Ch. Bansi Lal University, Bhiwani

Examination Scheme
&
Syllabi
for
M.Sc. Geography
(SEMESTER- I to IV)
(2016-2017)
Ch. Bansi Lal University, Bhiwani  
Scheme of Examination for Master of Science in Geography  

**Semester: I**  
**Total Credits: 34**  
**Total Marks: 650**

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Subjects</th>
<th>Type of course</th>
<th>Contact Hours Per Week</th>
<th>Credits</th>
<th>Examination Scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEO-101</td>
<td>Climatology</td>
<td>C.C.</td>
<td>4  - 4</td>
<td>4 - 4</td>
<td>80 20 - 100</td>
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<tr>
<td>GEO-102</td>
<td>Geomorphology</td>
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<td>4  - 4</td>
<td>4 - 4</td>
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<tr>
<td>GEO-103</td>
<td>Statistical Methods in Geography</td>
<td>I.D.C.</td>
<td>4  - 4</td>
<td>4 - 4</td>
<td>80 20 - 100</td>
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<td>GEO-104</td>
<td>Geography of India</td>
<td>F.C.</td>
<td>4  - 4</td>
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<tr>
<td>GEO-105</td>
<td>Resource Geography</td>
<td>C.C.</td>
<td>4  - 4</td>
<td>4 - 4</td>
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<tr>
<td>GEO-106</td>
<td>Practical I (Climatology and Geomorphology)</td>
<td>- 04×03</td>
<td>12  -- 02×03</td>
<td>6</td>
<td>-    50 50</td>
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<tr>
<td>GEO-107</td>
<td>Practical II (Computer based Data Management and Cartography)</td>
<td>- 04×03</td>
<td>12  -- 02×03</td>
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<tr>
<td>GEO-108</td>
<td>Seminar / Journal Club</td>
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<td>GEO-109</td>
<td>Self Study Paper</td>
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<td>20 24 44</td>
<td>20 12 34</td>
<td>400 100 100 650</td>
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C.C.= Core Course;  
F.C.= Foundation Course;  
I.D.C.= Inter Disciplinary Course
# Scheme of Examination for Master of Science in Geography

**Session: 2016-17**

## Semester: II

**Total Credits: 36**

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Subjects</th>
<th>Type of course</th>
<th>Contact Hours Per Week</th>
<th>Credits</th>
<th>Examination Scheme</th>
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<tr>
<td>GEO201</td>
<td>Hydrology</td>
<td>F.C.</td>
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<tr>
<td>GEO202</td>
<td>Biogeography</td>
<td>F.C.</td>
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<tr>
<td>GEO203</td>
<td>Geographical Thought</td>
<td>C.C.</td>
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<td>GEO204</td>
<td>Economic Geography</td>
<td>C.C.</td>
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<td>GEO205</td>
<td>Population Geography</td>
<td>C.C.</td>
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<td>GEO206</td>
<td>Communication Skills</td>
<td>C.M.C.</td>
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<td>GEO207</td>
<td>Practical I</td>
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<td>GEO208</td>
<td>Practical II</td>
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<td>GEO209</td>
<td>Seminar / Journal Club</td>
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<td>GEO210</td>
<td>Self-Study Paper</td>
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**Total Marks: 700**

C.C. = Core Course; F.C. = Foundation Course; CMC = Complimentary Course
## Scheme of Examination for Master of Science in Geography

**Session:** 2016-17

### Semester: III

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Subjects</th>
<th>Type of course</th>
<th>Contact Hours Per Week</th>
<th>Credits</th>
<th>Examination Scheme</th>
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<tbody>
<tr>
<td>GEO- 301</td>
<td>Oceanography</td>
<td>E.C.</td>
<td>4 - 4</td>
<td>4 - 4</td>
<td>Theory 80 Practical 20 Total 100</td>
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<tr>
<td>GEO- 302</td>
<td>Geographical Information Systems</td>
<td>E.C.</td>
<td>4 - 4</td>
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<td>Theory 80 Practical 20 Total 100</td>
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<tr>
<td>GEO- 303</td>
<td>Remote Sensing</td>
<td>C.C.</td>
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<td>Theory 80 Practical 20 Total 100</td>
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<td>GEO- 304</td>
<td>Urban Geography</td>
<td>C.C.</td>
<td>4 - 4</td>
<td>4 - 4</td>
<td>Theory 80 Practical 20 Total 100</td>
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<tr>
<td>GEO- 305</td>
<td>Geography and Water Resource Management</td>
<td>C.C.</td>
<td>4 - 4</td>
<td>4 - 4</td>
<td>Theory 80 Practical 20 Total 100</td>
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<tr>
<td>GEO- 306</td>
<td>Practical I: Visual Interpretation of Photographs and Satellite Images</td>
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<td>Theory 6 Practical 50 Total 50</td>
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<td>GEO- 307</td>
<td>Practical II: GIS Exercises</td>
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<td>GEO- 308</td>
<td>Seminar / Journal Club</td>
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<td>Theory 1 Practical 25 Total 25</td>
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<td>GEO- 309</td>
<td>Self-Study Paper</td>
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<td>Theory 1 Practical 25 Total 25</td>
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<td><strong>20 24 44 20 12 34</strong></td>
<td><strong>400 100 100 650</strong></td>
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C.C.= Core Course;  
E.C.= Elective Course;
## Scheme of Examination for Master of Science in Geography

### Semester: IV

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Subjects</th>
<th>Type of course</th>
<th>Contact Hours Per Week</th>
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<th>Examination Scheme</th>
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<tr>
<td>GEO- 401</td>
<td>Geography and Disaster Management</td>
<td>E.C.</td>
<td>4 - 4</td>
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<tr>
<td>GEO- 402</td>
<td>Application of Remote Sensing and GIS</td>
<td>E.C.</td>
<td>4 - 4</td>
<td>80</td>
<td>100</td>
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<tr>
<td>GEO- 403</td>
<td>Regional Development Planning with Special Reference to India</td>
<td>C.C.</td>
<td>4 - 4</td>
<td>80</td>
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<tr>
<td>GEO- 404</td>
<td>Social Geography</td>
<td>C.C.</td>
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<td>80</td>
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<tr>
<td>GEO- 405</td>
<td>Agricultural Geography</td>
<td>C.C.</td>
<td>4 - 4</td>
<td>80</td>
<td>100</td>
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<td>GEO- 406</td>
<td>Practical I: Digital Image Processing Techniques</td>
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<td>GEO- 407</td>
<td>Practical II: Application of Remote Sensing and GIS</td>
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<td>GEO- 408</td>
<td>Seminar / Journal Club</td>
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<td>Self-Study Paper</td>
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<td><strong>44</strong></td>
<td><strong>400</strong></td>
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C.C. = Core Course; EC = Elective Course;

Duration = 2 Years (4 Semesters)
Total Credits = 138
Total Marks = 2650
Ch. Bansi Lal University, Bhiwani
M.Sc- Geography

General Instructions

1. Seminar/ Journal Club

Max.Marks-25

Every candidate will have to deliver a seminar of 30 minutes duration on a topic (not from the syllabus) which will be chosen by him / her in consultation with the teacher of the department. The seminar will be delivered before the students and teachers of the department. A three member committee (one coordinator and two teachers of the department of different branches) duly approved by the departmental council will be constituted to evaluate the seminar. The following factors will be taken into consideration while evaluating the candidate. Distribution of marks will be as follows:

1. Presentation 10 marks
2. Depth of the subject matter 10 marks
3. Answers to the questions 05 marks

2. Self Study Paper

Max.Marks-25

Objective: This course intends to create habits of reading books and to develop writing skills in a manner of creativity and originality. The students are to emphasis his/her own ideas/words which he/she has learnt from different books, journals and newspapers and deliberate the same by adopting different ways of communication techniques and adopting time scheduling techniques in their respective fields. This course aims:

- To motivate the students for innovative, research and analytical work
- To inculcate the habit of self study and comprehension
- To infuse the sense of historical background of the problems
- To assess intensity of originality and creativity of the students

Students are guided to select topic of their own interest in the given area in consultation with their teachers/Incharge/Resource Person.

Instructions for Students

1. Choose the topic of your interest in the given areas and if necessary, seek the help of your teacher.
2. Select a suitable title for your paper.
3. You are expected to be creative and original in your approach.
4. Submit your paper in two typed copies of A4 size 5-6 pages (both sides in 1.5 line spaces in Times New Roman Font size 12).
5. Organize your paper in three broad steps:
   (a) Introductions
   (b) Main Body
   (c) Conclusion

6. Use headings and sub-headings
7. Use graphics wherever necessary
8. Give a list of books/references cited/used
9. The external examiner will evaluate the self-study paper in two ways i.e. Evaluation 15 Marks and Viva-Voce 10 marks.

**Distribution of Marks**

1. The evaluation is divided into different segment as under: **15 Marks**
   
   (i) Selection of Topic - 3 Marks
   (ii) Logical Organization of subject matter - 5 Marks
   (iii) Conclusions - 5 Marks
   (iv) References - 2 Marks

2. Viva-Voce: - **10 Marks**
M.Sc- Geography
Semester- I

GEO-101
Climatology

MaximumMarks-100
Theory Examination-80
Internal Assessment-20
Max. Time- 3 hrs.

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Student will have to attempt one question from each unit. Each question shall carry equal marks.

Unit- I

Unit- II

Unit- III

Unit- IV
Suggested Readings:

2. Critchfield, H J (Rep.2010) General Climatology, Prentice Hall of India, New Delhi,
M.Sc- Geography  
Semester-I  

GEO-102  
Geomorphology

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Student will have to attempt one question from each unit. Each question shall carry equal marks.

Unit- I


Unit- II

Continental drift theory and its basic considerations; Plate tectonics- Plate margins and boundaries, movement and distribution of plates, tectonic activities along the boundaries. Endogenetic processes – Faulting, folding and their geomorphic expressions. Earthquake – causes, classification, intensity and magnitude, geographical distribution. Volcanism – mechanism and causes; classification and geographical distribution.

Unit- III

Exogenetic processes-Weathering: Causes, type of weathering: mechanical, chemical and biological; rock weathering and soil formation. Mass wasting and hillslopes analysis: causes, classifications and types of mass movement- slow and rapid mass movements; Hillslope analysis: techniques and theories, mode and rate of slope retreat. geomorphic processes and resulting landforms: Fluvial, Glacial, Aeolian and Karst.

Unit- IV

Applied geomorphology: meaning and concept; role of geomorphology in environmental management of the accelerated erosion and sedimentation. Application of geomorphology in groundwater studies, in construction of large dams and in urban development.

Suggested Readings:

M.Sc- Geography
Semester-I

GEO-103
Statistical Methods in Geography

MaximumMarks-100
Theory Examination-80
Internal Assessment-20
Max. Time- 3 hrs.

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Student will have to attempt one question from each unit. Each question shall carry equal marks.

Unit- I

Unit- II

Unit- III
Bivariate analysis: scatter diagram, correlation analysis, Spearman’s rank correlation and Karl Pearson’s correlation coefficient. Test of significance: Chi-square test, student’s t-test, F-test.

Unit- IV
Simple linear regression model: regression equations, construction of regression line, computation of residuals and mapping. Basis of multivariate analysis: correlation matrix partial and multiple correlations.
Suggested Readings:

**M.Sc- Geography**

**Semester-I**

**GEO-104**

**Geography of India**

Maximum Marks-100  
Theory Examination-80  
Internal Assessment-20  
Max. Time- 3 hrs.

**Note:** There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Student will have to attempt one question from each unit. Each question shall carry equal marks.

**Unit- I**

India: size, shape and location. Unity in Diversity: Geological structure and relief, drainage system, climatic conditions. Making of India as a political unit through times. Border issues with Pakistan and China. Reorganization of states in India.

**Unit- II**

Natural Resources: forests and soils - types and their distribution, problems of soil erosion and conservation. Water resources – interstate disputes on water sharing. Regional distribution and development potentials of major minerals and power resources – iron ore, mica, bauxite, copper, coal, petroleum and natural gas. Problems and prospects of non-conventional energy resource.

**Unit- III**

Population distribution and growth, age and sex composition; literacy rate and differentials; Ethnic groups: linguistic and religious groups in context of unity in diversity in India. Features of Urbanization; determinants and implications of varying sex ratio in India.

**Unit- IV**

Economy: main features and problems of Indian agriculture, Green, white, blue and yellow revolutions. New industrial policy: Industrial regions; problems and prospect of transportation with reference to railways, roadways, waterways, airways and pipelines.

**Suggested Readings:**

M.Sc- Geography
Semester-I

GEO-105
Resource Geography

MaximumMarks-100
Theory Examination-80
Internal Assessment-20
Max. Time- 3 hrs.

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Student will have to attempt one question from each unit. Each question shall carry equal marks.

Unit- I

Concept and Scope of Resource Geography; Resource and ecosystem services: concept and types in relation to related concepts- environment, ecosystem, nature as nurture; World resources: classification of resources- changing profile and concerns; understanding relationship between natural resources and development process, and livelihoods with special reference to poor in the developing world. Sustainable development and some concerns from the past- from dooms day, zero growth to Rio and subsequent Earth summits.

Unit- II

Natural resource based development processes in history: the agricultural transition, the era of Malthusian stagnation, Emergence of world economy, rise of the Western Europe with special reference to golden era of resource based development (1870-1913), colonial origins and resource exploitation, centre-periphery trade-resource dependency and unequal development.

Unit- III

Models of Natural Resources Process: Zimmermann’s Primitive and Advance Models of natural resource process- population, resources and carrying capacity, Kirk’s Decision Model, Brookfield System Model; The resource curse hypothesis; open access exploitation hypothesis; factor endowment hypothesis; resources and common property/ entitlement-opportunity hypothesis; Resource exploitation and internal colonization, accumulation by dispossession; poverty and resource degradation.

Unit- IV

Suggested Readings:

M.Sc- Geography
Semester-I

GEO 106: Practical I
Representation of Physical Data
(Based on GEO-101 and GEO-102)

Max. Marks: 50
Time: 3 Hours

Note: The examiner shall set four questions, two from each unit. The candidate shall attempt two questions, one from each unit. Each question will carry twelve marks.

Distribution of marks
Exercise 24 marks
Viva voce 10 marks
Record book 16 marks

A: Climatology- GEO 101
1. Graphical Representation of Climatic Data
   a. Climatograph
   b. Climagraph (Taylor and Foster’s)
   c. Rainfall deviation diagrams
   d. Hythergraph
   e. Isopleths
2. Forecasting of Weather
   a. Study of weather instrument
   b. Elements of weather
   c. Interpretation of Indian Weather Maps
3. Construction of water budget diagram using precipitation and potential evapotranspiration data
4. Determination of climatic type using Koppen’s and Thornthwaites’s scheme

B: Geomorphology- GEO 102
1. Profile analysis: Transverse and Longitudinal
   a) Serial profiles
   b) Superimposed profiles
   c) Composite profiles
   d) Projected profiles
   e) Longitudinal or valley Thalweg profile
2. Relief Aspects
   a. Area Height Curve
   b. Altimetric Frequency Curve
   c. Hypsographic Curve
   d. Hypsometric Integral Curves
   e. Clinographic or Clinometric Curve
3. Absolute and Relative Relief Map (Smith’s Method)
4. Slope and Aspect Map (Wentworth’s method)
5. Dissection Index Map
Suggested Readings:
M.Sc- Geography
Semester-I

GEO 107: Practical II
Computer based Data Management and Cartography
(Based on GEO-103, GEO-104 and GEO-105)

Max. Marks: 50
Time: 3 Hours

Note: The examiner shall set four questions, two from each unit. The candidate shall attempt two questions, one from each unit. Each question will carry twelve marks.

Distribution of marks
Exercise 24 marks
Viva voce 10 marks
Record book 16 marks

1. Introduction to Computer System and M S Office
2. Entering and Managing data using Spreadsheets
3. Representation of Geospatial Data
   a. Line graph (Single and Polygraph)
   b. Bar graph (Simple, Compound and Multiple)
   c. Pie Charts
   d. X, Y scatter plots
   e. Trend Line
4. Introduction to SPSS program
5. Entering and Managing data in SPSS
6. Analysis of data using different statistical methods in SPSS
7. Preparation and interpretation of Simple and Multiple correlation and regression matrix in SPSS
8. Preparation of Distribution Maps
   b. Dot method
9. Miscellaneous diagrams and graphs
   a. Cartograms
   b. Accessibility maps.

Suggested Readings:

M.Sc- Geography
Semester- II

GEO-201
Hydrology

MaximumMarks-100
Theory Examination-80
Internal Assessment-20
Max. Time- 3 hrs.

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Student will have to attempt one question from each unit. Each question shall carry equal marks.

Unit- I
Definition, nature, scope and historical development of hydrology, Hydrological cycle, estimation of global water budget and human impacts on hydrological cycles, Sources of hydrological data sets in India.

Unit- II
Rainfall: frequency, intensity, measurement and trends, determination of average rainfall (Arithmetic mean, Theiesson polygon, isohyetel methods), rainfall variability, patterns and distribution.

Unit- III

Unit- IV
Groundwater: occurrence, storage, recharge and discharge, problems of ground water utilization, depletion and quality, Water Resources of India and associated problems.

Suggested Readings:
M.Sc- Geography
Semester- II

GEO-202
Biogeography

MaximumMarks-100
Theory Examination-80
Internal Assessment-20
Max. Time- 3 hrs.

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit.
Student will have to attempt one question from each unit. Each question shall carry equal marks.

Unit- I


Unit- II

Major biomes of the world: forests, grasslands and deserts, Distribution of plant life on the earth and its relation to soil, climate and human activities, Geographical distribution of animals on the earth and its relation to vegetation types, climate and human activities.

Unit- III

Communities-Nature of communities and ecosystems: bio-diversities; human induced communities changes; habitat decay and conservation of biotic resources, Ecosystem services and its significance.

Unit- IV

Environmental hazards, Ecological consequences, human perception and adjustment with respect to flood, drought and earthquake, Bio-Reserves of India, National forest and wild life policy of India.
Suggested Readings:

M.Sc- Geography  
Semester- II  

GEO-203  
Geographical Thought  

Maximum Marks-100  
Theory Examination-80  
Internal Assessment-20  
Max. Time- 3 hrs.  

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Student will have to attempt one question from each unit. Each question shall carry equal marks.  

Unit- I  
Classification of knowledge and place of Geography in the realm of knowledge, Geography as a science and its relationship with other science, Significance of space, place and location in geography, Explanations in Geography: Methodological and philosophical settings  

Unit- II  
Development of Geographical knowledge during ancient (Greek and Roman) and medieval (Arab) periods, Foundation of Modern Geography- Varenius, Kant, Humboldt and Ritter  
Concepts of Modern Geography- chorology, landscapes, areal differentiation, environmental determinism and possibilism, Dichotomy and dualism in Geography: Physical vs Human Geography, and Systematic vs Regional Geography  

Unit- III  
Quantitative Revolution and Emergence of theoretical geography, Positivist Explanations in Geography- Laws, theories, models, Inductive & deductive logic.  

Unit- IV  
Behavioral and Humanistic Perspectives in Geography, Social Relevance in Geography- Welfare, Radical and Feminist Perspectives, Postmodernism and geography.  

Suggested Readings:  
M.Sc- Geography
Semester- II

GEO-204
Economic Geography

Maximum Marks-100
Theory Examination-80
Internal Assessment-20
Max. Time- 3 hrs.

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Student will have to attempt one question from each unit. Each question shall carry equal marks.

Unit- I
Definition, nature, scope and approaches of Economic Geography, Relationship of economic geography with economics and other branches of social sciences, World Economies: bases of classification, patterns and characteristics of developed and developing economies of the world.

Unit- II
Functional Classification of Economic Activities, World production and distribution of energy resources: coal and petroleum. World production and distribution of mineral resources: iron-ore and bauxite.

Unit- III
Network structure and economic activities, impact of transport on economic activities, Edward Ullman’s spatial interaction model, Location models: Weber, Christaller and Losch models.

Unit- IV
Concept of economic growth and development, globalization and pattern of economic development, Theories of economic development: Modernizing theories; Dependency theories; Expert based model and Basic need theory, Theories of New Economic geography (Krugman).

Suggested Readings:
3. James, D., Wheeler and Peter O., Muller, Economic Geography, New York, John Wiley and Sons.
M.Sc- Geography
Semester- II

GEO-205
Population Geography

Maximum Marks-100
Theory Examination-80
Internal Assessment-20
Max. Time- 3 hrs.

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Student will have to attempt one question from each unit. Each question shall carry equal marks.

Unit- I
Population Geography: Definition, nature and scope, Conceptual framework and historical development, Sources of population data with particular reference to India – census, vital or civil registration system, Sample Registration System.

Unit- II

Unit- III
Components of population change: determinants of fertility and mortality, trends and patterns in fertility and mortality levels in India, Migration: major international migrations, features of internal migration in India, theories of migration, Population composition and characteristics - age and sex composition, literacy, marital status and economic characteristics of population.

Unit- IV
Suggested Readings:

M. Sc.- Geography  
Semester-II  

GEO-206  
Communication Skills  

Maximum Marks-50  
Theory Examination-40  
Internal Assessment-10  
Max. Time- 2 hrs.  

Note: *There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Student will have to attempt one question from each unit. Each question shall carry equal marks.*

**Unit-I**

Human Communication (Theoretical perspective): Its uniqueness, its nature, models of communication. Types of Human communication, Language, non-verbal communication, logic and reasoning, lateral thinking. The concept of facilitating: factors, barriers and filters in communication; the seven C’s of effective communication, Preparing for interviews, CV/Biodata.

**Unit -II**


**Unit -III**


**Unit-IV**

Suggested Readings:

M.Sc- Geography
Semester-II

GEO 207: Practical I
Hydrology and Biogeography
(Based on GEO-201 and GEO-202)

Max. Marks: 40
Time: 3 Hours

Note: The examiner shall set four questions, two from each unit. The candidate shall attempt two questions, one from each unit. Each question will carry ten marks.

Distribution of marks
Exercise 20 marks
Viva voce 08 marks
Record book 12 marks

Unit-I

Hydrology
1. Computation of Water Budget Equation
2. Interpolation of rain-fall data
   (i) Arithmetic mean
   (ii) Theiesson polygon
   (iii) Isohytel methods
3. Construction of Hydrograph
4. Stream Morphometric Analysis

Unit-II

Biogeography
1. Identification of trees/plants in a locality
2. Inventory of bird species in a locality
3. Identification of soil types and characteristics in a locality/village
M.Sc- Geography
Semester-II

GEO 208: Practical II
Field Methods (Socio-Economic), Economic Geography and Population Geography
(Based on GEO-204 and GEO-205)

Max. Marks: 60
Time: 3 Hours

Unit-I
Field Method (Socio-Economic) 20 Marks

Note: Students will perform a field work for seven days and collect primary data using a household schedule and prepare a report on the basis of this data.

Unit-II
Economic and Population Geography 40 Marks

1. Representation of Economic Data
   a. Distribution of Coal and Petroleum in India
   b. Distribution of Iron-ore and Bauxite in India
   c. Construction of isodapane using suitable data
   d. Analysis of sectoral contribution in Haryana/India
   e. Distribution of cultivators, agricultural labours and other workers

2. Representation of Population Data
   a. Population distribution map
   b. Population density map
   c. Age-sex structure of Population
   d. Fertility, mortality and natural growth of population by polygraph
   e. Calculation of life table
M.Sc. Geography  
Semester- III

GEO-301  
Oceanography

MaximumMarks-100  
Theory Examination-80  
Internal Assessment-20  
Max. Time- 3 hrs.

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Student will have to attempt one question from each unit. Each question shall carry equal marks.

Unit I
Definition, Nature and Scope of Oceanography; Oceanography and other branches of knowledge; Distribution Pattern of Land and Water; Origin of Ocean Basins: Wegner’s Drift Hypothesis, Sea Floor Spreading and Plate tectonics.

Unit II
Features of Ocean Basins; Continental Margins and Deep Oceanic Basins; Oceanic Floor Profile: Continental self, Slope, Ridge and Deeps, Abyssal Plains; Submarine Canyons; Coral reefs: Types, Origin and Distribution; Configuration of Ocean Floor of Indian, Atlantic and Pacific Ocean.

Unit III
Ocean Currents: origin, types and dynamics; Currents of Pacific, Atlantic, and Indian ocean; Impact of ocean currents; Physical properties of sea water: Temperature and Density; Chemical properties: Salinity and Dissolved Gases; Waves, Tides and Tsunami.

Unit IV
Life in the Ocean: Bio zones; Types of Organism- Plankton, Nekton and Benthos; Ocean and livelihood; Oceans as Source of Food, Mineral and Energy Sources; Oceans Deposits; Sea Level Change: Evidences and Impacts; Territorial waters and Exclusive Economic Zone. UN Convention on the Law of Sea- Case Studies / Recent developments
**Suggested Readings:**

M.Sc. - Geography  
Semester-III  

GEO- 302  
Geographical Information Systems  

MaximumMarks-100  
Theory Examination-80  
Internal Assessment-20  
Max. Time- 3 hrs.  

Note: There shall be nine questions in all. Question no. 1 is compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Students will have to attempt one question from each unit. Each question shall carry equal marks.  

Unit- I  
GIS: Definition and scope; Components and Elements; Geographic framework: Geoid and Spheroid. Coordinate projection system: Definition and need; Implications of spherical and planar coordinate systems and their transformations in GIS;  

Unit- II  
Geographic Entities: Point, line and Polygon; Data Types: Raster and Vector; Data formats: Spatial and non-spatial; Sources of data input; Generation of Geo-data bases; Data base management system; Spatial topology.  

Unit- III  
Spatial Analysis: Overlay, Neighbourhood and Proximity; Integration of raster and vector data; GIS and Map Production; GIS and Cartography; Bertin’s visual variables.  

Unit- IV  
Fundamentals of Global Positioning System (GPS): Concept and Principles; GPS Segment: Space, Control and User; GPS devices: handle and differential GPS; GPS system: NAVSTAR, GALILIO and GAGAN. Applications of GPS  

Essential Readings:  
Suggested Readings:

8. Elliot Kaplan, Christopher Hegarty; Understanding GPS: Principles and Apllications, 2nd ed., Artech House, Boston
M.Sc. - Geography  
Semester-III  

GEO- 303  
Remote Sensing  

Maximum Marks- 100  
Theory Examination- 80  
Internal Assessment-20  
Max. Time – 3hrs.  

Note: There shall be nine questions in all. Question no. 1 is compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Students will have to attempt one question from each unit. Each question shall carry equal marks.  

Unit- I  
Aerial photography: History, Definition, advantages and limitations; Elements of photographic systems-aerial camera and films; Aerial photographs: Types, scale and resolution; Geometric properties of single vertical aerial photograph, Mirror Stereoscope and Stereoscopic vision; Stereoscopic parallax and relief displacement; Image Interpretation: types of images- Panchromatic, False and True colour combination and elements of image interpretation.  

Unit- II  
Remote sensing- definition, scope and development; Electromagnetic radiation and spectrum; Black body radiation and Kirchhoff’s Law; Interaction of EMR with atmosphere and Earth’s surface features, Atmospheric windows; Orbits: Geo-stationary and sun synchronous; Remote Platforms and sensors; Resolution: Spatial, Radiometric and temporal.  

Unit- III  
Active and Passive remote sensing; Concept and principal of microwave remote sensing: platforms and sensor, Synthetic Aperture Radar (SAR), Hyper Spectral Remote sensing; Indian Space Programmes and remote sensing missions.  

Unit- IV  
Introduction to digital image processing: digital images and data formats; Image restoration: radiometric and geometric corrections; Introduction to contrast stretching techniques; Methods of classification: supervised and unsupervised classifications, accuracy of classified maps and recent trends in digital image processing.  

Essential Readings:  

Suggested Readings:
M.Sc. - Geography  
Semester-III  

GEO- 304  
Urban Geography  

Maximum Marks- 100  
Theory Examination- 80  
Internal Assessment-20  
Max. Time – 3hrs.  

Note: There shall be nine questions in all. Question no. 1 is compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Students will have to attempt one question from each unit. Each question shall carry equal marks.  

Unit-I  
Defining Urban, Urbanization and Urbanism; Urban Geography: Definition, nature and scope; Recent trends in Urban Geography, Urban population characteristics, Methodology in urban studies, Urban systems in Ancient, Medieval and Modern India.  

Unit-II  
City and region; Spatial linkages (rural- urban linkages) and interactions; Rural- Urban fringe, Sub-urbanization; Spatial network framework- Central Place Theory: Christaller, Losch, Walter Isard; Size and spacing of cities: Rank Size Rule, Primate City; Functional classification of cities: concepts and scheme of classification; Social and cultural ramification of cities and towns.  

Unit-III  
Urban Morphology and land use; Models of city structure: Concentric Zone model by E.W. Burgess, Sector model by Homer Hoyet, Multiple nuclei model by Harris and Ullman; Contemporary urban morphology in the wake of globalization-global city.  

Unit-IV  
Urbanisation In India: Patterns and Trends; Urban problems: Environmental problem, overcrowding, transportation and mobility; Urban Inequality: Urban Poverty, Slums & squatter housing, access to housing and amenities; Urban basic services; Quality of Urban Life; Urban Planning in India: National urban policy, Study of master plans of Delhi and Chandigarh; The Smart city.
Essential Readings:

Suggested Readings:
4. Johnson, James; Urban Geography: An Introductory Analysis, 2nd Edition
5. K. Siddharth and S. Mukherji : Cities, Urbanizations and Urban Systems
7. Shah Manzooor Alam : Urbanization in Developing Countries
M.Sc. - Geography  
Semester-III  

GEO- 305  
Geography and Water Resources Management  

Maximum Marks- 100  
Theory Examination- 80  
Internal Assessment-20  
Max. Time – 3hrs.  

Note: There shall be nine questions in all. Question no. 1 is compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Students will have to attempt one question from each unit. Each question shall carry equal marks.  

Unit- I  

Definition, nature and scope of the geography of water resources; distribution of water (surface and subsurface); changing trends in use of water, water crisis in world; Basic hydrological cycle and its components: precipitation, potential evapotranspiration, interception loss, runoff.  

Unit- II  

Water demand and use: methods of estimation, agricultural, industrial and municipal, navigational, power generation, recreational and domestic use of water; Factor affecting water resource development: climatic, physiographic, geologic and technological factors.  

Unit- III  

Problems of water resource management in India: waterlogging, floods, droughts, pollution and water quality parameters; multipurpose river valley projects, dams and their environmental impacts, case study of environmental and socio-economic impacts of Indira Gandhi Canal project and Damodar Valley Corporation  

Unit- IV  

Water Justice: International and interstate river water disputes and treaties with reference to India; Planning and policies of conservation and development of water resources, integrated basin planning and watershed management; water management in urban areas; River interlinking and inter basin transfer of water.
Suggested Readings:
3. Gurjar RK and Jat B.C. 2008, Geography of water resources, Rawat Publications, Jaipur related to water and sanitation
M.Sc. Geography  
Semester-III

GEO- 306
Practical I: Visual Interpretation of Photographs and Images

Maximum Marks- 50  
Max. Time– 3hrs.

Note: The examiner shall set four questions. The candidate shall attempt two questions. Each question will carry twelve marks.

Distribution of marks
Exercise 24 marks  
Viva voce 10 marks  
Record book 16 marks

Interpretation of Aerial Photographs
1. Basic information on aerial photographs (annotation and markings)
2. Identification of Principal Points, Fiducial Points, Conjugate point and Calculation of scale of aerial photographs
3. Determination of flight line and flight direction;
4. Determination of height of objects from single vertical aerial photographs;
5. Test of 3d vision using stereoscope,
6. Parallax bar measurement and height determination from stereo pairs;
7. Identification of objects and features with stereoscope (pocket and mirror) and preparation of thematic maps.

Interpretation of satellite images:
1. Identification, mapping and Interpretation of different natural and cultural features.
2. Comparison of features on panchromatic, true colour and false composite images
3. Preparation of interpretation keys.
4. Preparation of thematic maps i.e. land use and land cover map

Suggested Readings:
M.Sc. Geography
Semester-III

GEO- 307
Practical II: GIS Exercises

Maximum Marks- 50
Max. Time – 3hrs.

Note: The examiner shall set four questions. The candidate shall attempt two questions. Each question will carry twelve marks.

Distribution of marks
Exercise 24 marks
Viva voce 10 marks
Record book 16 marks

• Generation of geographic framework:
  ➢ Topographic maps,
  ➢ Projection,
  ➢ Spheroids (local & spheroids),
  ➢ Georeferencing,
  ➢ Geocoding.

• Generation of geodatabase/ spatial data base
  ➢ Vectorisation (point, line and polygon)
  ➢ Join non-spatial,
  ➢ Editing

• Analysis
  ➢ Query
  ➢ Proximity
  ➢ Overlay
  ➢ Network (morphometric drainage network and road network)

• Symbolization:
  ➢ Chorochromatic,
  ➢ choropleth and
  ➢ Point proportional.

• GPS:
  ➢ Introduction to the GPS and different pages in GPS device.
  ➢ Collection of GCP using GPS devices.
  ➢ Transfer of data in to computer.

Suggested Readings:
1. ArcGIS 10.1 user manuals, 2013
M.Sc. Geography
Semester-IV

GEO-401
Geography and Disaster Management

Maximum Marks-100
Theory Examination-80
Internal Assessment-20
Max. Time- 3 hrs.

Note: There shall be nine questions in all. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Student will have to attempt one question from each unit. Each question shall carry equal marks.

Unit-I
Definition and nature of disasters; Basic concepts: Hazards and Disaster; Classification/Types of Hazards/Disasters; Disaster management: meaning, concept, principal, scope, objectives and approaches; elements of disaster management; Geography and Disaster: Major disaster of world and India.

Unit-II
Tectonic Disasters: Volcano, Earthquake, Tsunami and Landslides; Hydrological Disaster: Floods and Droughts; Climatic Disasters: Cyclones and Heavy precipitation; Human induced Disasters: Industrial and Transport Disaster; Wars and Terrorism induced Disaster.

Unit-III
Disaster Mitigation: Hazard assessment, Vulnerability assessment and affecting factors, risk assessment and affecting factors, protective measures and public information; Disaster Preparedness: Disaster plan, Damage inspection, repair and recovery procedures, communication and control centres, disaster forecasting, warning and prediction.

Unit-IV
Disaster relief: rapid damage assessment, search and rescue operations, Evacuation and shelter, food and medical supply, mass media coverage, relief aid; significance of reconstruction planning; Economic and social rehabilitation; Impact of disaster on society and economic; Disaster Management Policies and mechanism in India; Remote sensing and GIS in disaster management planning.
Suggested Readings:

M.Sc. - Geography
Semester-IV

GEO- 402
Application of GIS and Remote Sensing

MaximumMarks-100
Theory Examination-80
Internal Assessment-20
Max. Time- 3 hrs.

Note: There shall be nine questions in all. Question no. 1 is compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Students will have to attempt one question from each unit. Each question shall carry equal marks.

Unit- I

Urban planning:
Land use change, urban land use planning, growth monitoring, urban sprawl, Municipal application: Cadastral mapping, ward level mapping, utilities and services etc. solid waste management, urban information system.

Unit- II

Disaster Management:
Hazard risk mapping, disaster damage assessment, flood risk extent mapping, drought monitoring, forest and agriculture residue burning, landslide vulnerability assessment.

Unit- III

Agriculture:
Importance of remote sensing in agriculture, double and triple crop mapping, agriculture production forecasting, crop damage assessment, watershed characterization, prioritization and management for development.

Unit- IV

Hydrology & Water Resources Management:
Digital Elevation Models, sources of data for DEM, morphometric drainage network analysis, interpolation methods, run off estimation, methods of estimating evapotranspiration and soil moisture, water balance computation.
Suggested Readings:

M.Sc. Geography
Semester- IV

GEO-403
Regional Development Planning with special reference to India

MaximumMarks-100
Theory Examination-80
Internal Assessment-20
Max. Time- 3 hrs.

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Student will have to attempt one question from each unit. Each question shall carry equal marks.

Unit I

Concept in development and regional studies; regional and spatial disparities, methods of regional delineation, types of planning region, balanced regional development.

Unit II

Development Theories: Trickle-down Theory (Hirschman), Growth Pole Model (Parroux), Cumulative causation model (Myrdal), Core-Periphery Theory (Friedman); Recent Divergence and convergence theories: Kuznets curve, Dependency theory, bio-regionalism, Eco-feminism, Deep ecology, sustainable development.

Unit III

Need for Planning Region; Characteristics of Planning Regions; Planning Process- Sectoral, Temporal and Spatial dimensions; Short-term and Long-term Perspective of Planning; Planning for a Region’s development and Multi-regional planning in National Context; sectoral-spatial development with special reference to agricultural and industrial development in India; decentralization and development; State, civil society and market in the Neo-liberal economic framework; Globalization

Unit IV

Regional Planning in India: Regional Imbalances/Disparities- Causes and Consequences; Measurements of Regional Disparities; Planning Policies for Regional Development; National Capital Region, study of regional development planning and programmes: Backward area development, Tribal area development, Hilly area development, Arid/Desert area development, flood and drought prone areas development and coastal area development.
Recommended Readings:
M.Sc-Geography  
Semester-IV  

GEO-404  
Social Geography  

Maximum Marks- 100  
Theory Examination-80  
Internal Assessment-20  
Max. Time – 3hrs.  

**Note:** There shall be nine questions in all. I shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Students will have to attempt one question from each unit. Each question shall carry equal marks.  

**Unit- I**  
Nature and Scope of Social Geography; Developments in the field of social geography; Concepts in social geography: social differentiation, region formation, social evolution, social change & transformation, social space, social and spatial justice, ethnicity, social wellbeing.  

**Unit-II**  
Elements of socio-cultural regionalism in India; Geography and caste: regional/spatial framework of dominant caste and land inequality, social and spatial segregation/exclusion, regional/cultural forms of untouchability in India- continuity and change; tribes and geographical isolation, tribe as a social formation: scheduled tribes and scheduled areas; regional studies of the major and minor tribes in India.  

**Unit-III**  
Language and dialect, language families, India as a linguistic area, linguistic diversity in India, Greenberg’s linguistic diversity index, Mother tongue, Bi-lingualism, multi-lingualism, language shifts and retention, linguistic regionalism and minority languages; space and religion: religious diversity in India, religious minorities, communalism and space  

**Unit-IV**  
Social Change and transformation in India: Modernization and sanskritization, role of rural urban interaction, problems of social transformation, social wellbeing- overview of concept; social and ethnic diversity of India and national integration: cultural pluralism and development.
Suggested Readings:

M.Sc-Geography
Semester-IV

GEO-405
Agricultural Geography

Maximum Marks- 100
Theory Examination-80
Internal Assessment-20
Max. Time – 3hrs.

Note: There shall be nine questions in all. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Students will have to attempt one question from each unit. Each question shall carry equal marks.

Unit- I

Nature, scope and significance of agricultural geography; Approaches: commodity, systematic, regional; Origin and dispersal of agriculture; gene-centres of agriculture; Determinants of agricultural patterns: physical, technological and cultural factors.

Unit-II

Concepts of land capability classification (U.S. and Britain), Land use survey and Classification (British and Indian), land use and cropping pattern; Agricultural concept and their measurement- (a) intensity of cropping, (b) degree of commercialization, (c) diversification and specialization, (d) agricultural efficiency and productivity, (e) crop combination and concentration; Von Thunen Model of agricultural land use.

Unit-III

Agricultural Regionalisation: Concept and criteria, Whittlesey's agricultural systems; and agricultural typology by Kostrowiki; Agro-climatic Zonation: Concept and agro-climatic regions of India; agricultural regions of India; Regional imbalances in agricultural productivity in India. Green revolution: Its impact and consequences in India.

Unit-IV

Neo-liberalization and Indian agriculture; Food Security: Concept and components, Food Security in India; New Perspectives in Agriculture: Urban agriculture, Contract Farming, Agri-business, Sustainable Agricultural Development; Agriculture and climate change: Impacts and adaptation.
Suggested Readings:
M.Sc. - Geography
Semester-IV

GEO- 406
Practical I: Digital Image Processing Techniques

Maximum Marks- 50
Max. Time – 3hrs.

Note: The examiner shall set four questions. The candidate shall attempt two questions. Each question will carry twelve marks.

Distribution of marks
Exercise 24 marks
Viva voce 10 marks
Record book 16 marks

1. Understand digital image (DN, Reflectance and variance).
2. Generate reflectance spectrum for different land uses/ surface characteristics.
3. Image enhancement techniques.
4. Band Rationing (i.e. NDVI)
5. Supervised classification
6. Unsupervised classification
7. Accuracy assessment

Suggested Reading:

1. ERDAS IMAGINE 2013 user manuals
M.Sc. - Geography
Semester-IV

GEO- 407
Practical II: Application of Remote Sensing and GIS

Maximum Marks- 50
Max. Time – 3hrs.

Distribution of marks
Project Report  30 marks
Presentation  20 marks

Note: Students have to submit a case study report on application of Remote Sensing and GIS techniques to solve/understand well defined problems from different sub-fields of geography.

- Urban Planning
- Disaster Management
- Agriculture and soil management
- Water Resource management
- Economic geography
- Social Geography
- Settlements, land use
- Geomorphology
- Climatology