# M. Sc. & M. A. in Geography

# Syllabus

*(Effective from the July 2019)*

## 2019 - 2021


**Department of General & Applied Geography**

**School of Applied Sciences**

**Doctor Harisingh Gour Vishwavidyalaya**

(A Central University)

**Sagar (M. P.)**

# Objectives and Learning Outcomes
of
# M. Sc. / M. A. in Geography

**(Semester wise prescribed Course/Papers in M. Sc. / M. A. are as follows :)**

## I Semester

| Course Code | Title of the Course | L | T | P | C |
|---|---|---|---|---|---|
| GOG CC 121 | History of Geographical Thought | 4 | 0 | 0 | 4 |
| GOG CC 122 | Advanced Physical Geography: Lithosphere | 4 | 0 | 0 | 4 |
| GOG CC 123 | Advanced Human Geography | 4 | 0 | 0 | 4 |
| GOG CC 124 | Advanced Geography of India: Physical and Resources | 4 | 0 | 0 | 4 |
| GOG CC 125 | Quantitative Techniques and Map Projection **(Practical)** | 0 | 0 | 8 | 4 |
| | | | | | ***Total Credits = 20*** |

## II Semester

| Course Code | Title of the Course | L | T | P | C |
|---|---|---|---|---|---|
| GOG CC 221 | Concepts and Methods in Geography | 4 | 0 | 0 | 4 |
| GOG CC 222 | Advanced Physical Geography: Atmosphere and Hydrosphere | 4 | 0 | 0 | 4 |
| GOG CC 223 | Advanced Economic Geography | 4 | 0 | 0 | 4 |
| GOG CC 224 | Advanced Geography of India: Economy and Development | 4 | 0 | 0 | 4 |
| GOG CC 225 | Morphometric Analysis and Geological Maps **(Practical)** | 0 | 0 | 8 | 4 |
| **Open elective** course of 2 credit to be opted by students outside the department | | | | | |
| GOG OE 221 | Rural Development | 2 | 0 | 0 | 2 |
| | | | | | ***Total Credits = 20*** |

## III Semester

| Course Code | Title of the Course | L | T | P | C |
|---|---|---|---|---|---|
| GOG CC 321 | Advanced Geomorphology | 4 | 0 | 0 | 4 |
| GOG CC 322 | Astronomy and Terrestrial Survey **(Practical)** | 0 | 0 | 6 | 3 |
| **Two courses** to be opted from the following **elective courses:** | | | | | |
| GOG EC 321 | Environmental Geography | 4 | 0 | 0 | 4 |
| GOG EC 322 | Population Geography | 4 | 0 | 0 | 4 |
| GOG EC 323 | Regional Planning and Development | 4 | 0 | 0 | 4 |
| GOG EC 324 | Agricultural Geography | 4 | 0 | 0 | 4 |
| GOG EC 325 | Introduction to Remote Sensing | 4 | 0 | 0 | 4 |
| GOG EC 326 | Climate Change and Proxies of Reconstructions | 4 | 0 | 0 | 4 |
| **Open elective** course of 2 credit to be opted by students outside the department | | | | | |
| GOG OE 321 | Population and Development | 2 | 0 | 0 | 2 |
| | | | | | ***Total Credits = 21*** |

## IV Semester

| Paper Code | Title of the paper/ course | L | T | P | C |
|---|---|---|---|---|---|
| GOG CC 421 | Applied Geomorphology | 4 | 0 | 0 | 4 |
| GOG CC 422 | Photogrammetry, Remote Sensing and GIS **(Practical)** | 0 | 0 | 8 | 4 |
| GOG CC 423 | Field Survey and Project Report **(Practical)** | 0 | 0 | 6 | 6 |
| **Two courses** to be opted from the following **elective courses**: | | | | | |
| GOG EC 421 | Environmental Management | 4 | 0 | 0 | 4 |
| GOG EC 422 | Population Geography of India | 4 | 0 | 0 | 4 |
| GOG EC 423 | Urban Geography | 4 | 0 | 0 | 4 |
| GOG EC 424 | Industrial Geography | 4 | 0 | 0 | 4 |
| GOG EC 425 | Geographical Information System and GPS | 4 | 0 | 0 | 4 |
| GOG EC 426 | Himalayan Cryosphere and Water Resources | 4 | 0 | 0 | 4 |
| | | | | | ***Total Credits = 22*** |

Core credits : 20+20+07+14 =61
Elective credits : 08+08 = 16
Open Electives : 02+02 = 04
**Total credits : 61+16+04=81**

# M. Sc. & M. A. Programme in Geography

**General Instructions**

1. Post- Graduate Programme (M. Sc. & M. A.) in Geography shall be consist of four semesters.
2. There shall be One Mid Semester Exam and One Internal Assessment in each course. The **Mid Semester Examinations** of theory and practical courses shall be of one and two hours duration respectively. It will carry 20% marks. The Internal Assessment will carry 15% marks and 5% marks are for 75% attendance.
3. The **End Semester Examination** will be of 3 hours and 4 hours duration for theory and practical courses respectively, carrying 60% of marks in each course covering the entire syllabus prescribed in the course.
4. Stencils of outer boundaries of the continents, oceans and countries of the world will be permitted in End semester examination.
5. Other instructions and conditions given in the Choice Based Credit System (CBCS) and in the University Ordinance shall be applied in this programme.

# M. Sc. & M. A. First Semester in Geography

The M. Sc. And M. A. Geography Courses in I Semester shall consist of **Five Core** (four theory and one practical) courses of 4 credits each. Following are the theory and practical courses in I Semester:

## I Semester

| **Course code** | **Title of the Course** | **L** | **T** | **P** | **C** |
|---|---|---|---|---|---|
| GOG CC 121 | History of Geographical Thought | 4 | 0 | 0 | 4 |
| GOG CC 122 | Advanced Physical Geography: Lithosphere | 4 | 0 | 0 | 4 |
| GOG CC 123 | Advanced Human Geography | 4 | 0 | 0 | 4 |
| GOG CC 124 | Advanced Geography of India: Physical and Resources | 4 | 0 | 0 | 4 |
| GOG CC 125 | Quantitative Techniques and Map Projection **(Practical)** | 0 | 0 | 8 | 4 |
| | | | | **Total Credits = 20** | |

**Note:** *At the time of End Semester Examination all candidates shall submit their practical records duly signed by the concerned teacher within the stipulated date.*

## M. Sc. & M. A. I Semester Geography
## GOG CC 121: History of Geographical Thought

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***Objectives:*** *To introduce students the philosophical and methodological foundations of the subject and its place in the world of knowledge. To familiarize them with the major landmarks in development of geographic thought through time.*

***Learning Outcomes:*** *After the completion of the course, the students will have the ability to:*

*1. Understand the history of the development of geographical ideas through time.*

*2. Develop an insight upon the historical basis and methodological foundation of Geography as a modern discipline.*

*3. Make synthesis of diversified philosophies and approaches to build an understanding of modern geography.*

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 0 | 4 |

*(Total Lectures: 60)*

**Unit 1**

The field of Geography: Definition, Nature and Scope; Its place in the classification of sciences; Geography as a discipline: Natural science vs. Social science; Approaches to the study of Geography; Relevance of Geography. *(12 Lectures)*

**Unit 2**

Historical development of Geography: Contributions of different scholars during ancient and medieval periods: the Greeks, Romans and Arabs. *(12 Lectures)*

**Unit 3**

Geographical knowledge in Ancient India; Geography during the Age of Explorations; Contribution of Bernard Varenius and Immanuel Kant. *(12 Lectures)*

**Unit 4**

Foundation of Modern Geography: Contributions of German scholars- Alexander von Humboldt, Carl Ritter, Frederick Ratzel and others; Contributions of French scholars: Vidal de la Blache, Jean Brunhes and others. *(12 Lectures)*

**Unit 5**

Contributions of British and American schools of thought; Dualism in Geography: Physical vs. Human Geography, Systematic vs. Regional Geography, Possibilism vs. Determinism; Recent trends in geography. *(12 Lectures)*

### *Essential Readings:*


Dikshit, R. D. ***Geographical Thought: A Contextual History of Ideas***. Prentice-Hall of India, New Delhi. 2016.

Mourya, S. D. ***History of geographical Thought***, Sharda Pustak Bhawan, Allahabad. 2016.

Adhikari, S. ***Fundamentals of Geographical Thought.*** Orient Black Swan, New Delhi, 2015.

Hussain, M. ***Evolution of Geographical Thought***. Rawat Pub. Jaipur, 2015.

Rana, L. ***Geographical Thought: A Systematic Record of Evolution***, Concept Publishing House. New Delhi. 2008.

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### *Suggested Readings:*


Rana, L. ***Ancient Tradition in Geography: The Western & Oriental Perspectives***, Project Report (unpublished), ICSSR, New Delhi, 2011.

Singh, R.S. ***Indian Geography: Perspectives, Concerns & Issues***, Rawat Publications, 2009.

Dikshit, R.D. ***The Art and Science of Geography- Integrated Readings***. Prentice-Hall of India, New Delhi, 1994.

James, P. E***. All Possible World: A History of Geographical Ideas***. The Odyssey Press New York, 1972.

Minshull, R. ***The Changing Nature of Geography***. Hutchinson University Library London, 1970.

Dickinson, R. E. ***Makers of Modern Geography***. Routledge & Kegan Paul, London, 1969.

Ali, S.M. ***The Geography of Puranas***. Peoples Publishing House New Delhi, 1966.

Freeman, T.W. ***Hundred Years of Geography***. Duckworth, London, 1961.

Hartshorne, R. ***Perspective on Nature of Geography***. Rand McNally & Co., 1959.

Taylor, G. (ed.), ***Geography in the 20th Century***. Methuen London, 1951.

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# M. Sc. & M. A. I Semester Geography
## GOG CC 122: Advanced Physical Geography: Lithosphere

***Objectives:*** *The objective of this course is to introduce to lithosphere to the students of geography in an adequate manner. This course mainly deals with geographical aspects responsible for the initial emergence of basic landforms, time concept and erosion cycle.*
***Learning outcome****:* Students will learn the basic of lithosphere and its role in human life. Students will be able to understand and interpret landforms of different orders along with having the ability to explore the past environmental change through the window of landscape evolution.

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 0 | 4 |

*(Total Lectures: 60)*

**Unit 1**
The nature and scope of Physical geography; the place of lithosphere in physical geography; Age of the Earth; Geological time scale; Earth's major relief features: their origin and evolution.

*(12 Lectures)*

**Unit 2**
Earth movements- Introduction, Endogenetic forces- sudden forces and movements, Diastrophic forces and movements, epeirogenetic movement, orogenetic movements; Forces of crystal instability; Crustal bending and crustal fracture; Theory of Isostasy. *(12 Lectures)*

**Unit 3**
Plate tectonics- meaning and concept; plate margins, sea-floor spreading, plate movement, plate tectonics and continental drift; plate tectonics and vulcanicity, plate tectonics and earthquakes, plate tectonics and mountain building, organic structures with reference to the evolution of the Himalayas. *(12 Lectures)*

**Unit 4**
Exogenic processes- Weathering: Meaning and concept, controlling factors, physical mechanical, chemical, biological and human and their resultant landform; Fluvial, Glacial, Aeolian, Marine and Karst processes and resulting landforms. *(12 Lectures)*

**Unit 5**
Geographical cycle of erosion: Davis, Penck; Normal cycle of erosion; Extension of the Erosion Cycle, concept to Aeolian, Coastal and Karst regimes. *(12 Lectures)*

***Essential Readings:***

Strahler, A.N. and Stahler, A.M. ***Modern Physical Geography***. Wiley India, New Delhi, 2016.
Singh, S. ***Physical Geography.*** Pravalika Publications, Allahabad, 2016.
Bryant Richard, H. ***Physical Geography***. Rupa Publication. New Delhi, 2016.
Hussain M. ***Physical Geography***. Anmol Publication. New Delhi. 2014.
Singh, S. ***Geomorphology.*** Prayag Publications, Allahabad, 1998.
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***Suggested Readings:***

Hugget, R. J. ***Fundamentals of geomorphology***, Routledge Taylor & Francis, London, 2017.
Summerfield, M. ***Global Geomorphology***. Routledge, New York. 2013.
Bloom A. L. ***Geomorphology***. Rawat Pulication, Jaipur, 2012.
Robinson, P.J. & S. Henderson. ***Contemporary Climatology***. Henlow,1999.
Stoddart,D. R. ***Process and Form in Geomorphology (Edited)***. *Routledge,* New York*,* 1996.
Chorley, R.J. ***Spatial Analysis in Geomorphology***. Methuen, London. 1972.
Sparks, B.W. ***Geomorphology***. Longman, London, 1960.
Thornbury,W. D. ***Principles of Geomorphology***. John Wiley, New York, 1960.
Mitchell, C.W., ***Terrain Evaluation***. Longman, London, 1973.
Wooldridge, S.W. and Morgan, R. S. ***The Physical Basis of Geography- An Outline of Geomorphology***. Longman, London, 1959.
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# M. Sc. & M. A. I Semester Geography
# GOG CC 123: Advanced Human Geography

***Objectives:*** *To familiarize the students with the understanding of the society through concepts and social theory, philosophical approaches and spatial processes; To comprehend the diffusion of various ethnic traits and religions; To understand the relationship between cultures and patterns of living and economic development.*

**Learning Outcomes:**

After the completion of the course, the student will be successful in understanding:

1. The basic concepts in various sub-fields of human geography;
2. Appreciate the growth, distribution and composition of population in different parts of the world;
3. Analyze the types and patterns of rural and urban settlements, urbanization and related issues in India and other regions of the world.

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 0 | 4 |

*(Total Lectures: 60)*

**Unit 1**

Nature and Scope of Human Geography; Principal concepts in Human Geography; World population in terms of racial, religious, language and culture groups; Cultural realms of the world. *(12 Lectures)*

**Unit 2**

Population: World distribution in relation to physical, economic and social environment; World Population growth and its regional dimensions. *(12 Lectures)*

**Unit 3**

World Food resources and Population; Population and Food problem in India; Food security: concepts and regional pattern. *(12 Lectures)*

**Unit 4**

Settlements: definitions and types – rural and urban, and their characteristics;
Rural settlements: concepts, characteristics, location factors and types; rural morphological characteristics; Rural development: transformation and planning rural India. *(12 Lectures)*

**Unit 5**

Urban settlements: origin, evolution and locational factors of urban settlements; theories of city structure; Specific characteristics of Indian Cities; Functional classification of towns; Urban problems. *(12 Lectures)*

### *Essential Readings:*


Hussain M. ***Human Geography***. Rawat Publication. New Delhi. 2016.
Chandna, R.C. ***Geography of Population***. Kalyani, New Delhi, 2016.
Mourya, S. D. ***Human Geography.*** Pravalika Publication. Allahabad. 2015.
Mourya, S. D. ***Population Geography***. Pravalika Publication. Allahabad. 2015.
Singh, L. R. ***Fundamentals of Human Geography***. Sharda Pustak Bhawan, Allahabad, 2005.
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gqlsu] ekftn % ***ekuo Hkwxksy***] jkor ifCyd'kUl] t;iqj] 2014


### *Suggested Readings:*


Mishra.R. P. ***Agriculture, food and Nutrition***. Northern Book Centre. New Delhi. 2013
Jagannathan, R. ***Human Geography***. Dominant Publisher and Distributor. New Delhi. 2012.
Deblij, H.J. ***Human Geography- Culture Society and Space***. John Wiley, New York, 1996.
Smith, D.M. ***Human Geography – A Welfare Approach***. Arnold Heinemann, London, 1984.
Brock, J.C. & J.W. Webb, ***Geography of Mankind***. McGraw Hills, New York. 1978.
Chisholm, M***., Human Geography: Evolution or Revolution***. 1975.
Leong, G. C. & Morgan, G. C. ***Human and Economic Geography***, Oxford University Press, 1973.
Haggett, Peter, et al., ***Locational Models***. Arnold Heinemann, 1979.
Ambrose, Peter***, Analytical Human Geography***. *Longman, 1970.*
Singh, R.L. & Kashi Nath Singh, eds***.: Readings in Rural Settlement Geography***. National Geographical Society of India, Varanasi.
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# M. Sc. & M. A. I Semester Geography
## GOG CC 124: Advanced Geography of India: Physical and Resources

***Objectives:*** *To understand India in terms of physical setting and the natural and human recourse endowments, their conservation and management.*

**Learning Outcome**:

After the completion of the course, the students will have the ability to:

1. Analyze the differences in terms of varied physiography of India
2. Understand the demographic component and settlement structure of India
3. Better understanding on types of natural resources, utilization pattern and availability of interior part of the country.

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 0 | 4 |

*(Total Lectures: 60)*

**Unit 1**

India: locational characteristics, Unity and diversity; making of India through geological times; major terrain units and their characteristics; Drainage system and watersheds.

*(12 Lectures)*

**Unit 2**

Climate characteristics in India: mechanism of the Indian Monsoon; Climatic regions of India; Soil resource: types, characteristics, distribution and problems.

*(12 Lectures)*

**Unit 3**

Forest resources: distribution, utilization and their conservation; Water Resource: potential, regional distribution, utilization and conservation methods; Irrigation: spatial pattern and development. *(12 Lectures)*

**Unit 4**

Mineral and power resources – reserves, production and development potentials of mineral and power resources; Non-conventional sources of energy; Nuclear energy; Resource regions of India.

*(12 Lectures)*

**Unit 5**

Human resource: distribution and growth with special reference to Post-Independence period and its implications; Literacy- spatial patterns; population problems: ageing, sex and literacy differentials; Urbanization and characteristics of Indian cities; Human development in India.

*(12 Lectures)*

### *Essential Readings:*


Khullar, D.r. ***India: A Comprehensive study*** kalyani pub., Luchiana, New Delhi, 2016.

Tiwari, R.C., ***Geography of India***. Allahabad: Pravalika Publication. Allahabad, 2016.

Gautam, A. ***Advanced Geography of India***. Sharda Pustak Bhawan. Allahabad. 2015.

Husain, Majid, ***Geography of India,*** McGraw-Hill Com. New Delhi, 2015.

Singh Gopal. ***A Geography of India***. Atmaram and Sons, New Delhi. 2010.

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### *Suggested Readings:*


Basham, A. L. ***The Wonder that was India***. Picador, London. 2004.

Das, P.K., *The* ***Monsoon***. National Book Trust of India, New Delhi. 2002.

Sharma, T.C. & Countinho O., ***Economic and Commercial Geography of India***, Vikash Publication, New Delhi. 1998.

Singh, R.L., ed., ***India- A Regional Geography***. N. G. S. India, Varanasi, 1971.

Spate,O.H.K. & Learmonth A.T.A.,***India and Pakistan- Land, People & Economy***. Methuen, London, 1967.

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# M. Sc. & M. A. I Semester Geography

## GOG CC 125: (Practical) Quantitative Techniques and Map Projection

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 8 | 4 |

**Distribution of Marks = 100**
**1. Lab work = 70**
(i) I Mid Sem = 20
(ii) Internal Assessment = 20
(iii) End Sem = 50
**2. Sessional/Viva-voce** = 10

**Objectives:** The objective of this course is to apprise the student with application of quantitative methods and to apprise the students the principles and techniques of map projections.

**Learning Outcomes:** After the completion of the course, the students will have the ability to:

1. Learn the basic quantitative techniques for geographical studies.
2. Make use of these techniques in their academic pursuits.
3. Understand the underlying concepts, principles and techniques of Map Projections.
4. Learn the skills to develop map projections to prepare maps from the globe.

*(Total hours: 120)*

**Unit 1**

Correlation: Types and significance; Measures of correlation- Scatter diagram, Karl Pearson's and Spearman's rank correlation; Simple Regression analysis. (*24 hours)*

**Unit 2**

Measures of inequalities- Lorenz curve and Gini's coefficient; Analysis of spatial distribution-Nearest Neighbour Analysis. (*24 hours)*

**Unit 3**

Network Analysis- Topologic structures: branching, circuit and barrier networks. (*24 hours)*

**Unit 4**

Map projection: Definition, types and their characteristics and use; Map projection- Bonne's, Polyconic, Gall's, Mercator projections. (*24 hours)*

**Unit 5**

Sinusoidal and Mollwieds projections by graphical and mathematical methods;Determination of percentage of error in scale and area on selected projections. (*24 hours)*

***Essential Readings:***


Mahmood Aslam. ***Statistical Methods in Geographical Studies***, Rajesh Publication. New Delhi. 2016.
Talukdar, S., An Introduction to Map Projection, EBH Publishers (INDIA), Guwahati, 2008.
Singh, R.L., ***Elements of Practical Geography***. Kalyani, New Delhi. 1991.
Misra, R.P. & Ramesh A.,***Fundamentals of Cartography***. Concept, New Delhi. 1989.
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***Suggested Readings:***


Robinson, A.H., et. Al**.:** ***Elements of Cartography***. 6th ed. John Wiley, New York, 1995.
Cuff, D.J. & Mattson, M.T., ***Thematic Maps: Their Design and Production***. Methuen, New York, 1982.
Hammond, R. &McCullagh P.S., ***Quantitative Techniques in Geography: An Introduction,*** Clarendan Press, Oxford. 1978.
John, P. Cole & King C.A.M., ***Quantitative Geography***. John Wiley, London. 1968.
Yeats, Maurice, ***An Introduction to Quantitative Analysis in Human Geography***. McGraw Hill, New York. 1968.
Gregory, S**.** ***Statistical Methods and the Geographer***. Longman, London. 1963.
Raiz Erwin, ***Principles of Cartography***. McGraw Hill, New York, 1962.
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# M. Sc. & M. A. Second Semester in Geography

The M. Sc. And M. A. Geography Courses in II Semester shall consist of **Five Core** (four theory and one practical) courses of 4 credits each and one **open elective** of 2 credits to be opted by students outside the department. Following are the theory and practical courses in II Semester:

## II Semester

| **Course Code** | **Title of the Course** | **L** | **T** | **P** | **C** |
|---|---|---|---|---|---|
| GOG CC 221 | Concepts and Methods in Geography | 4 | 0 | 0 | 4 |
| GOG CC 222 | Advanced Physical Geography: Atmosphere and Hydrosphere | 4 | 0 | 0 | 4 |
| GOG CC 223 | Advanced Economic Geography | 4 | 0 | 0 | 4 |
| GOG CC 224 | Advanced Geography of India: Economy and Development | 4 | 0 | 0 | 4 |
| GOG CC 225 | Morphometric Analysis and Geological Maps **(Practical)** | 0 | 0 | 8 | 4 |
| **Open elective** course of 2 credit to be opted by students outside the department | | | | | |
| GOG OE 221 | Rural Development | 2 | 0 | 0 | 2 |
| | | | | | ***Total Credits = 20*** |

**Note:** *At the time of End Semester Examination all candidates shall submit their practical records duly signed by the concerned teacher within the stipulated date.*

## M. Sc. & M. A. II Semester Geography
## GOG CC 221: Concepts and Methods in Geography

***Objectives:*** *To introduce students the emerging concepts and methodological developments in the subject and to familiarize students with the recent trends in geography.*

***Learning Outcomes:*** *After the completion of the course, the students will have the ability to:*

*1. Understand the basic concepts of modern geography.*

*2. Develop an insight upon the emerging philosophies in the post-world war era.*

*3. Learn the evolution and development of modern geography in India.*

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 0 | 4 |

*(Total Lectures: 60)*

**Unit 1**

Concept of region: types of regions, regions and regional geography, methods of regionalization. *(12 Lectures)*

**Unit 2**

Scientific explanations: routes to scientific explanations- inductive and deductive methods; types of explanations in geography. *(12 Lectures)*

**Unit 3**

Recent views on man-environment interaction- New environmentalism; Geography in the 20th century: Paradigm shift and changing paradigms in geography; quantitative revolution in geography; models in geography. *(12 Lectures)*

**Unit 4**

Contemporary thoughts in geography: positivism, behavioural revolution, humanistic geography, welfare and radical geography, postmodernism in geography.

*(12 Lectures)*

**Unit 5**

Status of Indian geography: evolution and development of geographical teaching and research in India; progress of major branches of geography in India; Recent trends in Indian geography; Future of Indian geography: problems and prospects.

*(12 Lectures)*

### *Essential Readings:*


Dikshit, R. D. ***Geographical Thought: A Contextual History of Ideas***. Prentice-Hall of India, New Delhi. 2016.

Mourya, S. D. ***History of geographical Thought***, Sharda Pustak Bhawan, Allahabad. 2016.

Adhikari, S. ***Fundamentals of Geographical Thought.*** Orient Black Swan, New Delhi, 2015.

Hussain, M. ***Evolution of Geographical Thought***. Rawat Pub. Jaipur, 2015.

Rana, L. ***Geographical Thought: A Systematic Record of Evolution***, Concept Publishing House. New Delhi. 2008.

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### *Suggested Readings:*


Rana, L. ***Ancient Tradition in Geography: The Western & Oriental Perspectives***, Project Report (unpublished), ICSSR, New Delhi, 2011.

Singh, R.S. ***Indian Geography: Perspectives, Concerns & Issues***, Rawat Publications, 2009.

Dikshit, R.D. ***The Art and Science of Geography- Integrated Readings***. Prentice-Hall of India, New Delhi, 1994.

Peet Richard. ***Modern Geographical Thought***, Wiley-Blackwell, 1998.

Johnston, R.J., ***The Future of Geography***. Methuen, London 1988.

Johnston, R.J., ***Philosophy and Human Geography***. Edward Arnold, London,1983.

Amedeo, Douglas, ***An Introduction to Scientific Reasoning in Geography***. John Wiley, USA, 1975.

Haggett, Peter, ***Geography: A Modern Synthesis.*** New York: Harper and Row, 1972.

Harvey, D., ***Explanations in Geography***. Edward Arnold, London, 1969.

Minshull, R., ***The Changing Nature of Geography***. Hutchinson University Library London, 1970.

Morrill, R.L., ***The Spatial Organization of Society.*** Belmont, Calif: Wadsworth, 1970.

Chorley, R.J. and P. Haggett***, Models in Geography***. Methuen, London, 1967.

Freeman, T.W., ***Hundred Years of Geography***. Duckworth, London, 1961.

Hartshorne, R. ***Perspective on Nature of Geography***. Rand McNally & Co., 1959.

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## M. Sc. & M. A. II Semester Geography
### GOG CC 222: Advanced Physical Geography: Atmosphere and Hydrosphere

***Objectives:*** *The objective of the course is to provide understanding of weather phenomena, dynamics of global climates and generation of climatic information and their application. It also aims to introduce students the different aspect of oceans, such as evolution of the oceans, physical and chemical properties of seawater, and the impact of marine environment on human activity.*

***Learning Outcome:*** Students will learn the atmosphere, climate, weather, ocean and related processes which affect human day to day life. Additionally, student will learn regarding the emerging environmental problems such as global warming and climate change.

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|---|---|---|---|
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*(Total Lectures: 60)*

**Unit 1**

Introduction to Climatology; Composition and structure of Atmosphere; Insolation; temperature: factors affecting and distribution; Atmosphere pressure: controlling factors and distribution- Pressure belts; Atmospheric Moisture: humidity, sources and related processes. *(12 Lectures)*

**Unit 2**

Wind systems: planetary, seasonal (Indian Monsoon) and local; Type of precipitation; Concepts of Air masses, Fronts and frontogenesis; Cyclones: Tropical and Temperate- their origin, development and associated weather phenomena. *(12 Lectures)*

**Unit 3**

Climatic classification by Koppen and Thornthwaite; Major weather phenomena: Green House effects, El Nino, ENSO, La-Nina; global warming and climate change; Weather forecasting and role of Climate on Human life. *(12 Lectures)*

**Unit 4**

Major relief features of ocean basin; Chemical composition of Oceanic water; Temperature and Salinity of oceanic water; Coral reef: types and theories of formation. *(12 Lectures)*

**Unit 5**

Oceanic circulation – Currents and their causes of origin, distribution and effects on the costal environment; Tides: types and theories of origin; Marine resources; Marine environment and human life. *(12 Lectures)*

***Essential Readings:***


Anthony J. Voga, and Robert V. Rohli, ***Climatology.*** Jones & Bartlett Learning, 2017.

Singh, Sukhvinder, ***Oceanography,*** Wisdom Press, New Delhi. 2014.

Malik R. ***Oceanography***. Sonali Publication. New Delhi. 2012.

Siddhartha, K. ***Oceanography: A Brief Introduction***, N. B. T., New Delhi. 2013

Singh Savindra, ***Climatology,*** Prayaga Pustak Bhawan, Allahabad, 2006.

Lal, D.S. ***Climatology,*** chaitanya publication, Allahabad, 2003.

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***Suggested Readings:***


Garrison Tom, ***Essentials of Oceanography***. Brooks/ Cole, C.A., USA, 2011. (International Ed.).

Berry, B.J.L. and Chorley, P.J. ***Atmosphere weather and climate***, Routledge India, New Delhi, 2009.

Menon, P. A. 2007. ***Ways of the Weather***, National Book Trust, New Delhi. 2007.

Das, P. K. ***The Monsoon***. National Book Trust, India, New Delhi. 2000.

Critchfield, J.S. ***General Climatology*** prentice Hall, India, 1993

Lal, D.S***., Oceanography.*** Sharda Pusak Bhawan, Allahabad, 2003.

Robinson, P.J. & Henderson S., ***Contemporary Climatology.*** Henlow, 1999.

Sharma R. C., & Vatal M., ***Oceanography for Geographers.*** Rajesh, New Delhi, 1998.

Trewarth, G. T. An Introduction to Climate. MeGraw Hills Inc. New York, 1991.

Peterson, ***Introduction to meteorology,*** McGraw Hill Book London, 1969

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## M. Sc. & M. A. II Semester Geography
## GOG CC 223: Advanced Economic Geography

***Objectives:*** *The objectives of this course are to acquaint the students about dynamic aspects of economic activities in the world and to 12iberalizat the spatial patterns of these activities.*

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*(Total Lectures: 60)*

**Unit 1**

Economic Geography: Scope and recent trends, Classification of the economies; Factors governing crop distribution; geographical limits and world distribution of rice, wheat, cotton; plantation crops-rubber and tea; agricultural regions of the world; agricultural location theory (Von Thunen).
*(12 Lectures)*

**Unit 2**

Principles governing exploitation of minerals: world distribution and production of iron ore, manganese, copper, bauxite; Power resources: world distribution and production of coal, petroleum and hydroelectricity. *(12 Lectures)*

**Unit 3**

Manufacturing industries: locational factors, distribution and changing spatial patterns in the world – Iron and steel, Textile-cotton and Synthetic and Petro-chemical; Theories of industrial location-Weber and Losch; Industrial regions of the world. *(12 Lectures)*

**Unit 4**

Modes of transportation: factors governing land, oceanic and air transport, major international railways; Suez and Panama canals and major world oceanic routes. *(12 Lectures)*

**Unit 5**

Principles governing trade: trade laws; factors affecting trade, World trade of wheat, coffee, tea, petroleum, coal and iron ore; globalization and economy. *(12 Lectures)*

***Essential Readings:***


Singh K. & Siddiqui A. R. ***Economic Geography***, Pravalika Publisher, Allahabad. 2016.

Roy, P. K. ***Economic geography A Study of Resources***, New Central Book Agency Ltd. Kolkata, 2014.

Saxena, H. M. ***Economic geography***. Rawat Publication. New Delhi. 2013.

Sharm, T.C. ***Economic geography of India,*** Rawat Publication. New Delhi. 2013.

Knowles R. & Wareing J., ***Economic and Social Geography***, Rupa Publication, New Delhi, 2004.

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***Suggested Readings:***


Guha, J. L. & Chhottoraj, P. R. ***A New Approach to Economic geography: A Study of Resources***. World Press Pvt. Ltd. Kolkata. 2001.

Wheeler, J.O. et.al. ***Economic Geography.*** John Wiley, New York, 1995.

Brynt, R. H., ***Economic and Social Geography***, Made Simple Book, Rupa Publication, New Dehi, 1990.

Hartshorn, T.N. & J.W. Alexander: ***Economic Geography***. Prentice Hall India, New Delhi, 1988

Smith, D.M ***Industrial Location- An Economic Geographical Analysis.*** John Wiley,New York, 1981.

Leong, G. C. and Morgan, G. C. Human and Economic Geography. Oxford Economic Press. 1973.

Mc Carty, H.H. & J.B. Lindberg: *A Preface to Economic Geography.Prentice Hall, New Jersey.1966*

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# M. Sc. & M. A. II Semester Geography

## GOG CC 224: Advanced Geography of India: Economy and Development

**Objective:** The aim of the course is to familiarize the students with status of economy and development of India which is emerging from the interaction and interrelationship of the physical and socio-economic elements of the regional structure over time.

**Learning Outcome**:

After the completion of the course, the students will have the ability to:

1. Learn the agriculture practices and pattern in different parts of India
2. Understand the regional development in India on the basis of industrial agglomerations.
3. Study the trade and transportation development in India.

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|---|---|---|---|
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*(Total Lectures: 60)*

**Unit 1**

Agriculture: characteristics, trends and technological development; Green revolution and its consequences; Agriculture land: Land holdings, land tenure, land consolidation, land reforms and land use patterns; Agriculture productivity: determinants and patterns; Agricultural 13iberalization13 of India; Problems of agriculture in India. *(12 Lectures)*

**Unit 2**

Industrial development: an overview; Spatial patterns of major industries in India – Iron & Steel, Textiles, Cement, Sugar and Paper; Industrial complexes and industrial regions; New industrial policy of India. *(12 Lectures)*

**Unit 3**

Transport development: Different modes of transport and their significance – land, water and air transport; Internal and international trade of India – composition and trends.

*(12 Lectures)*

**Unit 4**

Globalisation, 13iberalization and economic development of India; Special Economic Zone (SEZ); Planning during Five Year Plans; Regional Development in India.

*(12 Lectures)*

**Unit 5**

Regions of India – Basis of regional division; regional divisions of India by O.H.K. Spate and R.L. Singh; detailed study of Narmada Basin, Bundelkhand Uplands. *(12 Lectures)*

***Essential Readings:***


Khullar, D.r. ***India: A Comprehensive study*** kalyani pub., Luchiana, New Delhi, 2016.

Tiwari, R.C., ***Geography of India***. Allahabad: Pravalika Publication. Allahabad, 2016.

Husain, Majid, ***Geography of India,*** McGraw-Hill Com. New Delhi, 2015.

Gautam, A. ***Advanced Geography of India***. Sharda Pustak Bhawan. Allahabad. 2015.

Singh Gopal. ***A Geography of India***. Atmaram and Sons, New Delhi. 2010.

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***Suggested Readings:***


Basham, A. L. ***The Wonder that was India***. Picador, London. 2004.

Dreze, Jean and Sen, A. ***India: Development and Participation***. Oxford University Press. 2002.

Sharma, T.C. & Countinho O., ***Economic and Commercial Geography of India***, Vikash Publication, New Delhi. 1998.

Singh, M.B., ***Industrial Development in India***. Lotus, Varanasi, 1985.

Singh, R.L., ed., ***India- A Regional Geography***. N. G. S. India, Varanasi, 1971.

Sinha, B.N., ***Industrial Geography of India***. The World Press, Calcutta.

Spate,O.H.K. & Learmonth A.T.A.,***India and Pakistan- Land, People & Economy***. Methuen, London, 1967.

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# M. Sc. & M. A. II Semester Geography

## GOG CC 225: (Practical) Morphometric Analysis and Geological Maps

**Distribution of Marks = 100**
**1. Lab work = 70**
(i) I Mid Sem = 20
(ii) Internal Assessment = 20
(iii) End Sem = 50
**2. Sessional/Viva-voce** = 10

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**Objectives:** The objective of this course is to familiarize the student about morphometric techniques and geological structure by maps.
**Learning Outcome:**
1. After in the successful completion of the course student will equip with relief structures, fluvial patterns and forms.
2. The course will provide a better understanding about lithological compositions of the subsurface along with detailed geometrical configuration of slopes

*(Total hours: 120)*

**Unit 1**

Morphometric analysis: Relief analysis- Serial, Superimposed, Composite and Projected profiles and their significance. (*24 hours)*

**Unit 2**

Methods of landform analysis on the basis of stream profiles: longitudinal profile and cross profile of the rivers. (*24 hours)*

**Unit 3**

Hypsometric curve; Study of drainage basin- drainage density, drainage frequency, stream ordering and bifurcation ratio. (*24 hours)*

**Unit 4**

Study of Geological maps for horizontal, tilted, folded, faulted and unconformable structures and their significance. (*24 hours)*

**Unit 5**

Average slope analysis: C. K. Wentworth's Method and its significance.

(*24 hours)*

***Essential Readings:***

Singh L. R. ***Fundamentals of Practical Geography,*** Sharda Pustak Bhawan, Allahabad, 2016.
Sarkar, A. ***Practical geography: A systematic approach.*** Orient Black Swan Private Ltd., New Delhi, 2015.
Singh Gopal. ***Map Work and Practical Geography***. Vikas Publishing, New Delhi. 2012
Berness, J. W. & Richard J. L. ***Basic Geological Mapping***. John Wiley & Sons, 2011.
Singh, R.L. ***Elements of Practical Geography***. Kalyani, New Delhi. 1991.
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***Suggested Readings:***

Robinson, A.H. et. Al**.:** ***Elements of Cartography***. 6th ed. John Wiley, New York, 1995.
Misra, R.P. & A. Ramesh. ***Fundamentals of Cartography***. Concept, New Delhi. 1989.
Monkhouse, F.J. ***Maps and Diagrammes***. Methuen, London. 1982.
Raisz, E***. General Cartography***. John Wiley and Sons, New York. 5th edition, 1962.
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# M. Sc. & M. A. II Semester Geography
# GOG OE 221: Rural Development

**Objectives:** Objective of the course is to make understating on modern concept of development and dimensions of rurality in the development process.
**Learning Outcomes:** After the completion of course, the students will have ability to:
1. Appreciate the concepts, needs and various approaches to rural development;
2. Understand the strong economic bases of rural areas of India;
3. Appreciate the area based and target group based approaches and provision of services to rural development.

| L | T | P | C |
|---|---|---|---|
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*(Total Lectures: 30)*

**Unit 1**
Development: the concept, meaning and definition historical background of the concept, theories of development-Global hegemony and development theories-sustainable development theory. *(6 Lectures)*

**Unit 2**
The concept of Rural Development, meaning and definition need and objectives of rural development, Dimensions and approaches. *(6 Lectures)*

**Unit 3**
Programmes for the rural development: Area Based approach to rural development and their implication, Agricultural development- Green revolution, Sansad Adrash Gram Yojna and Mahatma Gandi National Rural Employment Guarantee scheme. *(6 Lectures)*

**Unit 4**
Planning for Rural development: Rural settlement, characteristics, influencing factors, ecological non-ecological, types and patterns. *(6 Lectures)*

**Unit 5**
Dimensions of Rural Development: Approaches and problems, Rural Growth Centre approach, identification and planning research project report. *(6 Lectures)*

***Essential Readings:***

Sharma P.K. and Sharma S. C. : Rural Development reading in Settlement Geography, English Bookhouse, Jaipur, 2018
Krishnamurthy, J. ***Rural Development – Problems and Prospects***, Rawat Publs., Jaipur. 2000.
Mishra and Sharma: Rural Growth Centres for micro level planning, Ritu pub., 2007
Misra, R. P. (ed.), ***Rural Development: Capitalist and Socialist*** Paths, Vol. 1, Concept, New Delhi. 1985.
Misra R. P. and Sundaram, K. V. (eds***Rural Area Development: Perspectives and Approaches***, Sterling, New Delhi. 1979)

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***Suggested Readings:***

Ramachandran H. and Guimaraes J.P.C. ***Integrated Rural Development in***
***Wanmali S. Rural Infrastructure Settlement Systems and Development of the Regional Economy in South India***, International Food Policy Research Institute, Washington, D.C. 1992.
Yugandhar, B. N. and Mukherjee, Neela (eds.) Studies ***in Village India: Issues in Rural Development***, Concept Publs. Co., New Delhi. 1991.
Gilg A. W., ***An Introduction to Rural Geography***, Edwin Arnold, London. 1985.
Palione M. ***Rural Geography***, Harper and Row, London. 1984.
Lee D. A. and Chaudhri D. P. (eds.), ***Rural Development and Stat***e, Methuen, London. 1983.
Robb P. (ed.), Rural ***South Asia: Linkages, Change and Development***, Curzon Press. 1983

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# M. Sc. & M. A. Third Semester in Geography

The M. Sc. / M. A. Geography courses in III Semester shall consist **two core** courses (one theory and one practical) and **two elective** courses (Theory) of 4 credits each from department. There shall be one **open elective** of 2 credits to be opted from outside the department. Following shall be the theory and practical courses in III Semester:

**III Semester**

| **Course Code** | **Title of the Course** | **L** | **T** | **P** | **C** |
|---|---|---|---|---|---|
| GOG CC 321 | Advanced Geomorphology | 4 | 0 | 0 | 4 |
| GOG CC 322 | Astronomy and Terrestrial Survey **(Practical)** | 0 | 0 | 6 | 3 |
| GOG CC 323 | Field Survey and Field Techniques **(Practical)** | 0 | 0 | 6 | 6 |
| **Two courses** to be opted from the following **elective courses**: | | | | | |
| GOG EC 321 | Environmental Geography | 4 | 0 | 0 | 4 |
| GOG EC 322 | Population Geography | 4 | 0 | 0 | 4 |
| GOG EC 323 | Regional Planning and Development | 4 | 0 | 0 | 4 |
| GOG EC 324 | Agricultural Geography | 4 | 0 | 0 | 4 |
| GOG EC 325 | Introduction to Remote Sensing | 4 | 0 | 0 | 4 |
| GOG EC 326 | Climate Change and Proxies of Reconstructions | 4 | 0 | 0 | 4 |
| **Open elective** course of 2 credit to be opted by students outside the department | | | | | |
| GOG OE 321 | Population and Development | 2 | 0 | 0 | 2 |
| | | | | | ***Total Credits = 21*** |

***Notes:***

1. *Students have to select two elective courses from the above mentioned elective courses and one open elective from courses available in the school/University.*

2. *At the time of End semester examination all candidates shall submit their practical records/ field survey reports duly signed by the concerned teacher within the stipulated date and time.*

## M. Sc. & M. A. III Semester Geography
## GOG CC 321: Advanced Geomorphology

**Objectives:** The objective of the course is to familiarise the students with fundamental concepts in geomorphology to landscape evolution.
**Learning Outcome:**
***1.*** After the successful completion of the course, student will be competent to know about the idea of land morphogenesis and basic concepts in geomorphology.
***2.*** Further the course deals with stage of gradation, slope slips and land resistance along with reactions in different geological conditions.

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*(Total Lectures: 60)*

**Unit 1**
Nature, scope and significance of Geomorphology; its relation with other sciences; Approaches to the study of Geomorphology-empirical, genetic and system approach. *(12 Lectures)*

**Unit 2**

Fundamental concepts- Geological structure and land forms, Uniformitarianism; Multicyclic and Polygenetic Evolution of landscapes, Threshold and equilibrium, Peneplain concept-its validity and controversy. *(12 Lectures)*

**Unit 3**
Exogenetic processes: Concepts of slope evolution, slope wash and stream erosion; Weathering: geomorphic significance, causes, types and classification; Mass movement and its geomorphic significance- creep, solifluction, rapid flowage and landslide. *(12 Lectures)*

**Unit 4**
Valley Development: Valley Deepening, Valley Widening, Valley Lengthening; Classification of Valley; Classification According to Stage in Geomorphic Cycle; Genetic Classification, Classification According to Controlling Structures, Classification on the Basis of Structural Trends, Classification According to Change of Base Level; Grading of Rivers: Controlling Factors; Longitudinal Profile and Cross Profile of Valleys; the Interrupted Profile and Re-graded Curve. *(12 Lectures)*

**Unit 5**
Geomorphic system based on (a) Agents- fluvial drainage pattern, misfit river and river terraces, Glacial, Aeolian and Marine (b) Climate- humid, cold and Arid Geomorphic system based on (c) Structure- folded, faulted, domal characteristics of landforms associated with these geomorphic system. *(12 Lectures)*

***Essential Readings:***

Hugget, R. J. ***Fundamentals of Geomorphology***, Routledge Taylor & Francis, London, 2017.
Summerfield, M. ***Global Geomorphology***. Routledge, New York. 2013.
Bloom A. L. ***Geomorphology***. Rawat Pulication, Jaipur, 2012.
Singh, S. ***Geomorphology.*** Prayag Publications, Allahabad, 1998.
Sparks, B.W. ***Geomorphology***. Longman, London, 1960.
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***Suggested Readings:***

Strahler, A.N. and Stahler, A.M. ***Modern Physical Geography***. Wiley India, New Delhi, 2016.
Singh, S. ***Physical Geography.*** Pravalika Publications, Allahabad, 2016.
Bryant Richard, H. ***Physical Geography***. Rupa Publication. New Delhi, 2016.
Hussain M. ***Physical Geography***. Anmol Publication. New Delhi. 2014.
Robinson, P.J. & S. Henderson. ***Contemporary Climatology***. Henlow,1999.
Stoddart,D. R. ***Process and Form in Geomorphology (Edited)***. *Routledge,* New York*,* 1996*.*
Mitchell, C.W., ***Terrain Evaluation***. Longman, London, 1973.Chorley, R.J. ***Spatial Analysis in Geomorphology***. Methuen, London. 1972.
Davis, W.M., ***Geographical Essays***, Dover, New York, 1964.Thornbury,W. D. ***Principles of Geomorphology***. John Wiley, New York, 1960.
Wooldridge, S.W. and Morgan, R. S. The Physical Basis of Geography- An Outline of Geomorphology. Longman, London, 1959.
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# M. Sc. & M. A. III Semester Geography
## GOG CC 322 (Practical): Astronomy and Terrestrial Survey

**Distribution of Marks: = 100**

1. Lab work: = 70
   - (i) I Mid Exam. = 20
   - (ii) Internal Assessment = 20
   - (iii) III Mid Exam. = 30
2. Field Survey =20
3. Sessional & Viva-Voce: =10

| L | T | P | C |
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***Objectives:*** *To introduce the students about the basic concepts of field astronomy and time concept and to introduce the student with the field survey instruments and their uses, preparation of road profile.*

***Learning Outcome:***

1. After the successful completion of the paper, the student will be competent to know about the concept of space, positional astronomical features.
2. *Further the student will be confident enough to calculate time across geocoordinates.*
3. *After the completion of this paper student will be aware about demarcating the elevations by geodetic surveys*

*(Total hours: 120)*

**Unit 1**

Field Astronomy: General terms – Great circle, celestial sphere, zenith, Nadir, Celestial Horizon, vertical circle, observer's meridian, Co-latitude, Altitude, Co-latitude/Zenith distance, Hour Angle. (*24 hours)*

**Unit 2**

Time concept: Determination of Time, Local Apparent Time (LAT), Local Mean Time (LMT), Greenwich Time (GMT), Universal Time and Standard Time (UT/ST). (*24 hours)*

**Unit 3**

Instrumental Surveying: Principles and types of surveying: trigonometric leveling: collimation method and contouring. (*24 hours)*

**Unit 4**

Dumpy Level: leveling and profile with the height of collimation (HC) with Rise and Fall method. (*24 hours)*

**Unit 5**

Indian Clinometer: basic principles; Methods of Height Determination: direct and indirect. (*24 hours)*

***Essential Readings:***


Kanetkar, T. P. & Kulkarni S. V.***, Surveying and Levelling.*** Vidyarthi Griha Prakashan, Pune. 2016.

Sarkar, Ashish: **Practical Geography**. Orient Black Swan. Hyderabad. 2015.

Singh, R.L., ***Elements of Practical Geography***. Kalyani, New Delhi. 1991.

Anderson, J.M. & Mikhail E.M., ***Introduction to Surveying***. 1985.

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***Suggested Readings:***


Robinson, A.H. et. al**.,** ***Elements of Cartography***. 6th ed. John Wiley, New York, 1995.

Misra, R. P. & Ramesh A., ***Fundamentals of Cartography***. Concept, New Delhi. 1989.

Mikhail E.M.& Anderson J.M., ***Introduction to Surveying***, Wiley, 1984.

Wolf P.J. & Brickner R.C., ***Elementary Surveying,*** Viii Ed.,Wiley, 1982.

Monkhouse, F.J., ***Maps and Diagrams***. Methuen, London, 1972.

Cole, John P. & King C.A.M, ***Quantitative Techniques in Geography***. John Wiley, London, 1968.

Raiz Erwin, ***Principles of Cartography***. McGraw Hill, New York, 1962.

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## M. Sc. & M. A. IV Semester Geography
## GOG CC 323: (Practical) Field Survey and Field/Project Report

Distribution of Marks = **100**
**1. Lab work** = 65
(i) I Mid Sem = 20
(ii) Internal Assessment= 20
(iii) End Sem = 25
**2. Field/Project Report = 25**
**3. Sessional & Viva-voce = 10**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 6 | 6 |

**Objective:** To make the students familiar with the different sources/types of socio-economic data; sampling technique and preparation of field questionnaires. Main objective of the field excursion is to vide the understanding of ground reality through field observation and questionnaire

**Learning Outcomes**: After the completion of the course, the students will have the ability to:

1. Learn the basics of field excursion, survey methods and values thereupon.
2. Learn ethics and techniques of data collection through field survey.
3. Develop an insight upon the ecological setting of field, based on empirical observation and analysis for the meaningful outcomes.
4. Understand the underlying concepts, principles and techniques of Map Projections.
5. Appreciate how the principles of projections are applied to prepare maps from the globe.

*(Total hours: 120)*

**Unit 1**

Field Survey and Field Techniques in Geographical Studies: Role, Value and Ethics of Field-Work; Primary and Secondary data: their sources and methods of collection. (*24 hours)*

**Unit 2**

Sampling methods: Use of various methods and their characteristics- Random Sampling, Systematic Sampling, Stratified, Systematic sampling, Multi- stage sampling; Use of Random Tables, Pilot Survey and its significance. (*24 hours)*

**Unit 3**

Selection of the Appropriate Technique; Observation, Questionnaire and Interview Schedule and their preparation; Analysis of filled questionnaire (*24 hours)*

**Unit 4**

Report writing: Methods, techniques and approaches of field based studies and report writing.

(*24 hours)*

**Unit 5**

Geographical excursion and report writing of a specific area for identical study based on field observation and pre-prepared Questionnaire, Schedule, Map, etc. (*24 hours)*

***Essential Readings:***


Kanitkar, T. P. ***Surveying and Leveling (Part I & Part II),*** Vidyarthi Griha. Pune. 2016.
Wolcott, H. ***The Art of Fieldwork***. Alta Mira Press, Walnut Creek, CA, 1995.
Creswell J. ***Research Design: Qualitative and Quantitative Approaches***, Sage Publications, 1994.
Singh, R.L.: ***Elements of Practical Geography***. Kalyani, New Delhi. 2017
Stoddard R. H. ***Field Techniques and Research Methods in Geography***, Kendall/Hunt, 1982.
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***Suggested Readings:***


Dikshit, R. D. ***The Art and Science of Geography: Integrated Readings***, Prentice-Hall of India, New Delhi, 2003.
Mukherjee, Neela ***Participatory Learning and Action: with 100 Field Methods***. Concept Publs. Co., New Delhi, 2002.
Robinson A. ***Thinking Straight and Writing That Way***, in Writing Empirical Research Reports: *A Basic Guide for Students of the Social and Behavioural Sciences*, eds. by F. Pryczak and R. Bruce Pryczak Publishing, Los Angeles, 1998.
Robinson, A.H. , et. al.: ***Elements of Cartography***. 6th ed. John Wiley, New York, 1995.
Mukherjee, Neela ***Participatory Rural Appraisal: Methodology and Application,*** Concept Publs. Co., New Delhi, 1993.
Evans M. ***Participant Observation: The Researcher as Research Tool*** in Qualitative Methods in Human Geography, eds. J. Eyles and D. Smith, Polity, 1988.
Misra, R. P. & A. Ramesh : ***Fundamentals of Cartography***. Concept, New Delhi. 1989.
Wolf P.J. & Brickner R.C., '***Elementary Surveying'*** Viii Ed.,Wiley, 1982.
Hammond, R. & P.S. McCullagh. ***Quantitative Techniques in Geography***. Clarinda Press, Oxford, 1974.Cole, John P. & C.A.M King: ***Quantitative Techniques in Geography***. John Wiley, London, 1968.
Raiz Erwin. ***Principles of Cartography***. McGraw Hill, New York, 1962.
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## M. Sc. & M. A. III Semester Geography
### GOG EC 321: Environmental Geography

***Objectives:*** *The main objective of the course is to introduce the students the basic concepts of environment, to provide understanding of ecology and ecosystem and to apprise the students about environmental hazards and emerging issues of pollution.*

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*(Total Lectures: 60)*

**Unit 1**

Environment: Meaning, definition, structure and types of environment; Components of environment- classification, characteristics and their interdependent relationship; Environmental geography: meaning, scope, approaches and fundamental concepts. *(12 Lectures)*

**Unit 2**

Ecological concepts: forms of ecology; Ecosystem: meaning, definition, concept; types and functioning of ecosystem- main terrestrial ecosystems of the world, forests and agriculture; Geography as human ecology. *(12 Lectures)*

**Unit 3**

Biomes- tundra, temperate and tropical and aquatic Biomes- warm water, cold water and fresh water; Influences of man on environment: human impacts on climate, vegetation, soil and water. *(12 Lectures)*

**Unit 4**

Environmental disasters and hazards: meaning, classification and types (natural and man induced hazards) causes, Impacts and remedial measures. *(12 Lectures)*

**Unit 5**

Environmental pollution: meaning, definition, sources of pollution nature and types: air, water, land/soil noise pollution and solid waste pollution. *(12 Lectures)*

***Essential Readings:***


Singh, S. ***Environmental Geography****.* Prawalika Publication, Allahabad, 2016.
Barucha, Arach***. Textbook of Environmental Studies***, University Press India, Hyderabad. 2016.
Saxena, H. M. ***Environmental Geography.*** Rawat Publications. Jaipur, 2015
Siddhartha, K. ***Ecology and Environment***. Kisalaya Publication Pvt. Ltd. Newdelhi. 2015.
Gautam, A. ***Geography of resources: Exploitation, conservation and management***. Sharda Pustak Bhawan, Allahabad, 2013.
Sharma, Y.K. **Environmental Geography**: ***Resource and Development***, Lakshmi Narayan Agarwal, Agra 2008
Roy, P. K. ***Resource Studies***. New Central Book Agency, Calcutta, 2006.
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***Suggested Readings:***


Sharma, B.L. & Puar P. ***Global Environmental Challenges****.* Rohini Books, Publishers &Distributors, Jaipur, 2004.
Saxena, H. M. ***Environmental Management.*** Rawat Publications, Jaipur, 2000.
Agrawal, A. & Sunita N. ***The Relationship between Environment and Development***, the First citizen report 1996
Goudie, Andrew. ***The Human Impact on the Natural Environment.*** *Blackwell* Oxford, 1994.
Mukerji, A. and V.K. Agnihotri. ***Environment and Development****.* Concept , New Delhi, 1993.
Smith, R. L. ***Man and his Environment****: An Ecosystem Approach.* Harper & Row, London, 1992.
Burton, I.; R.W. Kates & G.F. Whiley. ***The Environment as Hazards.*** O. U. P., New York, 1978.
Munn, R.E. ***Environmental Impact Assessment: Principles and Procedures.*** John Wiley & Sons, New York, 1979.
Edington , J.M. & Edington M.A. ***Ecology and Environmental Planning***. Chapman & Hall, London 1977.
Detwyler, J.R. **Man's Impact on Environment***.* Pelican, 1970.
U.N.E.P.: *Global Environmental Outlook .* U.N. Pub. New York. Online
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## M. Sc. & M. A. III Semester Geography
## GOG EC 322: Population Geography

***Objective:*** *To introduce the students to the complex dimensions of population, to understand and evaluate the association between demographic and socio-economic attributes of population and the resultant levels of social well-being and economic development in an ever-changing space-time continuum.*

***Learning Outcomes****: After the completion of the course, the students will have the ability to:*

1. *Develop an understanding of the population dynamics and their distribution pattern across the globe.*
2. *Understand and evaluate the basic theories of population dynamics in the changing man-environment relationship.*
3. *Develop an insight upon the changing population-resource relationship and level of social well-being in an ever-changing space-time continuum.*

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*(Total Lectures: 60)*

**Unit 1**

Population Geography: Nature, scope and significance; Development of Population Geography as field of specialization; Its relation with the Demography; Sources of population data, their level of reliability and problems of mapping of the population data. *(12 Lectures)*

**Unit 2**

Population distribution and density: factors affecting and spatial patterns in the world; Growth of population: theoretical issues, world pattern and their determinants. *(12 Lectures)*

**Unit 3**

Population Composition- Age and Sex Composition; Literacy and education, Occupational structure; Urbanization: determinants, processes and patterns. *(12 Lectures)*

**Unit 4**

Population Dynamics: Measurement of Fertility and Mortality; World patterns of fertility and mortality; Migration: concept, determinants, types, consequences, demographic transition. *(12 Lectures)*

**Unit 5**

Population and Resources Development: Concept of optimum population, under population and over population. Theories of Population: Malthus, Boserup, limits to growth; Population-Resource regions of the World. Food, Nutrition and Health. *(12 Lectures)*

***Essential Readings:***


Chandna, R.C. ***Population Geography***. Kalyani Publisher, New Delhi. 2016.

Roy, R. ***A Handbook of Population Geography***. Anmol Publication , New Delhi. 2013.

Hussain A. ***Population geography***, Vishwabharti Publication. New Delhi. 2013.

Kulkarni, K. C. ***Population and Settlement Geography***. Pacific Publication, Delhi, 2012.

Daugherty, H.G., Kenneth C.W.Kammeyir: ***An Introduction to Population.*** The Guiford Press, New York, 1998

Garnier, B.J. ***Geography of Population.*** Longman London, 1970.

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***Suggested Readings:***


Agrawal, K. ***Population Ecology***, Pacific Publication, Delhi, 2010.

Srinivasan, K. ***Basic Demographic Techniques and Applications***, Sage Publications, Delhi, 1998.

Crooch, Nigel **Principles of Population and Development.** Pergamon, New York, 1997.

Mishra, R.P. ***Demographic Upsurge.*** Book Centre, New Delhi, 1995.

Sundaram, K.V. and Sudesh Nagia (ed.): ***Population Geography.*** Heritage Publications,Delhi, 1986.

Woods, R***. Population Analysis in Geography***. Longman, London. 1979.

Clark, J.I. ***Population Geography.*** Pergamon Press, Oxford, 1973

United Nations ***Determinants and Consequences of Population Trends.*** New York, 1973.

Trewartha, G.T. ***Geography of Population: World Patterns,*** Pergaman Press, New York, 1969.

Bogue, D.J. ***Principles of Demography.*** John Wiley, New York, 1969.

Zelinsley, Wilbur ***A Prologue to Population Geography.*** Prentice Hall, 1966.

Boserup, E. ***The Conditions of Agricultural Growth*****.** George. Allen & Unwin, London, 1965.

Barcley, G.W. ***Techniques of Population Analysis.*** John Wiley, New York, 1959.

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**M.Sc. & M. A. III Semester Geography**

**GOG EC- 323: Regional Planning and Development**

***Objectives:*** *once students under goes this course they are expected to have obtained the skills in understanding a region, its dynamics, and planning aspects in India. The project work make them sharper to understand the micro level regional disparities in India*

**Learning Outcomes:**

After the completion of the course, the students will have the ability to:

1. Appreciate the basics of regional planning methodology and the need for adopting newer models in the planning process;
2. Understand the history of adopting various planning strategies for balanced national development;
3. Capable of diagnosing the regional issues and the necessity to adopt suitable planning in India.

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**Unit 1**

Regional Concept in Geography, Types of region: Formal and Functional. Planning: Meaning and Definition; Regional planning: Concept, Nature and scope of regional planning; Approaches to regional planning.

*(12 Lectures)*

**Unit 2**

Conceptual outlook: regional planning and planning region; Regional Planning in India: Sectoral and Regional planning in India, Need for regional planning in India, Historical Back Ground of Regional Planning in India: Regional policies in India.

*(12 Lectures)*

**Unit 3**

Planning Region: concept, characteristics and delineation; Planning regions of India: planning regions, specific problems and suggested plannings. Inter-regional and Intra-regional functional interactions. Planning for tribal regions.

*(12 Lectures)*

**Unit 4**

Regional disparities in India; Models for regional planning: Growth pole theory and Growth foci concept in Indian context; Growth centre and regional development with reference to India. Regional disparities in socio-economic development.

*(12 Lectures)*

**Unit 4**

Approaches to integrated regional planning at different levels: local, regional and national; Multi-level planning in India- State, District and Block level planning,; Decentralised planning: themes and issues.

*(12 Lectures)*

**Unit 5**

Regional Development strategies in the 21 st century; NITI Ayog: Its role in Regional Development; Project report: A project report assignment of regional development and disparity of a geographical unit area with the constant guidance from a faculty member. Presentations, Assignments and participatory knowledge building through case study analysis. *(12 Lectures)*

### *Essential Readings:*


Gupta, H. S. ***Regional Development and Planning***. Kalyanai Publication, New Delhi. 2017.
Chand, M. and Puri, V.K. ***Regional planning in India***; Allied Publishers, New Delhi, 2016.
Chandana, R. C. ***Regional Planning and Development***, Kalyani Publication. 2016.
Sundram K. V. ***Geography of Planning.*** Concept Publishing Co. New Delhi, 2012.
Chandana,R.C.,***Regional Development and Planning***.Kalyani Publishers, New Delhi, 2005.
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### *Suggested Readings:*


Sundram K. V. ***Development Planning at the Grass Roots***, Concept Publishing Co. New Delhi, 2012.
Haynes J., ***Development Studies***, Polity Short Introduction Series, 2008.
Bhat, L.S. ***Micro Planning: A Case Study of Karnal Area***, KB Publications, New Delhi, 2003.
Mahapatra, A.C. and Pathak, C. R. (eds.) *Economic liberalisation and Regional Disparities in India. Special Focus on the North Eastern Region*. Star Publishing House, Shillong, 2003.
Pathak, C. R., ***Spatial Structure and Processes of Development in India.*** Regional Science Association, Kolkata, 2003.
Mishra R. P. ***Regional Planning: Concepts, Techniques, Policies and Case Studies***. Concept Publishing, New Delhi, 2002.
Sen, A., ***Development as Freedom***. Oxford University Press, Oxford, 1999.
Smith, D. and Närman, A. (eds.) ***Development Theory and Practice: Current Perspectives on Development and Development Co-operation***. Longman, London, 1999.
Claval P.l., ***An Introduction to Regional Geography***, Blackwell Publishers, Delhi,1998.
Sen, A. and Dreze, J. (eds.), ***Indian Development: Selected Regional Perspectives***. Oxford University Press, Oxford, 1996.
Dube, K.K. and Singh, M.B. ***Pradeshik Niyojan***. Tara Book Agency, Varanasi, 1986.
Mishra, R.P, Sundaram, K.V., and Prakasarao, V.L.S. ***Regional Development*** MIT Press, Massachusetts, 1976.
Kuklinski, A.R. (ed.), ***Regional Development and Planning***: International Perspective, Sijthoff-Leydor, 1975.
Moseley, M.J***., Growth Centres in Spatial Planning***. Pergamon Press, Oxford, 1974.
Kuklinski, A.R. ***Growth Centres in Regional Planning***. Mounton & Company, Paris, 1972.
Bhat, L.S. ***Regional Planning in India***, Indian Statistical Institute, Calcutta, 1972.
Blij H. J. De, ***Geography: Regions and Concepts***, John Wiley and Sons, 1971.
Johnson E. A. J. ***The Organization of Space in Developing Countries***, MIT Press, 1970.
Friedman, J. and Alonse, W. (eds.), ***Regional Development and Planning***, M.I.T.
Press, Cambridge-Massachusetts, 1968.
Isard, W., ***Methods of Regional Analysis.*** MIT Press, Cambridge, MA, 1960

# M. Sc. & M. A. III Semester Geography
## GOG EC 324: Agricultural Geography

***Objectives:*** *To familiarize the students with the basic concepts and development of agriculture, to familiarise the students with application of various theories, models and classification schemes of cropping patterns and productivity, and to discuss environmental, technological and social issues in agricultural sector with special reference to India.*

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*(Total Lectures: 60)*

**Unit 1**

Agricultural Geography: Nature, scope and significance; approaches to the study of agricultural geography: systematic and regional; Determinants of agricultural land use: physical, economic, social, institutional and technological. *(12 Lectures)*

**Unit 2**

Land use classification; Land capability- concept and classification; Concepts and measures of agricultural productivity-ranking coefficient methods of Kendall and carrying capacity method; Crop combination- Weaver and Doi's methods; crop diversification. *(12 Lectures)*

**Unit 3**

Theories of agricultural location- Von Thunen's theory and its recent modifications; Agricultural typology and methods of agricultural regionalization: Kostrovicki's scheme of agricultural typology, critical review of Whittlesey's classification of agricultural regions. *(12 Lectures)*

**Unit 4**

Agriculture systems in India: Land use classification; Regional pattern of productivity in India; Green Revolution and its environmental and ecological implications. *(12 Lectures)*

**Unit 5**

Agro-climatic region in India; Indian agriculture: Characteristics, trends and development; Specific agricultural problems and their remedial measures. *(12 Lectures)*

***Essential Readings:***

Banarjee, D. ***Agricultural Geography***. Random Publications New Delhi. 2014.
Gupta, Rajiv. ***Agricultural Geography***, Sonali Publication. New delhi. 2014.
Hussain, Majid, ***Systematic Agricultural Geography***. Rawat Publication jaipur, New Delhi, 2010.
Singh, J. and Dhillon S.S., ***Agricultural Geography.*** Tata McGraw Hill Pub.New Delhi, 1988.
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***Suggested Readings:***

Noor Mohammad. ***Agricultural Diversification, Food security in the Moutain Ecosystem***, Concept Publishing Company, New Delhi. 2014.
Noor Mohammad, ed, ***New Dimensions in Agricultural Geography.*** Concept Pub.Co., New Delhi, 1992.
Grigg, D.B. ***Agricultural Systems of the World.*** Cambridge University Press, New York, 1974.
Tarrant, J.R. ***Agricultural Geography.*** Wiley, New York, 1974.
Morgan, W.B. and Norton. R.J.C., ***Agricultural Geography.*** Matheun, London, 1971.
Gregor, H.P. ***Geography of Agriculture.*** Prentice Hall, New York, 1970.
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# M. Sc. & M. A. III Semester Geography
# GOG EC 325: Introduction to Remote Sensing

**Objective:** To introduce to the students about the basic principles of Remote Sensing, to indicate the methods of visual and digital interpretations of satellite imageries and to outline the application of remote sensing.

**Learning Outcomes**: After the completion of the course, the students will have the ability to:

1. Appreciate the basic principles and components of Remote sensing;
2. comprehend the basics of aerial photogrammetry and image processing for spatial analysis;
3. Analyze the basic spatial resources for land use and Land Cover for meaningful interpretation.

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*(Total Lectures: 60)*

**Unit 1**

An overview of Remote Sensing: Meaning, Scope and relevance in geographical studies; Specific characteristics, potentials and limitations of Remote Sensing; Development in the world and in India. *(12 Lectures)*

**Unit 2**

Principles and concept of Remote Sensing: Radiation and Resolution concepts pragmatic division of EMR spectrum for Remote Sensing; Role of atmospheric in Remote Sensing; Interaction of Earth features and materials with EMR. *(12 Lectures)*

**Unit 3**

Aerial Photography: Types of photographs, marginal information on aerial photographs; simple geometry of conventional vertical aerial photographs, photograph scale and its characteristics; displacement of images due to relief; Specific features of aerial cameras; Map, aerial photograph and satellite imagery – a comparative perspective. *(12 Lectures)*

**Unit 4**

Visual image interpretation of B/W and colour images - basic concepts, indemnificatory elements of images; interpretation keys; Stereoscopic human vision and its application to 3-dimensional perception - stereoscopic parallax and its measurement; Principal Satellite systems – general classification and detailed characteristics of LANDSAT and IRS. *(12 Lectures)*

**Unit 5**

Digital image processing and its application in remote sensing; Data preprocessing/restoration – basic geometric and radiometric corrections; Histogram of digital data and its diagnostic significance; Contrast enhancements, Spatial filtering; Digital classification and pattern recognition – supervised and unsupervised procedures. Other advanced transformations. *(12 Lectures)*

### *Essential Readings:*


Joseph, G. ***Fundamentals of Remote Sensing,*** Universities Press, India. 2016.
Lillesand, Thomas M. ***Remote Sensing and Image Interpreation***. Wiley India, New Delhi. 2016.
Nath Sandhu. ***An Introduction to Remote Sensing***, Koross Press, London. 2015.
Emilo, Chovieco & Huete Alfred. ***Fundamentals of Remote Sensing***, CRC Press. 2009.
Campbell J. B., ***Introduction to Remote Sensing,*** Guildford Press, 2007.
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### *Suggested Readings*:


Jian Guo Liu, Philippa, J. Mason***. Image Processing & GIS for Remote Sensing: Techniques and Applications***. Wiley Blackwell. 2016.
Michael, N. Demers. ***Fundamentals of Geographic Information System***, Wiley India. New Delhi. 2015.
Lawrence Fox III**. *Essentials Earth Imaging for GIS.*** ESRI Press. 2015.
Schowengerdt, R. A. ***Remote Sensing: Models and Methods for Image Processing***. Elsevier, Amsterdum. 2013
Walter Fisher. ***Remote Sensing for GIS***, NYX Academics, New Castle. 2012.
Gopi, Sateesh, Sathikumar, R., N. Madhu. ***Advanced Surveying: Total Station, GIS and Remote Sensing***, Pearson Education press, 2006.
Jensen J. R., ***Introductory Digital Image Processing: A Remote Sensing Perspective***, Prentice Hall, 2004.
Lillesand T. M., Kiefer R. W. and Chipman J. W., ***Remote Sensing and Image Interpretation,*** Wiley. (Wiley Student Edition), 2004.
Rees W. G., ***Physical Principles of Remote Sensing,*** Cambridge University Press, 2001.
Wolf P. R. & Dewitt B. A., ***Elements of Photogrammetry: With Applications in GIS***, McGraw-Hill, 2000.
Rampal, K. K. ***Handbook of aerial Photography & Interpretation***, Concept Publication, New Delhi. 1999.
Greeth,R.: ***The Remote Sensing Data Book***, Cambridge University Press,1999.
Nag P. & Kudra, M., ***Digital Remote Sensing,*** Concept, New Delhi, 1998.
Singh R. B. & Murai S., ***Space-informatics for Sustainable Development***, Oxford and IBH Pub, 1998.

## M.Sc./M.A. III Semester Geography
## GOG EC 326 Climate Change and Proxies of Reconstruction

**Objective:** To introduce the students with the basics of climate change and to develop the skills of palaeo- climatic reconstructions.
**Learning Outcomes**: After the completion of the course, the students will have the ability to:
1. understand the basic principles of climate changes and factors responsible for the same;
2. identify different proxies for palaeoclimatic reconstruction in different environment;
3. will have a comprehensive understanding of the palaeoclimatic & glacial fluctuation in the Himalayas and surrounding regions.

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(Total Lectures: 60)

**Unit1**

Introduction to climate change studies: its relevance in the present time. Definition, nature and scope. Difference between climatic variability and change. Present and palaeo-climates, normal climate and climatic anomalies. Schools of climate change.
(12 Lectures)

**Unit II**

Causes of climatic changes, Milankovitch cycle, terrestrial causes; volcanism, land and sea distribution, mountain emergence, tropical forests, cow dungs, role of greenhouse gases and humans. (12 Lectures)

**Unit III**

Methods of palaeo-climatic reconstructions: geomorphological; glacial facies, fluvial facies, 25eolian facies. Pollen analysis, geochemical analysis, dendrochronology analysis, lichenometric analysis, Ice core analysis and archaeological analysis for climatic reconstructions. (12 Lectures)

**Unit IV**

History of Climate change, periods of Rapid Climate Change (RCC), periods of cold events (Ice Age & little Ice age) and periods of warm events (Green House Age & interglacial periods). History of Quaternary glaciations; Last Glacial Maximum (LGM), its style and timing in Europe, America and Himalaya. (12 Lectures)

**Unit V**

Alpine glaciations and their synchronous and asynchronous character. LGM in Himalaya and trans-Himalayan region. Holocene period and phases of glacial advance and retreat. (12 Lectures)

**Suggested Readings: Books**

Barry, R. G. and Chorley, R. J. 2003: Atmosphere, weather and climate, Routledge, 8th edition. London: Methuen.

Huddart, D. and Stott, T. 2010: Earth environments past, present and future, Wiley Blackwell, 1st edition, West Sussex.

Shroder, J.F. (edited) 2005: Himalaya to the sea geology, geomorphology and the Quaternary, Taylor & Francis, London.

Anderson, G.D.; Maasch, K.A.; Sandweiss, D.H. (edited) 2007: Climate Change and cultural dynamics, a global perspective on Mid-Holocene Transition, Academic Press, London.

Walker, Mike 2005: Quaternary Dating Methods, John Wiley & Sons, West Sussex.

Last, W.M. and Smol, J.P. (edited) 2002: Tracking Environmental change using lake sediment vol I, Kluwer Academic Publishing, New York.

Bennet, M.R. and Glasser, N.F. 2009: Glacial geology ice sheets and landforms, Wiley Blackwell, West Sussex.

**Journals** Quaternary International, Quaternary International Review, Journal of Quaternary Science, Quaternary, Climate of the Past, Nature Geoscience

## M. Sc. & M. A. III Semester Geography
## GOG OE 321: Population and Development

**Objective:** To introduce the students to the complex state of population and development relationship; to understand the relationship among population-development an environment for a better future of Earth and humankind.

**Learning Outcomes:** After the completion of the course, the students will have the ability to:

1. Develop an understanding of the human resource and its relationship with development.
2. Develop an insight upon the changing relationship among population, resource and environment and level of social well-being in an ever-changing space-time continuum.

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*(Total Lectures: 30)*

**Unit I**

Conceptual Frame: Population as resource; Population and development: a debate; Population and ecosystem; Development and Human wellbeing. *(6 Lectures)*

**Unit II**

History and Characteristics: Growth of human population; Demographic transition; distribution and density of population in world. *(6 Lectures)*

**Unit III**

Population characteristics: developed and developing countries (case study of India); Relationship between population, food and energy; Debate on The Limits to Growth. *(6 Lectures)*

**Unit IV**

Population and Development Conflict; Concepts of rich and poor worlds and their global perspectives; Neo-Malthusian theory; Future perspectives: Growth scenario and relationship with development. *(6 Lectures)*

**Unit V**

Problems and Policies: Optimum population; Family welfare and planning; Population policies in developed and developing countries (case study of India). *(6 Lectures)*

### *Essential Readings:*


Chandna, R.C. ***Population Geography***. Kalyani Publisher, New Delhi. 2015.

Hussain A. ***Population geography***, Vishwabharti Publication. New Delhi. 2013.

Roy, R. ***A Handbook of Population Geography***. Anmol Publication , New Delhi. 2013.

Dyson, Tim. ***Population and Development*** The Demographic Transition. Zed Books, London. 2010.

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### *Suggested Readings:*


Thakur, B. (ed.). ***Population, Resources and Development***. Vol. II, Perspectives in Resource Management in Developing Countries. Concept Publishing. Company, New Delhi. 2004.

Firor, J. and Jacobsen, J. E. ***The Crowded Greenhouse: Population***, Climatic Change and Creating a Sustainable World. Universities Press (India) Private. Ltd., Hyderabad. 2003.

Haggett, P. ***Geography, A Modern Synthesis***. 5th edition, Harper and Row, New York. 2001.

Middleton, N. and O'Keefe, P. *Redefining Sustainable Development*. Pluto Press, London. 2001.

Hammett, C. (eds.). ***Social Geography***: A Reader. Arnold, London. 1996.

Ehrlich, P.R. and Ehrlich, A.H. ***Ecoscience: Population, Resources, Environment***. 6th edition, W.H. Freeman and Company, San Francisco. 1996.

Sharma, P. R. (ed.) ***Regional Policies and Development in the Third World***. Rishi Publications, Varanasi. 1994.

Champion, T. (ed.). ***Population Matters.*** Paul Chapman, London. 1993.

Meadows, D.H., Meadows, D.L. and Randers, J. ***Beyond the Limits. Confronting Global Collapse, Envisioning a Sustainable Future. (A sequel to The Limits to Growth)***. Chelsa Green Publishers, Post Mills VT, USA. 1992.

Sharma, P. R. ***Perspectives on the Third World Development***. Rishi Publications., Varanasi. 1991.

Simon, J. L. ***The Economics of Population Growth***. Princeton University. Press, Princeton. 1977.

Ross, J. A. (ed.) ***International Encyclopaedia of Population***. Free Press, New York. 1982.

Mesarovic, M. and Pester, E. ***Mankind at the Turning Point. II Report of the Club of Rome***. The New American Library, New York. 1974.

Meadow, D.H., Meadows D.L., Randers J., and Behrens W.W. III. ***The Limits to Growth. I Report of the Club of Rome***. The New American Library, New York. 1973.

# M. Sc. & M. A. Fourth Semester in Geography

The M. Sc. / M. A. Geography courses in IV Semester shall consist of **three core** courses (one Theory and two practical) of 4 credits each and **two elective** courses (Theory) of 4 credits each which shall be opted from the department.

Following shall be the theory and practical courses in IV Semester:

## IV Semester

| Paper Code | Title of the paper/ course | L | T | P | C |
|---|---|---|---|---|---|
| GOG CC 421 | Applied Geomorphology | 4 | 0 | 0 | 4 |
| GOG CC 422 | Photogrammetry, Remote Sensing and GIS **(Practical)** | 0 | 0 | 8 | 4 |
| GOG CC 423 | Dissertation | 0 | 3 | 3 | 6 |
| | **Two courses** to be opted from the following **elective courses**: | | | | |
| GOG EC 421 | Environmental Management | 4 | 0 | 0 | 4 |
| GOG EC 422 | Population Geography of India | 4 | 0 | 0 | 4 |
| GOG EC 423 | Urban Geography | 4 | 0 | 0 | 4 |
| GOG EC 424 | Industrial Geography | 4 | 0 | 0 | 4 |
| GOG EC 425 | Geographical Information System and GPS | 4 | 0 | 0 | 4 |
| GOG EC 426 | Himalayan Cryosphere and Water Resources | 4 | 0 | 0 | 4 |
| | | | | | ***Total Credits = 22*** |

### *Notes:*

1. *Students have to select two elective courses from the above mentioned elective courses, and one open elective from the courses available in the school/University.*

2. *At the time of End semester examination all candidates shall submit their practical records/ field survey reports duly signed by the concerned teacher within the stipulated date and time.*

# M. Sc. & M. A. IV Semester Geography
## GOG CC 421: Applied Geomorphology

**Objective:** The objective of this course is to introduce the latest emerging aspects of applied geomorphology. It becomes useful when it helps in identifying and solving the diversified problems being faced by human society.

**Learning Outcome:**

***1.*** Course will provide geometrical base for relief analysis and representation.

***2.*** Student will be competent in examining local geomorphic structures, its evolution and the future of the landscapes.

***3.*** Course will be helpful in detailed understanding about resource excavations, civil construction and spatial planning.

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*(Total Lectures: 60)*

**Unit 1**

Applied Geomorphology: Nature, Scope and significance; Modern techniques in geomorphology and their application- Profile, Hypsometry, Altimetry, Clinographic and Slope Analysis. *(12 Lectures)*

**Unit 2**

Drainage Basin: Network Characteristics, Morphology, Phases of drainage network development, Drainage modification and rearrangement; Evolution of landforms based on terrain elements- Local Relief, Slope, Profile, Texture, Locational Sequence, Surface material, and Dimensions. *(12 Lectures)*

**Unit 3**

Geomorphic application in soil studies- Weathering, Profile of weathering, Various type of weathering formation, Soil as a product of weathering, its formation, Vertical zonation and major soil groups. *(12 Lectures)*

**Unit 4**

Environmental Geomorphology: Meaning and Application; Natural hazards and environmental management; Geomorphic hazards: Volcanic, Earthquakes, Land slide and Floods; Anthropogenic activities and their effects on erosion and sedimentation.

*(12 Lectures)*

**Unit 5**

Geomorphology in engineering construction: Construction of large Dam, roads and tunnels and their impact; Urban geomorphology: Study of previous terrain of the cities; Application in urban planning; Geomorphology in groundwater studies.

*(12 Lectures)*

***Essential Readings:***


Hugget, R. J. ***Fundamentals of geomorphology***, Routledge Taylor & Francis, London, 2017.

Bloom A. L. ***Geomorphology***. Rawat Pulication, Jaipur, 2012.

Kale, V.S. & Gupta, A.: **Introduction of Geomorphology,** Quent pub. 2001.

Kandolf, M. & Pigay, H.: **Methods in fluvial Geomorphology,** New York, Jon Wiley, 2001

Thornbury,W. D. ***Principles of Geomorphology***. John Wiley, New York, 1960.

Sparks, B.W. ***Geomorphology***. Longman, London, 1960.

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***Suggested Readings:***


Garner, H.F. The Origin of Landscape – ***A Synthesis of Geomorphology***, Oxford University Press, London 1974

Strahler, A.N. and Stahler, A.M. ***Modern Physical Geography***. Wiley India, New Delhi, 2016.

Singh, S. ***Physical Geography.*** Pravalika Publications, Allahabad, 2016.

Bryant Richard, H. ***Physical Geography***. Rupa Publication. New Delhi, 2016.

Hussain M. ***Physical Geography***. Anmol Publication. New Delhi. 2014.

Summerfield, M. ***Global Geomorphology***. Routledge, New York. 2013.

Robinson, P.J. & S. Henderson. ***Contemporary Climatology***. Henlow,1999.

Singh, S. ***Geomorphology.*** Prayag Publications, Allahabad, 1998.

Stoddart,D. R. ***Process and Form in Geomorphology (Edited)***. *Routledge,* New York*,* 1996.

Chorley, R.J. ***Spatial Analysis in Geomorphology***. Methuen, London. 1972.

Mitchell, C.W., ***Terrain Evaluation***. Longman, London, 1973.

Wooldridge, S.W. and Morgan, R. S. The Physical Basis of Geography- An Outline of Geomorphology. Longman, London, 1959.

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# M. Sc. & M. A. IV Semester Geography
## GOG CC 422 (Practical): Photogrammetry, Remote Sensing & GIS

**Distribution of Marks = 100**

1. Lab work = 70
   (i) I Mid Sem = 20
   (ii) Internal Assessment = 20
   (iii) End Sem = 30
2. Field Work (Inst.) = 20
3. Sessional/Viva-voce = 10

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**Objectives:** Introduce the basic concepts Remote Sensing and the study of IRS GIS and computer applications and to introduce the students the basic principles of photogrametry. To indicate the methods of interpretations of aerial photographs and colour photographs.

**Learning Outcomes**: After the completion of the course, the students will have the ability to:

1. Appreciate the basic principles and components of GIS, remote sensing and aerial photography;
2. Apply raster including satellite images/aerial photographs and vector data structure for GIS analysis;
3. Analyze the basic geospatial resources for land use and land cover for meaningful interpretation.

*(Total Hours: 120)*

**Unit 1**

Aerial Photographs- types and characteristics, Marginal information; Application of aerial photographs in geographical studies; Comparison of aerial photograph with map; Perception and measurement of height difference; Photo scale and its characteristics; Use of mirror stereoscope for studying photographs. (*24 hours)*

**Unit 2**

Interpretation of Aerial Photographs: Elements of aerial photographs applications in feature identification; Interpretation of B/W and Colour photographs. (*24 hours)*

**Unit 3**

Remote Sensing- Meaning and its characteristics; Physical bases of Remote Sensing; Satellite and its function; Study of IRS system of Remote Sensing satellite, Elements of image interpretation. (*24 hours)*

**Unit 4**

GIS and its application in Geography; Computer and its application in geographical contents. (*24 hours)*

**Unit 5**

Theodolite Surveying: Principles, Tacheometry - Triangulation, Traversing and Contouring. (*24 hours)*

### *Essential Readings:*


Joseph George. ***Fundamentals of Remote Sensing***, Universities Press. India. 2016.
Lillesand, Thomas M. ***Remote Sensing and Image Interpreation***. Wiley India, New Delhi. 2016.
Kanetkar, T. P. & Kulkarni S. V., ***Surveying and Levelling.*** Vidyarthi Griha Prakashan, Pune. 2016.
Schowengerdt, R. A. ***Remote Sensing: Models and Methods for Image Processing***. Elsevier, Amsterdum. 2013.
Heywoods, I., Cornelius, S and Carver, S., ***An Introduction to Geographical Infromation system***. Prentice Hall,2006.
Kraak M.J. & Ormeling F., ***Cartography: visualization of Geo-spatial Data,*** Pearson Education Asia., 2nd Ed., 2004.
Goutam, N.C., ***Fundamentals of GIS***, Pink Pubs. 1993.
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### *Suggested Readings:*


Anderson, J.M. & Mikhail E.M., ***Introduction to Surveying***. 1985.
Mikhail E.M.& Anderson J.M., ***Introduction to Surveying***, Wiley, 1984.
Michael, N. Demers. ***Fundamentals of Geographic Information System***, Wiley India. New Delhi. 2015.
Jha, M.M. and Singh, R.B., ***Land Use: Reflection on Spatial Informatics Agriculture and Development,*** *Concept,* New Delhi, 2008.
Nag, P., ***Introduction to GIS,*** Concept India, New Delhi, 2008.
Agarwal N.K., ***Essentials of GPS,*** Spatial Networks, 2004.
Lo C.P. & Yeung A.K.W., ***An Introduction to GIS***, P.H.I/Pearson Edu., Asia, 2002
Burrough P.A. & McDonnell R.A., ***Principles of GIS for Land Resource Assessment,*** OUP, 2nd ed. 1998.
Chrisman N., ***Exploring Geographic Information Systems***, Wiley, 1997.
Haywood I., Cornelius I. & Carver S., ***An introduction to GIS***, Longman/Pearson Education Asia, 1998/2000.
Geodetic Survey Division, ***GPS Positioning Guide,*** Govt. of Canada, 1995.
Martin D. ***GIS and their Socio-economic Applications,*** Routledge, 2nd ed., 1997.
Singh, R.B. and Murai, S., ***Space Informatics for Sustainable Development***, Oxford and IBH, New Delhi, 1998.
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# M. Sc. & M. A. IV Semester Geography
## GOG EC 421: Environmental Management

***Objectives:*** *To understand and evaluate the dimensions of environmental degradation and emerging role and impact of human activities, to understand the meaning and need of environmental management.*

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*(Total Lectures: 60)*

### Unit 1
Emerging Environmental issues and problems; Ecological impacts of pollution; Environmental Degradation: meaning, definition, nature, causes and consequences; Anthropogenic activities causing environmental degradation: Agriculture, Urbanization, mining and Industrialization.
*(12 Lectures)*

### Unit 2
Emerging problems of environmental degradation in developing countries with special reference to India; Environmental conflicts and ethics: development of environmental ethics, environmental ethics and pollution. *(12 Lectures)*

### Unit 3
Environmental Management: meaning, importance and approaches- spatial, ecological and strategic approach; Historical perspectives of environmental management. *(12 Lectures)*

### Unit 4
Environmental education and Peoples participation: Goals and objectives, Environmental educational programmes and organization; Need for environmental policy and laws; Preservation and Conservation of environment through resource management –waste management, Chipko movement, National Parks. *(12 Lectures)*

### Unit 5
Environmental Actions: Need and importance –Stockholm Conference, Earth Summit; World Summit on Sustainable Development: Concept of sustainable development; Environmental monitoring and Assessment: Environmental impact assessment- EIA cycle and procedures, environmental management plan. *(12 Lectures)*

### *Essential Readings:*


Singh, S. ***Environmental Geography***. Prawalika Publication, Allahabad, 2016.
Barucha, Arach***. Textbook of Environmental Studies***, University Press India, Hyderabad. 2016.
Saxena, H. M. ***Environmental Geography.*** Rawat Publications. Jaipur, 2015
Siddhartha, K. ***Ecology and Environment***. Kisalaya Publication Pvt. Ltd. Newdelhi. 2015.
Sharma, Y.K. **Environmental Geography**: Resource and Development, Lakshmi Narayan Agarwal, Agra 2008.
Saxena, H. M. ***Environmental Management.*** Rawat Publications, Jaipur, 2000.
Munn, R.E. ***Environmental Impact Assessment: Principles and Procedures.*** John Wiley & Sons, New York, 1979.
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### *Suggested Readings:*


Gautam, A. ***Geography of resources: Exploitation, conservation and management***. Sharda Pustak Bhawan, Allahabad, 2013.
Roy, P. K. ***Resource Studies***. New Central Book Agency, Calcutta, 2006.
Sharma, B.L. & Puar P. ***Global Environmental Challenges***. Rohini Books, Publishers &Distributors, Jaipur, 2004.
Agrawal, A. & Sunita N. ***The Relationship between Environment and Development***, the First citizen report 1996
Goudie, Andrew. ***The Human Impact on the Natural Environment.*** *Blackwell* Oxford, 1994.
Mukerji, A. and V.K. Agnihotri. ***Environment and Development***. Concept , New Delhi, 1993.
Smith, R. L. ***Man and his Environment****: An Ecosystem Approach.* Harper & Row, London, 1992.
Burton, I.; R.W. Kates & G.F. Whiley. ***The Environment as Hazards.*** O. U. P., New York, 1978.
Edington , J.M. & Edington M.A. ***Ecology and Environmental Planning***. Chapman & Hall, London 1977.
Detwyler, J.R. **Man's Impact on Environment**. Pelican, 1970.
U.N.E.P.: **Global Environmental Outlook** . U.N. Pub. New York. Online
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# M. Sc. & M. A. IV Semester Geography
## GOG EC 422: Population Geography of India

**Objective:** To introduce students the complex dimension of population in India, to understand and evaluate the association between demographic and socio-economic attributes of population in India, to understand the problem of growing population, related issues and planning in the country.

**Learning Outcomes**: After the completion of the course, the students will have the ability to:

1. Develop an understanding of the population dynamics and their distribution pattern in India.
2. Understand and evaluate the basic theories of population dynamics in India.
3. Examine the population problems and the population policies in view of their role in human well-being in the country.

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*(Total Lectures: 60)*

### Unit 1

Development of Population Geography in India; Sources of population data: primary and secondary sources- Census of India, Sample Registration, Sample Surveys, etc. *(12 Lectures)*

### Unit 2

Population distribution and density, Regional pattern and their determinants; Trends in the Growth of population, causes and consequences and Regional pattern. *(12 Lecture)*

### Unit 3

Population Composition- Age and Sex structure; population aging; Literacy and education; Occupational structure; dependency ratio; rural and urban population and trends in urbanization. *(12 Lectures)*

### Unit 4

Population Dynamics: Measurements and patterns of fertility and mortality; Internal Migration, Demographic Transition in India. *(12 Lectures)*

### Unit 5

Population regions of India; Population problems and prospects in India; Population policies, population and development; food, Nutrition and Health in India. *(12 Lectures)*

### *Essential Readings:*


Chandna, R.C. ***Population Geography***. Kalyani Publisher, New Delhi. 2016.

Roy, R. ***A Handbook of Population Geography***. Anmol Publication , New Delhi. 2013.

Hussain A. ***Population geography***, Vishwabharti Publication. New Delhi. 2013.

Kulkarni, K. C. ***Population and Settlement Geography***. Pacific Publication, Delhi, 2012.

Clark, J.I. ***Population Geography.*** Pergamon Press, Oxford, 1973

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### *Suggested Readings:*


Agrawal, K. ***Population Ecology***, Pacific Publication, Delhi, 2010.

Dyson, Tim. ***Population and Development***: The Demographic Transition. Zed Books, London. 2010.

Srinivasan, K.: ***Basic Demographic Techniques and Applications***, Sage Publications, Delhi, 1998.

Daugherty, H.G.,Kenneth C.W.Kammeyir: ***An Introduction to Population.*** The Guiford Press, New York, 1998

Crooch, Nigel**: Principles of Population and Development.** Pergamon, New York, 1997.

Mishra, R.P. ***Demographic Upsurge.*** Book Centre, New Delhi, 1995.

Sundaram, K.V. and Sudesh Nagia (ed.): ***Population Geography.*** Heritage Publications,Delhi, 1986.

Woods, R***.: Population Analysis in Geography***. Longman, London. 1979.

United Nations***: Determinants and Consequences of Population Trends.*** New York, 1973.

Garnier, B.J.: ***Geography of Population.*** Longman London, 1970.

Trewartha, G.T.: ***Geography of Population: World Patterns,*** Pergaman Press, New York, 1969.

Bogue, D.J.: ***Principles of Demography.*** John Wiley, New York, 1969.

Zelinsley, Wilbur: ***A Prologue to Population Geography.*** Prentice Hall, 1966.

Boserup, E. ***The Conditions of Agricultural Growth***. George. Allen & Unwin, London, 1965.

Barcley, G.W. ***Techniques of Population Analysis.*** John Wiley, New York, 1959.


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# M. Sc. & M. A. IV Semester Geography
## GOG EC 423: Urban Geography

***Objective:*** *to apprise the students with the methods and approaches to urban geography and to make the students familiar with urban problems and planning for better urban system.*

**Learning Outcomes:**

1. After the completion of the course, the students will have the ability to:
2. Understand the scope and recent trends of urban geography.
3. Understand the fundamentals and patterns of urbanization process
4. Learn the Urban models and Theories and functional classification of cities
5. Know contemporary Analysis the urban problems and suisrtainable urban development planning

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*(Total Lectures: 60)*

**Unit 1**

Urban geography: Meaning, scope and recent trends; Methodology in urban studies; Urban settlements: characteristics, processes and trends of urbanisation; Origin and evolution of urban settlements; Characteristics of cities in different historical periods. *(12 Lectures)*

**Unit 2**

Urban economic base; basic and non-basic functions; classification of towns on the basis of size and functions; functional classification of towns. *(12 Lectures)*

**Unit 3**

Spatiality and Models: Size and spacing of cities: Rank-size rule; Law of the primate city; Umland: meaning, types, delimitations; Central Place Theory (Christaller). *(12 Lectures)*

**Unit 4**

Urban land use and functional morphology: Theories of urban structure concentric zone theory and sector theory of urban land use. Central business district: concept characteristics and delineation. *(12 Lectures)*

**Unit 5**

Issues and Planning: Urban problems: environmental, poverty, slums, transportation, housing, crime; Urban planning: concepts and approaches; smart city: concept, historical development and planning. Application of Remote sensing techniques in urban planning, Identification of the urban research problems and project report. *(12 Lectures)*

***Essential Readings:***


Ramachandran, R., ***Urbanisation and Urban Systems in India.*** Oxford University Press, Delhi, 2016.

Pacione, M. ***Urban Geography: A Global Perspective***, Routledge, London and New York, 2009.Hall, T., ***Urban Geography.*** 2nd edition. Routledge, London, 2001.

Mandol, R. B. ***Urban Geography***, Concept Publishing Com. New Delhi. 2000.

Carter, H., ***The Study of Urban Geography***. 4th ed. Reprinted in 2002 by Rawat Publications, New Delhi, 1995.

Johnson, J.H., ***Urban Geography,*** Pergaman Press, Oxford, 1981.

Bansal, S.C. Urban Geography: Meenakshi pub. 2018


***Suggested Readings:***


Dutt, A. Allen, K, Noble, G., Venugopal G. and Subbiah S. (eds.), ***Challenges to Asian Urbanisation in the 21st Century***. Kluwer Academic Publishers, Dordrecht and London, 2003.

Paddison, R. (ed.) ***Handbook of Urban Studies.*** Sage, London, 2001.

Bridge, B. and Watson, S. (eds.), ***A Companion to the City.*** Blackwell, Oxford, 2000.

Haughton, G and Hunter, C., ***Sustainable Cities.*** Jessica Kingsley, London, 1994.

Hall, P., ***Urban and Regional Planning***. Routledge, London, 1992.

Jacquemin, A., ***Urban Development and New Towns in the Third World – A Lesson from the New Bombay Experience.*** Ashgate, Aldershot, UK, 1999.

Singh, K. and Stainberg, F. (eds.) ***Urban India in Crisis.*** New Age International, New Delhi, 1998.

Singh, S. B. (ed.) **New Perspectives in Urban Geography**. M.D. Publications, New Delhi, 1996.

Dubey, K.K. and Singh, A.K. ***Urban Environment in India***. Deep and Deep, New Delhi, 1983.

Singh, R.L. and Singh, R.P.B., (eds.) ***Place of Small Towns in India.*** NGSI of India, Varanasi, 1979.

Singh, R.L. ***Banaras. A Study in Urban Geography***. Nand Kishore and Brothers, Varanasi, 1955.

# M. Sc. & M. A. IV Semester Geography
## GOG EC 424: Industrial Geography

***Objectives:*** *To introduce the nature, development and significance of manufacturing and its links with the world economy, to understand the location of major manufacturing activities with the support of various industrial location theories and models. To discuss the problems and impact of manufacturing industries with respect to relocations, environmental pollution` and occupational health and industrial hazard*

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*(Total Lectures: 60)*

**Unit 1**

Nature, scope and significance of the Industrial geography; Approaches to study industrial geography; Development of industrial geography; Industrial revolution and world economic change. *(12 Lectures)*

**Unit 2**

Manufacturing industries: Factors affecting location of industries and their relative significance, Classification of industries, world distribution and changing spatial patterns in the world - Iron and steel, Textiles-cotton and Petro-chemical. *(12 Lectures)*

**Unit 3**

Theories of industrial location: Weber and Losch; Industrial regions- concept and methods of delineation; detailed study of the Great Lakes of America and industrial regions of India; Special Economic Zones (SEZ) in India: concept, distribution and significance. *(12 Lectures)*

**Unit 4**

Evolution of industries in India; Locational factors and distribution of industries in India - Iron and steel, Textiles-cotton and Petro-chemical; Manufacturing and Indian economy. *(12 Lectures)*

**Unit 5**

Manufacturing industries: role in economy and development; impact of manufacturing industries on environment; Globalization and its impact on industrial sector.

*(12 Lectures)*

***Essential Readings:***


Saxena, H. M. ***Economic geography***. Rawat Publication. New Delhi. 2013.
Sharm, T.C. ***Economic geography of India,*** Rawat Publication. New Delhi. 2013.
Smith, D.M. ***Industrial Location- A Economic Geographic Analysis.*** John Wiley & Sons, New York, 1971.
*Alexanderson, G.* **Geography of Manufacturing**. *Prentice Hall, Bombay,1967.*
Miller, E.W. ***A Geography of Manufacturing.*** Prentice Hall, Englewood Cliff, 1962.
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***Suggested Readings:***


Singh, M.B. : ***Industrial Development in India***. Lotus, Varanasi, 1985
Llyod,P.E. and Dicken. ***Location in Space.*** Harper & Row, London., 1978.
Shukla, S.K. ***Location of Industries.*** Sahitya Ratnalaya, Kanpur, 1979.
Berry, B.J.L. et al: ***Geography of Economic System.*** Prentice Hall, Englewood Cliff, 1976.
Sinha, B.N. ***Industrial Geography of India.***The World Press, Calcutta, 1972.
Estall, R.C. and Buchanan R.C.. ***Industrial Activity and Economic Geography.*** Hutchinson University Library, London, 1963.
Singh, M.B., ***Industrial Development in India***. Lotus, Varanasi, 1985.
Sinha, B.N., ***Industrial Geography of India***. The World Press, Calcutta

# M. Sc. & M. A. IV Semester Geography
# GOG EC 425: Geographical Information System & GPS

**Objective:** To introduce GIS as a tool of spatial science and to indicate the basic elements of GIS and application of GIS.
**Learning Outcomes:** After the completion of the course, the students will have the ability to:
1. Appreciate the basic principles and components of GIS and GPS;
2. Apply raster and vector data structure for GIS analysis;
3. Analyze the various geospatial resources for the interpretation of land use and land cover.

| L | T | P | C |
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*(Total Lectures: 60)*

**Unit 1**

Geographical Information System: Definition, scope and specific characteristics; its development in the world and in India; Relation of GIS with other collateral subjects like Cartography, Remote Sensing, Computer Science and Geography. *(12 Lectures)*

**Unit 2**

Basic concepts and essential elements of GIS – Map concepts; geo-referencing; types of data involved in GIS; types of data structures, their characteristics, and merits-demerits; Components of GIS; Methods of inputting data in GIS. *(12 Lectures)*

**Unit 3**

Spatial Hardware and Software components of GIS; Integration of remote sensing data with GIS; Digital terrain modeling (DTM) and its application in GIS; Spatial analysis in GIS - map overlay operations, nearest neighbour, gravity and network analysis. *(12 Lectures)*

**Unit 4**

Global Positioning System (GPS) – basic concepts and applications; Segments of GPS; Errors in GPS; GPS operations and methods; Mobile mapping systems; Regional Positioning Systems (RPS), specially WAAS of US and IRNSS of India. *(12 Lectures)*

**Unit 5**

National Spatial Data Infrastructure (NSDI) in India; Problems of access to geospatial data India and the New Map Policy of India; Major national projects of Geospatial database and network in India; Relevance, suitability and future trend of the new Geospatial technology in India.
*(12 Lectures)*

### *Essential Readings:*


Atiqur R. & Shahab A. ***Global Positioning System: Concept, Technique and Application***, New Age International Publisher, New Delhi. 2017.
Ben L. & Lawrence H. ***GPS Systems: Technology, Operation, and Applications***, Discover Net Publishing, Walnet Street, USA, 2016.
Michael, N. Demers. ***Fundamentals of Geographic Information System***, Wiley India. New Delhi. 2015.
Lo C.P. & Yeung A.K.W., ***An Introduction to GIS***, P.H.I/Pearson Edu., Asia, 2002
Heywoods, I., Cornelius, S and Carver, S., ***An Introduction to Geographical Infromation system***. Prentice Hall,2006.
Nag, P., ***Introduction to GIS,*** Concept India, New Delhi, 2008.
Agarwal N.K., ***Essentials of GPS,*** Spatial Networks, 2004.
Goutam, N.C., ***Fundamentals of GIS***, Pink Pubs. 1993.
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### *Suggested Readings:*


Lillesand, Thomas M. ***Remote Sensing and Image Interpreation***. Wiley India, New Delhi. 2016.
Joseph George. ***Fundamentals of Remote Sensing***, Universities Press. India. 2016.
Schowengerdt, R. A. ***Remote Sensing: Models and Methods for Image Processing***. Elsevier, Amsterdum. 2013.
Jha, M.M. and Singh, R.B., ***Land Use: Reflection on Spatial Informatics Agriculture and Development,*** *Concept,* New Delhi, 2008.
Kraak M.J. & Ormeling F., ***Cartography: visualization of Geo-spatial Data,*** Pearson Education Asia., 2nd Ed., 2004.
Burrough P.A. & McDonnell R.A., ***Principles of GIS for Land Resource Assessment,*** OUP, 2nd ed. 1998.
Chrisman N., ***Exploring Geographic Information Systems***, Wiley, 1997.
Geodetic Survey Division, ***GPS Positioning Guide,*** Govt. of Canada, 1995.
Martin D. ***GIS and their Socio-economic Applications,*** Routledge, 2nd ed., 1997.
Singh, R.B. and Murai, S., ***Space Informatics for Sustainable Development***, Oxford and IBH, New Delhi, 1998.
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## M.Sc./M.A. IV Semester Geography
## GOG EC 426 Himalayan Cryosphere and water resources

**Objective:** To actively engage the students in the Himalayan cryopsheric studies and to generate the future manpower who can work on the Himalayan cryopshere.
**Learning Outcomes**: After the completion of the course, the students will have the ability to:
1. understand the basic principles of cryosphere & its importance as a water resource;
2. analyse glaciers as an indicator of present and palaeo-climate change;
3. will have a comprehensive understanding of the palaeoclimatic & glacial fluctuation in the Himalayas and surrounding regions.

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(Total Lectures: 60)

**Unit1**
Introduction to cryospheric studies. Distributions of glaciers and ice sheets in polar and alpine environments including Himalaya as Third Pole. Climate change and its impact upon the cryopshere. (12 Lectures)

**Unit**
Types of glaciers and their classification. different zones of a glaciers, Accumulation Zone, Ablation zone, Equalibirium Line Altitude (ELA), methods of ELA reconstruction, Snow Line and Permanent Snow Line and Terminus. Glacial environments their characteristics; Supra glacial, englacial, proglacial, paraglacial, periglacial and glaciofluvial environments. (12 Lectures)

**Unit III**
Glaciers as indicators of climate change, glacial landforms and reconstruction of past glacial extent. Monitoring of glacier extent in Himalaya, Terminus monitoring and mass monitoring. Areal and length change in Himalayan glaciers and its climatic implications. Methods of mass balance and mass balance studies in Himalayas. (12 Lectures)

**Unit IV**
History of Himalayan glaciations, Last Glacial Maximum and its style and timing. Glacial stages during the Holocene across the Himalaya, its synchronous and asynchronous pattern. Period of glacial advance in recent past (Little Ice Age). (12 Lectures)

**Unit V**
Recent global warming and its impact upon the contemporary Himalayan glaciers. Remote Sensing data and its application in monitoring the Himalayan glaciers. (12 Lectures)

**Suggested Readings: Books**
Benn, D. and Evans, D.J.A. 2010: Glaciers and Glaciation, Hodder Arnold Publication, Routledge, London.
Embleton and Cuchlaine A. M. King 1968: Glacial and Periglacial Geomorphology, Edward Arnold, London.
Barry, R. G. and Chorley, R. J. 2003: Atmosphere, weather and climate, Routledge, 8th edition. London: Methuen.
Huddart, D. and Stott, T. 2010: Earth environments past, present and future, Wiley Blackwell, 1st edition, West Sussex.
Shroder, J.F. (edited) 2005: Himalaya to the sea geology, geomorphology and the Quaternary, Taylor & Francis, London.
Walker, Mike 2005: Quaternary Dating Methods, John Wiley & Sons, West Sussex.
Last, W.M. and Smol, J.P. (edited) 2002: Tracking Environmental change using lake sediment vol I, Kluwer Academic Publishing, New York.
Bennet, M.R. and Glasser, N.F. 2009: Glacial geology ice sheets and landforms, Wiley Blackwell, West Sussex.
**Journals** Quaternary International, Quaternary International Review, Journal of Quaternary Science, Quaternary, Climate of the Past, Nature Geoscience, Journal of Glaciology