 101

Time: 3 Hours

M.M. 40+10

Unit I

Origin of Earth's Magnetic Field; Paleomagnetism; Plate Tectonics as a Unified Theory of Global Tectonics; Tectonic and Neo-tectonic processes; Earth's Interior- with special reference to Seismology; Earth Movements;

Unit II

Endogenetic Processes- Faulting and Folding; Vulcanism and associated structures. Exogenetic Processes; Weathering; Mass Movement, Denudation, Deposition.

UNIT III

Fluvial Processes: Erosional and Depositional Landforms
Aeolian Processes: Erosional and Depositional Landforms
Glacial Processes: Erosional and Depositional Landforms
Marine Processes: Erosional and Depositional Landforms

UNIT IV

Models of Landform development by Hutton, Davis, Penck, and King
Application of Geomorphology in Feasibility Assessment of Engineering and Industrial Projects;
Application of Geomorphic knowledge to Hazard Risk Assessment studies

UNIT V

Concept of Morphogenetic Region - classification schemes and characteristics;
Regional geomorphology of Thar Desert, Aravalli Region, Hadoti Plateau, Deccan Trap, Chota Nagpur; Western Ghats,

Suggested Readings:

Ahmed, E., 1985, Geomorphology, Kalyani Publishers, New Delhi.
Ahmed, E., 1972, Coastal Geomorphology of India, Orient Longman.
Chorley, R., Schumm, S. and Sugden, D.E. 1994. Geomorphology, Methuen, London.
Cook and Doorncamp. 1988. Geomorphology in Environment Management, London
Dayal, P., 1995, A Textbook of Geomorphology, Shukla Book Depot. Patna
Dury, G.H., 1967, Essays in Geomorphology, Heinemann Educational Books Ltd, London
Faniran, A. and Jeje, L.K. 1983. Humid Tropical Geomorphology, Longman, London
Fairbridge, R.W., 1968, The Encyclopaedia of Geomorphology, (Ed), Rainhold Book Corporation, New York
Goguel, J. and Thalmann, H. E., 1962, Tectonics, W.H. Freeman and Company

Kale, V.S. and Gupta, A. 2001. Introduction to Geomorphology, Orient Longman Ltd., Hyderabad

Knighton, D. 1998: Fluvial Forms and Processes: A New Perspective, Arnold, London

King, L.C., 1965 Morphology of the Earth, Oliver and Boyd, Edinburgh.

Leopold, L.B., et al, 1964, Fluvial Processes in Geomorphology, Eurasia Publishing House, New Delhi.

Mitchell, C.W. 1991. Terrain Evaluation, 2nd edition, Longman Scientific & Technical, Harlow

Morisawa, M. (editor) 1994. Geomorphology and Natural Hazards, Elsevier, Amsterdam.

Morisawa, M. 1985. Rivers, Longman, London.

Melhorn, W.N. and R. C. Flemal, 1975, Theories of Landform Development, George Allen and Unwin.

Ollier, C.D. 1981: Tectonic Geomorphology, Longman Scientific & Technical, London.

Petts, G. and Foster, I. 1985. Rivers and Landscapes, Edward Arnold, London.

Petts, G.E. and Amoros, C. (editors) 1996. Fluvial Hydrosystems, Chapman and Hall, London.

Rice, R.J. 1988. Fundamentals of Geomorphology, 2nd edition, Longman Scientific and Technical, London.

Selby, M.J. 1985. An Introduction to Geomorphology, Clarendon, Oxford.

Sharma, H.S. 1987. Tropical Geomorphology: A Morphogenetic Study of Rajasthan, South Asia Books, Jaipur.

Starkel, L. and Basu, S. 2000 Rains, Landslides and Floods in the Darjeeling Himalaya, Indian National Science academy, New Delhi.

Strahler, A. N. and Strahler, A. H., 1978, John Wiley and Sons, New York

Summerfield, M.A. (Editor) 1991. Global Geomorphology: An Introduction to the Study of Landforms, John Wiley and Sons Ltd., New York.

Singh, Savindra, 2000. Geomorphology, Prayag Pustak Bhavan

Thornbury, W.D. 1969. Principles of Geomorphology, Wiley Eastern Limited, New Delhi.

Tinkler, 1985. A Short History of Geomorphology, Croom Helm Ltd., Beckenham.

Valdiya, K.S. 1998. Dynamic Himalaya, University Press (India) Ltd., Hyderabad.

Wilson, J.P. and Gallant, J.C. (editors) 2000. Terrain Analysis: Principles and Applications, John Wiley, and Sons Ltd. New York.

Wirthmann, A. 2000. Geomorphology of the Tropics, Translated by Busche, D. Springer-Verlag, Berlin.

Wooldridge, S.W., 1965, An Outline of Geomorphology, Longman Young, A., 1972, Slopes, T. and A. Constable Ltd, Edinburgh

Course Title: Climatology

Course Code: GCC 102

Time: 3 Hours

M.M. 40+10

Unit I

Composition and Structure of atmosphere;
Insolation: latitudinal distribution over the Earth
Geographic Influences on Temperature distribution over Earth surface:
Temperature: Environmental Lapse Rate and Inversion;

Unit II

Pressure and Wind Distribution; Forces controlling Motion of air;
Evaporation and cloud formation;
General Circulation in the atmosphere;
Jet Stream;
Local Winds
Air Masses and Fronts- types, characteristics and weather conditions;

Unit III

Precipitation- causes, forms, types.
Adiabatic processes and Instabilities;
Tropical Cyclones- Distribution, Characteristics and Origin;
Temperate Cyclones- Distribution, Characteristics and Origin;
Monsoon- Characteristics and Theories of Origin,
Spatial distribution of Precipitation over the Earth

Unit IV

Extreme Weather Events- Cloudbursts; Tornado, Typhoons, Hailstorms, Wind Storms, Heat Wave, Cold Wave, Fog.
Ocean-Atmospheric Interaction- El Nino, Southern Oscillation (ENSO) and La Nina;
Climatic classification schemes of Koeppen and Thornthwaite;
Salient characteristics of different Climatic types identified by Koeppen.

UNIT V

Global Warming- Causes and evidence
Climate Change: theories of astronomical and anthropogenetic causes;
Climate Change – Spatial variations in Environmental and Social Impacts;
Climate Change – Mitigation and Adaptation Strategies
Urban Heat Island; Concept of Heat Index

Suggested Readings:

Anthes, R. 1997: Meteorology, 7th edition, Prentice-Hall Inc., Upper Saddle River
Barry, R.G. and Chorley, R.T. 1992: Atmosphere, Weather and Climate, 6th edition, Routledge, London
Brigg, G.R. 1996 : The Ocean and Climate, Cambridge University Press, Cambridge

Cock, N.K. 1995 : Geohazards: Natural and Human, Prentice Hall, Englewood Cliffs Critchfield, H.J.
 1983: General Climatology, 4th edition, Prentice Hall India Ltd., New Delhi
 Das, P.K. 1995 : Monsoons, 2nd edition, National Book Trust, New Delhi
 Elsom, D.M. 1992 : Atmospheric Pollution: A Global Problem, 2nd edition, Blackwell Pub. Co., London
 Lal, D.S. 1993 : Climatology, 3rd edition, Chaitanya Pub. House, New Delhi
 Linacre, E. and Geerts, B. 1997 : Climates and Weather Explained, Routledge, London
 Lutgens, F.K.. and Tarbuck, E.J. 1998 : The Atmosphere: An Introduction to Meteorology, 7th edition, Prentice-Hall Inc., Upper Saddle River
 Moran, J.M. and Morgan, M.D. 1997 : Meteorology: The Atmosphere and the Science of Weather, 5th edition, Prentice-Hall Inc.
 Pant, G.B. and Kumar, R.K. 1997: Climates of South Asia, John Wiley and Sons Ltd., Chichester
 Smith, K. 1996 : Environmental Hazards: Assessing Risk and Reducing Disaster, 2nd edition, Routledge, London
 Taylor, J.A. (editor) 1974 : Climatic Resources and Economic Activity, David & Charles, London
 Byers H .R. 1959: General Meteorolgy, Mcgraw Hill Book Company
 Oliver J.E. & Hioddore J.J, 2003.: Climatology: An atmospheric science, Pearson
 Lal, M, 1993: Global Warming: concern for tomorrow, Tata Mcgraw Hill

Course Title: Oceanography

Course Code: GCC-103

Time: 3 Hours

M.M. 40+10

Subject matter of oceanography and relation with other environmental sciences;
 Origin of ocean basins: Wegner's drift hypothesis, Sea floor spreading and Plate Tectonics.

Distribution pattern of land and ocean over Earth and impacts upon climatic patterns

Unit-II

Elements and characteristics of ocean floor: continental shelf; slope; ridge; abyssal plains; submarine canyons; trenches

Configuration of ocean floors of Indian, Pacific, Atlantic, and Arctic oceans

Unit-III

Horizontal and vertical profile of Temperature variations in oceanic water: causes and impacts;

Salinity variations in oceans; causes and impacts;

Density of oceans;

Coral reefs - origin theories and distribution;

UNIT IV

Tides: theories and environmental impacts

Warm and Cold ocean currents – distribution and their impact on regional climate and economy;

Fisheries – distribution, prospects and problems

Fossil fuel resources in Ocean basins – Problems and Prospects

UNIT V

Global Warming and Sea-level rise: evidence, mechanism, and impacts.

Pollution of oceanic waters: sources and environmental impacts

Potential of waves and tides as sources of renewable energy generation

Major Oceanic trade routes - economic and Geo-Political significance

Tsunami hazard in coastal regions and its Mitigation

Suggested Readings:

Denny, M., 2008, How the Ocean works: An introduction to Oceanography, Princeton University Press, New Jersey.

Garrison, T., 1995, Essentials of Oceanography Wardsworth Pub. Co., London.

S. Kerhsaw., 2004, Oceanography: An Earth Science Perspective, Routledge, UK.

Sharma, R.C. and V. Vatal., 1986. Oceanography for Geographers, Chatanaya Publishing, Allahabad.

Shepart, F., 1969, The Earth Beneath the Sea, Athneum, Rev. ed., New York.

Singh, Savindra., Oceanography, 2014, Pravalika Publications, Allahabad. Thurman, V. Harold., 1987, Essentials of Oceanography, A Bell & Howell Company, Columbus/ Toronto/ Sydney.

Von Arx, W.S., 1962, An Introduction to Physical Oceanography, Addison, Wesley, New York

Course Title: Evolution of Geographical Thought

Course Code: GCC 104

Time: 3 Hours

M.M. 40+10

Unit-I

Geography - Definition and subject matter

Historical development of the Geographical knowledge - Contribution of Greeks (Homer, Thales, Haceteous, Anixaminder, Herrodots, Eratisthenes, Posidonius} and the Romans (Strabo and Ptolemy) scholars in the ancient world;

Geographical knowledge in the Vedas;

Geography knowledge in the Puranas: continents. oceans, mountain chains and river systems; and described in Puranas

Development of geography in India.

Unit-II

Impact of Dark Ages in Europe upon the process of advancement in Geographical knowledge;

Development of Geographical knowledge in the Islamic world in Middle Ages – understanding of Climatological, Geological and Geomorphic processes and mapping of known areas of Asia, Europe and Africa;

Age of explorations: the great voyages by Columbus, Vasco de Gama, Marco Polo, Magellan, and Captain Cook, and the discoveries of continents, island chains and the over-land/sea-bound trade routes between Europe and Asia.

Establishment of idea of Heliocentric Universe in 16th and 17th Centuries – contributions of Copernicus, Kepler, Galileo, Newton

Unit-III

The emergence of scientific geography in the 18th and 19th centuries - Contribution of Kant, Humboldt and Ritter.

Geographical contribution of Ratzel, Hettner, Richthofen, Vidal-de-la Blache, Jean Brunhes, Mackinder, Dudley Stamp, Semple, Huntington, W.M. Davis, Carl Sauer, Issa Bowman, David Harvey, Griffith Taylor,

UNIT IV

Paradigms in Geography:
Environmental Determinism
Areal Differentiation
Positivism and quantitative revolution;
Locational Analysis in Geography
Behavioral Geography
Radicalism and Development of Critical Geography;
Humanistic Geography

UNIT V

Dualisms in Geography: Environmental Determinism vs Possibilism; Physical vs Human Geography; Regional vs Systematic Geography; Idiographic vs Nomothetic Approaches; Theoretical vs Applied Geography.

Welfare approach in Geography; Geography of equality, Social Justice and Environmental Justice; Feministic Geography.

Impact of Advances in Geo-spatial Technologies.

Post modernism in Geography.

Perspectives on the Nature of Geography.

Practical 1 (Combine Practical for GCC 101 and GCC-102)

Time: 4 Hours

M.M. 80+20

Topographical maps - numbering system.

Physiographic study of an area carried out by analyzing toposheets using following techniques (a) serial, superimposed, projected and composite profiles; (b) altimetric frequency and (c) hypsometric curves of drainage basins; (d) slope analysis (Robinson method and Wentworth method), (e) drainage analysis and stream ordering

Interpretation of topographical maps of (a) the Himalayan belt (1:250000 scale) toposheet (b) Coastal area on (1:250000 scale) toposheet and (c) Northern plain on (1:250000 scale) toposheet, (d) Peninsular Plateau on (1:250000 scale) toposheet, and (e) Thar desert on (1:250000 scale) toposheet. Interpretation should be based on information related to relief, drainage, vegetation, agriculture, scrub-land, transport, and settlements in an area.

Practical 2 (Combine Practical for GCC 103 and GCC-104)

Time: 4 Hours

M.M. 80+20

Weather and climatic data representation techniques: Isotherms, Isobar, Isohytes, Climograph, Hythergraph, Climatograph, Ergograph, Rainfall dispersion diagrams, Aridity index, Heat index, Water balance analysis.

Components and Interpretation of Indian Daily Weather Maps of January, April, August, October months

Plain Table Survey: Radiation, Intersection, Traversing and Three Point problem.

Evaluation of Practical Notebook and Viva-Voce

Suggested Readings:

Dickinson, G.C.: Statistical mapping of statistics, London

Khan, Z A: Text book of Practical Geography, Concept, New Delhi, 1998.

Lawrence, GRP: Cartographic Methods, London, 1971.

Monkhouse, FJ & Wilkinson HR: Map & Diagram, Methuen, London, 1994.

Robinson AH et.al. : Elements of Geography, John Willey, New York, 1995.

Sarkar, A K: Practical Geography: A Systematic Approach, Oriental Longman, Calcutta, 1997.

Saroj K. Pal: statistics for Geosciences- Techniques and applications, Concept, New Delhi, 1998.

M.A./M.Sc. Second Semester

GFC-200	Human Values
GCC-201	Economic Geography: Concepts, Principles and Techniques
GCC-202	Population Geography
GCC-203	Quantitative Methods in Geography
GCC-204	Environmental Geography

Course Title: Economic Geography: Concepts, Principles and Techniques
Course Code: GCC-201

Time: 3 Hours

M.M. 40+10

Unit I

Definition, Scope, and development of Economic Geography.
Economic activities and sectors (primary, secondary, tertiary, and quaternary).
Concept of economic development, indicators of development,
Geographical basis of economic activities: systematic approach and spatial approach.

Unit II

Von Thuenen's model of agriculture location and its modification.
Agricultural Regions- Concepts and techniques of Delineation;
World Agricultural Systems and Regions.

Unit III

Industrial Location theories: Weberian Location analysis; Losch's economics of locations; Isard's space economy.
Spatial Distribution of Iron & Steel, Cotton Textile, Petro Refining Industries, Technology Industries;
Major Industrial Regions of the World;

UNIT IV

Primate City, Rank Size Rule, Christaller's Theory of Central Places;
Spatial Patterns of Urbanization in Developed and Developing countries
Basic Elements of World Economy;
Spatial Structure of World Economy.

Sustainable development, Human Development.

Concept of Accessibility and Connectivity; Transportation: Modes, Comparative Cost Advantage; Networks- Types and Network Graphs; Connectivity of Networks and their Measurement Indices.

UNIT V

GATT and World Trade Organization (WTO),
Significance of Globalization in World and Regional Economies.
Concept of Economic region;
Techniques of delimitation of economic regions,

Suggested Readings:

Alexander, J.W. (1963) Economic Geography, Prentice - hall Inc
Boyce, Ronald Reed (1974) The Bases of Economic Geography, Holt, Rine Hart and Winston Inc, New York.
Brereton, E. 1992: Resource Use and Management, Cambridge University Press, Cambridge.
Datt, R. & K.P.M. Sundaram (2006) Indian Economy, Prentice - hall Inc
Elliotte, j. A. 1994: An Introduction to Sustainable Development: The Developing World, Routledge, London.
Hurst, Michael E. Eliot (1974) Transportation Geography: Comments and Readings, Mc. Graw-Hill Book Company Ltd.
Johnston, R.J., Taylor, P.J. and Watts, M.J. (editors): 1995: Geographies of Global Change: Remapping the World in the Late Twentieth Century, Blackwell, Oxford.
Mitchell, B. 1997: Resources and Environment Management, Addison Wesley Lon~an Ltd., Harlow. Pickering, K. and Owen, L.A. 1997: An Introduction to Global Environmental Issues, 2nd edition, Routledge, London.
Taaffe E.J. & H. L. Gauthier (1973) Geography of Transportation, Prentice-hall Inc.
United Nations Populations Fund 1997: India Towards Population and Development Goals, Oxford University Press, New Delhi.
Unwin, T. (editor) 1994: Atlas of World Development, John Wiley and Sons Ltd., Chichester.
World Bank 1996: From Plan to Market: World Development Report 1996, Oxford University Press, Oxford.
World Resources Institute 1998: World Resources 1998-99: A Guide to the Global Environment, Oxford University Press, Oxford

Course Title: Population Geography
Course Code: GCC 202

Time: 3 Hours

M.M. 40+10

Unit I

Nature and Scope of Population Geography vis a vis Demography

Sources of Population Data: Census, Sample Survey, Vital Statistics, International Sources.

World Population Growth: Trends in Developing and Developed Countries

Environmental and Social factors of Population Distribution

Spatial Distribution pattern of Population in the 21st Century

Unit II

Population Composition and Characteristics in the Developed and Developing countries in context of the variables of: Age, Sex, Rural-Urban, Occupational Structure, Literacy and Education.

UNIT III

Components of Population Change.

Fertility: Measurement Techniques, Social and Economic Theories, Global and Regional Trends.

Mortality: Measurement Techniques, Life Table, Global and Regional Trends.

Migration: Types, Streams, Ravenstein's Law, Theory of Intervening Opportunities, Gravity Model,

UNIT IV

Theories of Population Change: Malthusian, Neo-Malthusian,

Concept of Population Explosion

Concept of Optimum Population;

Demographic Transition Theory.

UNIT V

Development and Environmental Conservation Dilemma.

Population Policies in Developed and Developing Countries.

Population Projection: Techniques and World Scenario.

Diaspora, and Identity Crisis.

Suggested Readings:

Asha A. Bhende, Tara Kanitkar (1978), Principles Of Population Studies, Himalaya Publishing House.

Jacob S. Siegel and David A. Swanson (2004), The Methods and Materials of Demography

K. Srinivasan (1998) 'Basic Demographic Techniques and Applications', New Delhi: SAGE India.

R.C. Chandna (1986), A Geography of Population, Kalyani Publishers.

Shryock, H.S. and J.S. Siegel (1971). The Methods and Materials in Demography (Vol. I and II), Washington DC, US Bureau of Census.

Agarwala and Sinha, 1977, India's Population Problems, Tata McGraw-Hill Publishing Co. Ltd., New Delhi

Bird, J., 1977: Centrality and Cities, Routledge, London

Borooah, G.L., 1938, Population Geography of Assam, Mitali Publications

Cassen, R.H., 1978, India: Population, Economy and Society, English language Book society and Macmillan

Chandna R.C. 2005: Population Geography, Kalyani publishers

Chitambar, J.B. 1993: Introductory Rural Sociology, Wiley Eastern, New Delhi

Clout, Hugh D., 1972, Rural Geography-An Introductory survey, Pergamon Press

Dickinson, R.E. 1968: City and Region: A Geographical Interpretation, Routledge and Kegan Paul Ltd. London.

Diddee, J., 1997: Indian Medium Towns, Rawat Publications, Jaipur.

Flint C and Flint.D, 1999: Urbanisation Changing Environments, Collins, London

Garnier, J. Beaujeu, 1966, Geography of Population, Commonwealth Printing Press Ltd.

Ghosh, S. 1998: Introduction to Settlement Geography, Orient Longman Ltd., Calcutta

Hassan, M. Izhar, 2005, Population Geography, Rawat Publications

Herbert, David and Thomas, Colin, 1982: Urban Geography A First Approach, John Wiley & Sons, New Delhi

Hudson, F.S. 1970: Geography of Settlements, Macdonald and Evans Ltd., Plymouth

Husain, Kuppaswamy, B., 1975, Population and Society in India, Popular Prakashan, Bombay

Law, N., Smith, D., (1991), Decision Making Geography, Stanley Thornes Pub. Ltd, Leckhampton

Mandal, R.B. (2000): Urban Geography: A Textbook, Concept Pub. Co., New Delhi.

Mandal, R.B. 1988: Systems of Rural Settlements in Developing Countries, Concept Pub. Co., New Delhi

Mandal, R.B., Uyanga, J. and Prasad, H., 2007, Introductory Methods in Population Analysis, Concept Publishing Company

Course Title: Quantitative Methods in Geography

Course Code: GCC 203

Time: 3 Hours

M.M. 40+10

Unit I

Introduction: Types of Data: Nominal, Ratio, Interval, Discrete, Continuous;
 Concepts of population, sample; parameter, statistics;
 Sampling Techniques: Survey, Schedule, Questionnaire

Unit II

Measures of central tendency: Mean, Mode, Median.

Measurement of dispersion: standard deviation, and variance;

Unit III

Correlation and Regression analysis, Indices of inequality and disparity.

UNIT IV

Concept of Probability. Probability Distribution – Normal, Binomial and Poison. Permutation and Combination. Standard Error of Mean; Confidence interval; Test of Significance.

UNIT V

Hypothesis formulation – Null Hypothesis and Alternate Hypothesis.

Hypothesis testing: Student T Test, Z Test; Chi-Square, Mann-Whitney Test and Mann-Kendall Test;

Pattern Analysis: nearest neighbor analysis;

Time Series analysis.

Suggested Readings:

Alvi, Z. 1995: Statistical Geography: Methods and Applications, Rawat Pub. New Delhi.

Pal, S.K. 1999: Statistics for Geoscientists, Concept publishing Company, New Delhi

Silk, J. 1979: Statistical techniques in Geography, George Allen and Unwin, London

Ahuja, R. (2001). Research Methodology. Kolkata: Rawat Publication.

Das, D. L. (2000). Practice of Social Research. New Delhi: Rawat Publication.

Harper, C., & Marcus, R. (2007). Research for Development: A practical Guide. New Delhi: Vistaar Publication.

Kothari, C. (2009). Research Methodology: Methods and Techniques. Kolkata: New Age International Publishers.

Misra, H., & Singh, V. (1998). Research Methodology in Geography: Social and Policy Dimension. New Delhi: Rawat Publication.

Misra, R. (2001). Research Methodology: A handbook. New Delhi: Concept Publishing Company.

Mondal

Panneerselvam, R. (2009). Research Methodology. Learning private limited. Singh,

K. (2007). Quantitative Social Research Methods. New Delhi: Sage Publication.

Somekh, B., & Lewin, C. (2005). Research Methods in Social Science. New Delhi: Vistaar Publication.

Course Title: Environmental Geography

Course Code: GCC-204

Unit I

Environmental Geography: Concepts and Study of Ecological History;
Approaches to Environmental Studies: Environmentalist, Holistic, Organismic and Human Ecological;

Environmental pollution- meaning, types, sources, causes and impacts; Air, Water and Land pollutions;

Unit-II

Ecosystem: Meaning and concepts of ecosystem, Classification and components of eco-system, Trophic structure, Ecological pyramid, Energy flow and Biogeochemical cycle; Global Ecological regions

Unit-III

Deforestation: causes and impacts
Biodiversity Degradation: Hot Spots and environmental impacts;
Greenhouse effect and Global warming;
Ozone depletion, causes of spatial-temporal variations in Ozone Hole formation over the Arctic and Antarctic regions;

UNIT IV

Land Degradation and Desertification in different environmental regions.

Production Technology and Environmental Change, Technological Fix; Carbon Concentration and Sequestration; Red, Brown and Green Technology;

UNIT V

Global Resource Scarcity with special reference to Food and Energy;
Relationship between population increase and environmental degradation
Tragedy of the commons;
Environmental politics of Resource and Development with Special Reference to Climate Change,
Earth Summits, and Protocols and concept of Sustainable Development

Suggested Readings:

Adams, W.M. 1995: Green Development: Environmental Sustainability in the Third World, Routledge, London
Alexander, D. 1993: Natural Disasters, Research Press, New Delhi
Allaby, M. 1996: Basics of Environmental Science, Routledge, and London
Allaby, M. 2006: The Encyclopaedia of Natural Calamities, Viva, Kolkata.

- Arnold, D. & Guha, R. 1995: *Nature, Culture & Imperialism*, OUP, New Delhi
- Barrow, C. J. (2003). *Environmental Change and Human Development*. Arnold Publication.
- Bhattacharra, R.N. (Ed.) Reprint, 2007. *Environmental Economics – An Indian Perspective*, Oxford University Press, New Delhi.
- Blaikie, P., Cannon, To Davis, I. and Wisener, 1994: *At Risk: Natural Hazards, People's Vulnerability and Disasters*, Routledge, London
- Brown, J.H. & Lomolino, M.V. 1998: *Biogeography*, Sinauer Associates, USA.
- Bryant, E.A. 1991: *Natural Hazards*, Cambridge University Press, And Cambridge.
- Buchholz, R.A. 1993: *Principles of Environmental Management, the Greening of Biosphere*, Prentice Hall Inc., New Jersey
- Canter, L. W. 1996: *Environmental Impact Assessment*, 2nd edition, McGraw Hill, New York.
- Chambers, R., Saxena, N.C. & Shah, T. 1989; *To the Hands of the Poor: Water and Trees*, Oxford & IBH, New Delhi.
- Chary, S. N. (2008). *Environmental Studies*. Macmillan Publication.
- Cox, C.B & Moore, P.D. (2000) *Biogeography - An Ecological & Evolutionary Approach*, Blackwell Science Ltd, Oxford, London
- Das, M.C. 1993: *Fundamentals of Ecology*, Tata Mc Graw Hill, New Delhi.
- Echlom, E.P. 1991: *Down To Earth*, EWP, New Delhi.
- Elsom, D.M. 1992: *Atmospheric Pollution: A Global Problem*, 2nd edition, Blackwell Pub. Co., London.
- Farmer, A. 1997 : *Managing Environmental Pollution*, Routledge, London.
- Gadgal, M. & Guha, R. 1993 ; *This Fissured Land- An Ecological History of India*, O U P, New Delhi.
- Gilpin, A. 1996 : *Dictionary of Environment and Sustainable Development*, John Wiley and Sons Ltd., Chichester:
- Gilpin, A. 1997 : *Environmental Impact Assessment: Culling Edge for the Twentyfirst Century*, Cambridge University Press, Cambridge: 181p.
- Hugget, R. & Cheesman, I.(2002) *Topography & The Environment*, Prentice Hll, New York, London.
- Huggett, R.J (Reprint 2002) *Fundamentals of Biogeography*, Routledge, London & New York.
- Hynes, R. (1982). *Environmental Science Methods*. London: Chapman & Hall. I.G. Simmons – *Ecology of Natural Resources*, New York.
- Johansen, B. E. (2006). *Global Warming in the 21st Century*. Atlantic Publication.
- Maiti, S. K. (2001). *Handbook of Methods in Environmental Studies, Water and Waste Water Analysis*. Jaipur: ABD Publishers.
- Malhotra, R. (2008). *Global Warming . Global Vision Public House*.
- Marsh, W.M. and Grossa, J.M. 1996: *Environmental Geography: Science, Landuse and Earth Systems*, John Wiley and Sons Inc., New York.
- Mathur, M.H. & Marsden, D. 1998 : *Development Projects and Impoverishment Risk*, OUP, New Delhi.
- Marsh, W.M. & Grossa(Ir). I.(1996) *Environmental Geography- Science, Land use & Earth Systems*, John Willey & Sons, New York
- Manivasakam, N. 1984 ; *Environnental Pollution*, NBT, New Delhi.
- Mackenzie, A., Ball, A.S. & Virdee, S.R. (Reprirent 2001). *Instant Notes in Ecology*, Viva Books PrivateLtd. New Delhi, Mumbai & Chennai.
- Middleton, N & Keefe, P.O (2001) *Redefining Sustainable Development*, Pluto Press, London, Sterling & Virginia.

Mishra, R. N. (2008). Environment and Forest Resource Management . New Delhi: Sonali Publication, .

Odum, E.P. 1971 : Fundamentals of Ecology, WB Saunders, USA

Park, C. 1998: The Environment: Principles and Applications, Routledge, London:43

Pickering, K. and Owen, L.A. 1997 : An Introduction to Global Environmental Issues, 2nd edition, Routledge, London:

R. Guha(Ed) 1994: Social Ecology, OUP, New Rajagopalam, R. (2005). Environmental Studies. Oxford University.

Roberts, N. (editor) 1994: The Changing Global Environment, 3rd edition, Blackwell Pub. Co., London.

Rosenbaurn, W.A. 1991: Environmental Politics & Policy, EWP

Sukla, R S. & Chandel, P.S. 1991: Plant Ecology, S.Chand & Co. Ltd., New Delhi.

Speth, I.G. (Reprint 2005) Global Environmental Challenges – Transitions to a Sustainable World, Orient Longman, New Delhi.

Tivy, J & Hare, O.G.(1981) Human Impact On The Ecosystem, Oliver & Boyd, Edinburg & New York.

Turk, I. & Turk. A. (1988) Environmental Science, Saunders College Publishing, New York.

Ta'I, B., Murphy, P. & Rana, P.S. (Ed.2007) Environmental Impact Assessment, Indo-Australian Perspective, Bookwell, New Delhi.

New York.

Vogler, J. 1995: The Global Commons: A Regime Analysis, John Wiley and Sons Ltd., Chichester

Wathern, P. (editor) 1988: Environmental Impact Assessment: Theory and Practice, Routledge, London.

Whyte, I.L.1995: Climate Change and Human Society, Arnold, London.

Woodward, F.I. 1992: Global Climatic Change: The Ecological Consequences, Academic Press, London.

Practical 3 (Combine Practical for GCC 201 and GCC-202)

Time: 4 Hours

M.M. 80+20

General principles and classification of projections: mathematical construction, properties, limitations, and uses of Zenithal (Polar cases: Stereographic, Orthographic, Gnomonic, Equal Area) , Conical (Simple conical projection with one standard parallel; Simple conical projection with two standard parallel; Bonne's projection, Polyconic projection); Cylindrical projections (Mercator, Gall's, Equal Area) and Conventional Projections (Mollweide and Sinusoidal);

Distortions related to different projections: distance; direction; area and scale variation.

Concept of UTM Projection and Conversion of Latitude and Longitude to UTM coordinates.

Methods of socio-economic surveying: Questionnaire; Interview; Focus Group Discussion; Participatory Observation

Differentiate between Schedule and Questionnaire:

Basic elements of: Household Survey, Market Survey, Tourist Survey

Practical 3 (Combine Practical for GCC 203 and GCC-204)

Time: 4 Hours

M.M. 80+20

Representation of Population Distribution Characteristics: Arithmetic Density; Physiological Density; Agricultural Density

Measures of Urbanization: Choropleth map of Degree of urbanization;

Choropleth map of Urban-Rural ratio; Graphical Representation of Tempo of Urbanisation;

Agriculture land-use intensity mapping; Crop diversification; Kendall's Ranking Method ; Bhatia's method

Pyramid Diagram;

Ogive (Cumulative Frequency Curve);

Location quotient for agricultural and industrial data mapping;

Lorenz curve for inequality measurement;

Calculation of Human development index, Poverty index, Gender related development index.

Collection of demographics and socio-economic data at household level (Duration one week) from primary and preparation of analytical survey report to assess the development of an area highlighting the socio-economic conditions, problems, and suggestions for the development.

Suggest Readings:

Kellaway, G. P. 1970: Map Projections, Methun and Co. Ltd., London.

Monkhouse F.J. and Wilkinson, H.R. 1971: Maps and Diagrams: Their Compilation and Construction, B.I. Publications Private Limited, New Delhi.

Maceachren, A. M. and Taylor, D. R. F. 1994: Visualization in Modern Cartography, Permamon. UK.

Dorling, D. and Fairbairn, D. 1997: Mapping Ways of Representing the World, Longman. England.