
SEMESTER IV

4 Papers**Total 100 x 4 = 400 Marks**
I. GENERIC/DISCIPLINE CENTRIC ELECTIVE [ECGEO401A]:
 (Credits: Theory-04, Tutorial-01)

Marks: 30 (MSE: 20Th. 1Hr + 5Attd. + 5Assign.) + 70 (ESE: 3Hrs)=100	Pass Marks (MSE:17 + ESE:28)=45
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Instruction to Question Setter:***Mid Semester Examination (MSE):***

There will be **two** groups of questions in written examinations of 20 marks. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type five** questions of five marks each, out of which any three are to be answered.

End Semester Examination (ESE):

There will be **two** groups of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of five questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type six** questions of fifteen marks each, out of which any four are to be answered.

Note: There may be subdivisions in each question asked in Theory Examinations

The Mid Semester Examination shall have three components. (a) Two Semester Internal Assessment Test (SIA) of 20 Marks each, (b) Class Attendance Score (CAS) of 5 marks and (c) Class Performance Score (CPS) of 5 marks. "**Better of Two**" shall be applicable for computation of marks for SIA.

(Attendance Upto 75%, 1 mark; 75 < Attd. < 80, 2 marks; 80 < Attd. < 85, 3 marks; 85 < Attd. < 90, 4 marks; 90 < Attd., 5 marks).

A. HYDROLOGY AND WATER RESOURCES**Theory: 60 Hours; Tutorial: 15 Hours****Unit 1:**

Definition and scope of hydrology, importance of water, hydrological cycle, water storages – glaciers, river channels, lakes and reservoirs, soil moisture, ground water,

Unit 2:

Surface water: sources and factors affecting quality and quantity; precipitation: forms and factors; interception: factors; runoff: sources and factors affecting runoff; evaporation: measurement and factors; evapotranspiration: control and factors.

Unit 3:

Ground water: characteristics of stream flow, darcy's law, permeability, infiltration, ground water storage, ground water aquifers in different rock systems, movement and discharge.

Unit 4:

Environmental influences on water resources; sectoral demands for water; urban water supply; water management; water harvesting; water pollution and control.

References:

- ☐ Timothy, Davie. 2003. Fundamentals of Hydrology. Routledge, Taylor and Francis Group, U.K.
- ☐ Todd, D.K. 2009. Groundwater Hydrology. John Wiley & Sons Inc.
- ☐ Mahajan, G. 1989. Evaluation and Development of Groundwater. Ashish Publishing House, New Delhi.
- ☐ Karanth, K.R.C. 1988. Ground Water: Exploration, Assessment and Development. Tata-Mcgraw Hill, New Delhi.
- ☐ Andrew D. Ward and Stanley Trimble. 2004(2nd edition). Environmental Hydrology. Lewis Publishers.
- ☐ Wright. R.T and Nebel. B.J. 2002(8th Edition). Environmental Science: Toward a Sustainable Future. Prentice Hall India Ltd.
- ☐ Vijay P. Singh. 1995. Environmental Hydrology. Kluwer Academic Publications, The Netherlands.

- Subramaniam V. 2002. Text Book of Environmental Science. Narosa Publishing House, Delhi.
- Santhosh Kumar Garg. 2007. Hydrology and Water Resources Engineering. Khanna Publishers, Delhi.
- Patra, K.C. 2004. Hydrology and Water Resources Engineering. Narosa Publications, New Delhi.
- Viessmann, Warren., Lewis, Gary. 2002(5th edition) Introduction to Hydrology. Prentice Hall.
- Hendriks Martin. 2010. Introduction to Hydrology. Oxford University Press, London.
- Raghunath H.M.2006. Hydrology: Principles, Analysis and Design. New Age International Publishers , Mysore.

OR**GENERIC/DISCIPLINE CENTRIC ELECTIVE****[ECGEO401B]:**

(Credits: Theory-04, Tutorial-01)

Marks: 30 (MSE: 20Th. 1Hr + 5Attd. + 5Assign.) + 70 (ESE: 3Hrs)=100**Pass Marks (MSE:17 + ESE:28)=45****Instruction to Question Setter:****Mid Semester Examination (MSE):**

There will be **two** groups of questions in written examinations of 20 marks. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type five** questions of five marks each, out of which any three are to be answered.

End Semester Examination (ESE):

There will be **two** groups of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of five questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type six** questions of fifteen marks each, out of which any four are to be answered.

Note: There may be subdivisions in each question asked in Theory Examinations

The Mid Semester Examination shall have three components. (a) Two Semester Internal Assessment Test (SIA) of 20 Marks each, (b) Class Attendance Score (CAS) of 5 marks and (c) Class Performance Score (CPS) of 5 marks. “**Better of Two**” shall be applicable for computation of marks for SIA.

(Attendance Upto75%, 1mark; 75<Attd.<80, 2 marks; 80<Attd.<85, 3 marks; 85<Attd.<90, 4 marks; 90<Attd, 5 marks).

B. REGIONAL PLANNING & DEVELOPMENT**Theory: 60 Hours; Tutorial: 15 Hours****Unit 1:**

Concept of Region: Types, hierarchy and characteristics of regions, Delineation methods of regions – Formal, Functional and Nodal. Geography and regional planning. Concept and scope of Regional Planning. Regional Approaches. Principles, methods, techniques of regional planning, need for planning.

Unit 2:

Conceptual and theoretical frame work of regional planning: Growth pole and growth foci. Planning Processes: Sectoral, Multilevel, decentralized planning. Integrated Area Development Planning (IADP). Planning for tribal and hill areas, drought prone areas, command areas and watershed. Planning for metropolitan region: CDP, satellite towns, urban green belt.

Unit 3:

Concept of Development, Indicators of development. Regional imbalance. Regional development strategies. Problems and issues in regional planning. Sustainable development of regions. Regionalization of India: Based on natural, economic and administration (macro and meso levels only).

Unit 4:

Theories of regional development: Central Place Theory, Diffusion theory (Hegerstand's). The role of locational theories in regional planning process. An evaluation of regional disparities / imbalances – backward regions of India. Identification of backward areas, Planning backward area. Harnessing the information through GIS, Remote Sensing, GPS for regional planning and development.

References:

- Tiwari R. C. (2005) Geography of India, Prayoug Pustak Bhavan, Allahabad.
 - Singh Jagadish (2003) India – A Comprehensive Systematic Geography, Gyanodaya Prakashan, Gorakhpur, U.P.
 - Mishra R. P (1969) Regional Planning Concepts Techniques Policies and case studies, Prasaraanga, The Mysore University, Mysore.
 - V.K.R.V. Rao (1978). Planning in Perspective, Allied Publishers Private Limited, Bombay.
 - Mahesh Chand and Viney K. Puri (1985) Regional Planning in India, Allied Publishers Pvt. Ltd., Bombay.
 - Mishra R.P. (1979) Regional Planning and National Development, Vikas Publishing House Pvt. Ltd., New Delhi.
 - Laxmidevi (1997) Planning Development and Regional Disparities, Anmol Publication Pvt. Ltd., New Delhi.
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OR**GENERIC/ DISCIPLINE CENTRIC ELECTIVE [ECGEO401C]:**

(Credits: Theory-04, Tutorial-01)

Marks: 30 (MSE: 20Th. 1Hr + 5Attd. + 5Assign.) + 70 (ESE: 3Hrs)=100	Pass Marks (MSE:17 + ESE:28)=45
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Instruction to Question Setter:**Mid Semester Examination (MSE):**

There will be **two** groups of questions in written examinations of 20 marks. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type five** questions of five marks each, out of which any three are to be answered.

End Semester Examination (ESE):

There will be **two** groups of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of five questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type six** questions of fifteen marks each, out of which any four are to be answered.

Note: There may be subdivisions in each question asked in Theory Examinations

The Mid Semester Examination shall have three components. (a) Two Semester Internal Assessment Test (SIA) of 20 Marks each, (b) Class Attendance Score (CAS) of 5 marks and (c) Class Performance Score (CPS) of 5 marks. "**Better of Two**" shall be applicable for computation of marks for SIA.

(Attendance Upto 75%, 1 mark; 75 < Attd. < 80, 2 marks; 80 < Attd. < 85, 3 marks; 85 < Attd. < 90, 4 marks; 90 < Attd., 5 marks).

C. ENVIRONMENTAL GEOGRAPHY Theory: 60 Hours; Tutorial: 15 Hours**Unit 1:**

Nature and Interdisciplinary Aspect of Environmental Geography. Ecological Approaches. Definition and Meaning of environment. Habitat. Ecological Niche. Bio-sphere and Biodiversity.

Unit 2:

Ecosystem: Structure and Functioning of Ecosystem, Pond as a Ecosystem, Food Chains, Food Webs, Food Pyramid. Biomes – Equatorial to Tundra i.e 11 types. Man and Environmental Relationships. Resource Use and Ecological Imbalance with reference to Soil, Forests and Energy Resources. Man Made Ecosystem - Urban, Ecotourism, National Parks and Sanctuaries. Depletion of Ozone, Green House Effect and Acid Rain.

Unit 3:

Man Induced Changes in Environment: Environmental Pollution, i.e. Air, Water, Noise, Solid Waste with special reference to India. Environmental Hazards, i.e. earth as Warehouses, Flood, Famines, Land Slides, Avalanches, Forest Fires, Impact of Green revolution and Extinction of Species.

Unit 4:

Principles of Environmental Management- Environmental Policy of India, (post 2000AD). Environment Impact Assessment (EIA). Global Summits and Agencies of Environment Conservation.

References

- Strahler A.N. (1968) The Earth Sciences, Harper International Education, New York.
- Richard H.B. (2004) Physical Geography, Heinmann Simple Services, Rupa & Company, New Delhi
- Robinson H. (1982) Bio Geography, ELBS, New York.
- Healey I.N. and Moore P.D. (1973) Bio-Geography, Backwell Oxford, U.K.
- Strahler A.N. and Strahler A.H. (1973) Environmental Geo Science, Hamilton, California.
- Savindra Singh (2004) Environmental Geography, Prawalika Publication, Allahabad,
- Savindra Singh (2004) Pryawaran Bhugol, Prawalika Publication, Allahabad,
- Paul Selman (2000) Environmental Planning, Sage Publicatoins, New Delhi.
- Tiwari, Ram Kumar (2005): Pryawaran Adhyayan, Luxmi Publications, New Delhi.
- Rao, B.P. (2000): Paryawaran Bhugol, Vasundhara Prakashan, Gorakhpur.
- Strahler A.N. and Strahler A.H. (1977) Geography and Man's Environment, John Wiley & Sons, N.York.