UNIVERSITY OF KALYANI

Syllabus for Undergraduate Programmes in Geography

Semester: V - VI

Under Curriculum and Credit Framework for Undergraduate Programmes (CCFUP) as per NEP, 2020

With Effect from the Academic Session 2023-2024

SEMESTER WISE COURSE STRUCTURE: UNDERGRADUATE PROGRAMMES IN GEOGRAPHY (AS PER NEP 2020)

SEMESTER V							
Course Code	**Course Title**	**Nature of Course**	**Credit of Course**	**Class hour/week**	**Evaluation**		**Total Marks**
					Internal	**Semester End**	
GEOG-M-T-6	HYDROLOGY AND OCEANOGRAPHY	Major	6	6	15	60	75
GEOG-M-P-7	MAP PROJECTION, MAP INTERPRETATION AND IDENTIFICATION OF ROCKS AND MINERALS	Major	6	6	15	60	75
GEOG-MI-T-3	ECONOMIC GEOGRAPHY	Minor	4	4	10	40	50
–	–	Minor	4	4	10	40	50
04			**20**	**20**	**50**	**200**	**250**

SEMESTER VI							
Course Code	**Course Title**	**Nature of Course**	**Credit of Course**	**Class hour/week**	**Evaluation**		**Total Marks**
					Internal	**Semester End**	
GEOG-M-T-8	ECONOMIC GEOGRAPHY AND GEOGRAPHY OF INDIA	Major	6	6	15	60	75
GEOG-M-T-9	GEOGRAPHICAL THOUGHT	Major	6	6	15	60	75
GEOG-M-P-10	QUANTITATIVE TECHNIQUES IN GEOGRAPHY	Major	6	6	15	60	75
GEOG-M-P-11	-	(Outreach/ Internship)	2	2			
03			**20**	**20**	**45**	**180**	**225**

SEMESTER V

Type: Major
PAPER: VI (Theory)
COURSE CODE: GEOG-M-T-6
COURSE TITLE: HYDROLOGY AND OCEANOGRAPHY

Total Marks: 75 **Credits: 6**

Course Evaluation: Semester End Examination (60 Marks) and Internal Assessment (15 Marks)

Course Objectives:

- To understand the fundamental concepts in hydrology and oceanography
- To study the hydrological cycle, aquifers, principles of groundwater, concept of basin hydrology and hydrological measurements
- To study the relief of oceans, composition of ocean water, ocean water movement, and ocean water deposits
- To analyse integrated water resources management system and marine hazards

Course Learning Outcomes:

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

- understand fundamental knowledge in hydrology and oceanography
- obtain adequate knowledge on global hydrological cycle, surface and groundwater movements, ocean water movement
- acquire comprehensive knowledge of integrated water resources management and methods of water conservation
- understand the dynamic nature of the aquifers and oceans

Professional Skill Development Opportunities of the Course:

The obtained fundamental knowledge and concept of this course will increase the interest of the learners for further study and research in Physical Geography and water resources. This course is also effective in developing observational skills and critical thinking abilities of the learners.

Course Content:

UNIT I: HYDROLOGY

1. Scope and content of Hydrology
2. Global hydrological cycle: Concept and significance; Concept of water budget
3. Principles of groundwater: Storage, movement and discharge; Aquifers: Types and issues related to overutilization
4. Concept of basin hydrology and run off cycle
5. Unit hydrograph, rating curve and their applications
6. Concept of integrated water resources management; Methods of water conservation: Rainwater harvesting and watershed management

UNIT II: OCEANOGRAPHY

1. Relief of oceans; bottom reliefs of Atlantic, Pacific and Indian Oceans
2. Composition of ocean water: Temperature, density and salinity; T-S Diagram
3. Ocean water movement: Warm and cold currents of Atlantic, Pacific and Indian Oceans, waves, tides
4. Coral reefs: Theories of origin, favourable conditions, types, coral bleaching
5. Ocean water deposits
6. Marine resources: classification, significance and sustainable use

Suggested Readings:

- Basu, S.K. (2003). *Hand Book of Oceanography*. Global Vision Publishing House, Delhi.
- Chow, V., Maidment, D. and Mays, L. (2017). Applied Hydrology, McGraw Hill Education, New York.
- Davie, T. (2008). Fundamentals of Hydrology, 2nd edition, Routledge, London.
- Jenkins, J.T. (1921). *A textbook of Oceanography*. Constable and Company Publication, London.
- Lal, D.S. (2023). *Oceanography*. Sharda Pustak Bhawan, Prayagraj.
- Reddy, P. J. R. (2011). A Text Book of Hydrology, 3rd edition, USP pub.
- Sharma, R.C. & Vatal, M. (2017). *Oceanography for Geographers*. Surjeet Publications, Delhi.
- Singh, S. (2021). *Oceanography*. Pravalika Publications, Allahabad.
- Trujillo, A.P. & Thurman, H.V. (2016). *Essentials of Oceanography*. Pearson Publication, Noida.

SEMESTER V

Type: Major
PAPER: VII (Practical)
COURSE CODE: GEOG-M-P-7
COURSE TITLE: MAP PROJECTION, MAP INTERPRETATION AND IDENTIFICATION OF ROCKS AND MINERALS

Total Marks: 75 **Credits: 6**

Course Evaluation: Semester End Examination (50+10* = 60 Marks) and Internal Assessment (15 Marks)
***Laboratory Note Book + Viva-voce: 5+5 = 10**

***Course Objectives**:*

- To develop knowledge and skills in Map Projections, Map interpretation and identification of Rocks and Minerals
- To develop ability and skills in calculating and drawing Map Projections
- To enhance ability in Morphometric Analysis on Drainage Basin
- To develop ability and skills in interpreting Topographical Maps
- To develop ability and skills in interpreting Geological maps
- To enhance ability and skills in megascopic identification of Rocks and Minerals

Course Learning Outcomes:
After the completion of course, the learners will have ability to:

- acquire practical knowledge and skills in Map Projections, Map interpretation and identification of Rocks and Minerals
- improve ability and skills in calculating and drawing Map Projections
- acquire knowledge and skills in Morphometric Analysis on Drainage Basin and to interpret appropriately
- develop expertise in Geological Map interpretation
- Improve ability and expertise in megascopic identification of Rocks and Minerals

***Professional Skill Development Opportunities of the Course**:*
The course will help the learners to build basic foundation for further studies and research in Map Projection, Topographical and Geological Maps interpretation and megascopic identification of rocks and minerals. This course will be highly effective to enhance data analysis skills, analytical skills, spatial analysis skills, observational skills and data visualisation skills. This course also offers employment opportunities.

Course Content:

1. Map Projections: Classification, properties and uses; concept and significance of UTM projection
2. Construction of Projections: Simple Conical with One Standard Parallel Projection, Bonne's Projection, Cyllindrical Equal Area Projection, Mercator's Projection and Polar Zenithal Stereographic Projection
3. Construction and Interpretation of Relief Profiles (Superimposed, Projected and Composite) on Topographical Map (SOI, R.F. 1:50,000)

4. Preparation and Interpretation of Relative Relief Map and Average Slope Map (Wentworth's Method) on a Drainage Basin from Topographical Map (SOI, R.F. 1:50,000)
5. Preparation and Interpretation of Stream Order Maps (After Horton and Strahler) on a Drainage Basin from Topographical Map (SOI, R.F. 1:50,000)
6. Transect Chart: Relationship between physical and cultural features from Topographical Map (SOI, R.F. 1:50,000)
7. Geological Map (Horizontal, Uniclinal, Folded and Faulted Structure): Drawing Geological Section and Interpretation of the Map
8. Megascopic Identification of Rocks and Minerals -

   Rocks: Granite, Basalt, Dolerite, Shale, Sandstone, Limestone, Conglomerate, Laterite, Slate, Phyllite, Schist, Marble, Quartzite and Gneiss

   Minerals: Talc, Gypsum, Calcite, Mica, Feldspar, Quartz, Chalcopyrite, Hematite, Magnetite Bauxite and Galena

Suggested Readings:

- Mishra, R. P. and Ramesh, A., (1989). Fundamentals of Cartography, Concept, New Delhi.
- Monkhouse, F. J. and Wilkinson H. R., (1971). Maps and Diagrams: Their Compilation and Construction, Methuen & Co Ltd., London.
- Robinson, A.H., Morrison, J.L., Muehrcke, P.C., Kimerling, A.J. and Guptill, S.C., (2009). Elements of Cartography, Wiley India Pvt. Ltd., New Delhi.
- Sarkar, A., (2015). Practical Geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi.
- Singh, R. L. and Singh, R. P. B., (1999). Elements of Practical Geography, Kalyani Publishers.
- Spencer, E.W. (2017). Geologic Maps: A Practical Guide to Preparation and Interpretation, Waveland Press.
- Steers, J. A., (1970). Introduction to the Study of Map Projections, University of London Press, London.
- Zavoianu, I., (2011). Morphometry of Drainage Basins, Volume 20, Elsevier Science.

SEMESTER V

Type: Minor
PAPER: III (Theory)
COURSE CODE: GEOG-MI-T-3
COURSE TITLE: ECONOMIC GEOGRAPHY

Total Marks: 50 **Credits: 4**
Course Evaluation: Semester End Examination (40 Marks) and Internal Assessment (10 Marks)

Course Objectives:

- To introduce the fundamental knowledge of Economic Geography and its different dimensions
- To explain the economic theories and approaches to economic processes and typologies
- To make aware about the problem-solving approaches of Economic Geography to industrial and transport plan

Course Learning Outcomes*:*

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

- connect economic theories with geographical phenomena.
- get a geographical perspective to examine economic phenomena, including transport effectiveness.
- practically evaluate the problems of economic thoughts and commodification systems.

Professional Skill Development Opportunities of the Course*:*

This course will help the learners in developing analytical skills, observational skills and critical thinking abilities:

- Students will be able to analyse economic processes theoretically and contribute to policy design.
- Students will be skilled in handling the syllabus for All India basis competitive exams.
- Students will be skilled in employing the modern techniques of GIS to evaluate economic problems

Course Content:

1. Definition, approaches and fundamental concepts of Economic Geography
2. Locational theories – Agriculture (von Thunen) and industry (Weber)
3. Determination of market area: theory of Losch
4. Primary activities – Shifting cultivation, intensive subsistence farming, commercial grain farming, commercial dairy farming, plantation, commercial fishing
5. Primary activities - Mining: Iron ore, coal and petroleum
6. Secondary activities – Iron and steel industry, cotton textile industry and petro-chemical industry
7. Tertiary activities – Modes of transportation, patterns of international trade
8. Quaternary activities: Information and communication technology industry
9. GATT and WTO: Functions and relevance
10. Regional blocks in international trade: SAARC, OPEC, EU

Suggested Readings:

- Alexander J. W. (1963). Economic Geography, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
- Bagchi-Sen S. and Smith H. L. (2006). Economic Geography: Past, Present and Future, Taylor and Francis.
- Coe N. M., Kelly P. F. and Yeung H. W. (2007). Economic Geography: A Contemporary Introduction, Wiley-Blackwell.
- Combes P., Mayer T. and Thisse J. F. (2008). Economic Geography: The Integration of Regions and Nations, Princeton University Press.
- Durand L. (1961). Economic Geography, Crowell.
- Dutta, R., and Sundaram, K. P. M. (1999). Indian Economy. S. Chand and Company Limited, New Delhi
- Galina, S., and Sengupta, P. (1967). Economic Regionalisation of India, Census of India
- Hodder B. W. and Lee R. (1974). Economic Geography, Taylor and Francis.
- Sharma, T. C. (2013). Economic Geography of India. Rawat Publication, Jaipur
- Wheeler J. O. (1998). Economic Geography, Wiley.
- Willington D. E. (2008). Economic Geography, Husband Press.

SEMESTER VI

Type: Major
PAPER: VIII (Theory)
CODE: GEOG-M-T-8
COURSE TITLE: ECONOMIC GEOGRAPHYAND GEOGRAPHY OF INDIA
Total Marks: 75 **Credits: 6**
Course Evaluation: Semester End Examination (60 Marks) and Internal Assessment (15 Marks)

Course Objectives:

- To introduce the fundamental knowledge of Economic Geography and its different dimensions
- To explain the economic theories and approaches to economic processes and typologies
- To make aware about the problem-solving approaches of Economic Geography to industrial and transport plan
- To acquaint the student with the physiography, climate, soil, vegetation, population dynamics of India
- To study agriculture, mineral and power resources in India
- To evaluate industrial development in India

Course Learning Outcomes:

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

- connect economic theories with geographical phenomena
- get a geographical perspective of economic phenomena, including transport effectiveness.
- evaluate the problems of economic thoughts and commodification systems practically
- acquire clear knowledge on physiography, climate, soil, vegetation, population dynamics of India
- familiarise with the population distribution, growth and population policies adopted in India
- acquire knowledge on mineral and power resources
- understand the nature and development of agriculture and industry

Professional Skill Development Opportunities of the Course:

This course will help the learners in developing analytical skills, observational skills and critical thinking abilities:

- Students will be able to analyse economic processes theoretically and contribute to policy design.
- The acquire knowledge will help the learners to build better foundation for further studies and research in Geography of India.
- Students will be skilled in employing the modern techniques of GIS to evaluate economic problems with reference to India
- Students will be skilled in handling the syllabus for All India basis competitive exams.

Course Content:

UNIT I: ECONOMIC GEOGRAPHY

1. Definition, Approaches and Fundamental Concepts of Economic Geography
2. New Economic Geography and the tenets of Political Economy
3. Locational Theories – Agriculture (Von Thunen) and Industry (Weber)
4. Determination of market areas: Theories of Losch and Palander

5. Economic Activities – Primary: Intensive Subsistence Farming, Commercial Grain Farming, Plantation, Commercial Fishing, and Mining (iron ore, coal and petroleum); Secondary: – Cotton Textile Industry, Petro-Chemical Industry, Major Manufacturing Regions; Tertiary and Quaternary: – Modes of Transportation, Patterns of International Trade, and Information and Communication Technology Industry
6. GATT, WTO, TRIPS, SAARC, OPEC, and EU: Objective, function and relevance

UNIT II: GEOGRAPHY OF INDIA

1. Physical: Geology and Physiographic Divisions; Climate, drainage, soil and vegetation
2. Population: Distribution, growth and policies
3. Settlement System - Rural Settlement: Types and patterns; Urban settlement: Concept and functional classification
4. Resource Base – Livestock (cattle and fisheries), energy resource (coal and hydroelectricity), minerals (iron ore and bauxite).
5. Economy – Agriculture (Rice, Wheat, Sugarcane, Groundnut, Jute, and Cotton); Industries (Cotton Textile, Iron-Steel, Automobile and information technology), Transportation Modes (Road and Rail).
6. Regional planning and developmental issues in North-East India, Damodar Valley region and Sundarban delta

Suggested Readings:

- Deshpande, C. D. (1992). India: A Regional Interpretation, ICSSR, New Delhi
- Wadia, D.N. (1919). Geology of India. London: Macmillan & Co. Ltd.
- Dutta, R., and Sundaram, K. P. M. (1999). Indian Economy. S. Chand and Company Limited, New Delhi
- Galina, S., and Sengupta, P. (1967). Economic Regionalisation of India, Census of India
- Johnson, B. L. C., (ed.) (2001). Geographical Dictionary of India, Vision Books, New Delhi
- Khullar, D. R. (2014). India: A Comprehensive Geography, Kalyani publishers
- Mamoria, C. B. (1996). Economic and Commercial Geography of India. Revised edition, Shivlal Aggarwala and Co., Agra
- Mandal, R. B. (ed.) (1990). Patterns of Regional Geography – An International Perspective, Vol. 3 – Indian Perspective
- Pathak, C. R. (2003). Spatial Structure and Processes of Development in India. Regional Science Assoc., Kolkata
- Sharma, T. C. (2013). Economic Geography of India. Rawat Publication, Jaipur
- Singh, J. (2003). India - A Comprehensive & Systematic Geography, Gyanodaya Prakashan, Gorakhpur
- Singh, R. L. (1971). India: A Regional Geography, National Geographical Society of India
- Spate, O. H. K., and Learmonth, A. T. A. (1967). India and Pakistan: A General and Regional Geography, Methuen
- Tiwari, R. C. (2007). Geography of India. Prayag Pustak Bhawan, Allahabad

SEMESTER VI

Type: Major
PAPER: IX (Theory)
COURSE CODE: GEOG-M-T-9
COURSE TITLE: GEOGRAPHICAL THOUGHT

Total Marks: 75 **Credits: 6**
Course Evaluation: Semester End Examination (60 Marks) and Internal Assessment (15 Marks)

Course Objectives:

- To obtain fundamental knowledge of Geographical Thought
- To study the development of Geographical knowledge during ancient and medieval periods
- To study the development of Geography during the Age of Discovery
- To study the development of Geography during the classical period
- To study the development of Modern Geography
- To study the recent development of Geography

Course Learning Outcomes*:*

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

- familiarise with the evolution of Geographical Thought
- understand the fundamental Philosophical basis of Geography
- familiarise with the changing paradigm shift in Geography
- acquire clear knowledge of theoretical and methodological development of Geography

Professional Skill Development Opportunities of the Course*:*

The acquire knowledge of this course will increase the interest of the learners for further study in the evolution of Geographical Thought. This course will be helpful to the learners in developing critical thinking abilities and analytical skills.

Course Content:

1. Concept of space in Geography: Material space and social space; Spatial process and pattern; Spatial organisation; Spatial relationship; Spatial interaction and spatial integration
2. Contributions of Greek, Roman, Chinese and Indian scholars in the development of geographical knowledge during the ancient period
3. Contributions of Arab Scholars in the development of Geography during the medieval period
4. Transition from Cosmography to Scientific Geography: Contributions of Bernard Varenius and Immanuel Kant
5. Dualism and Dichotomies: Physical and Human Geography; Regional and Systematic Geography; Determinism and Possibilism, Ideographic and Nomothetic
6. Contributions of Alexander von Humboldt and Carl Ritter to the foundation of Modern Geography
7. Contributions of Friedrich Ratzel, Ferdinand von Richthofen, and Alfred Hettner to the foundation of Modern Geography
8. Schools of Geographical thought: French, British and American

9. Evolution of Geographical thought in India since 20th century
10. Positivism and Quantitative Revolution in Geography
11. Critical Revolution in Geography, Humanistic, Behavourial, Radical and Welfare approaches in Geography
12. Feminism and Feminist Geography, Postmodernism and Postmodern Geography

Suggested Readings:

- Adhikari, S., (2015). Fundamentals of Geographical Thought, Orient Blackswan Pvt. Ltd., Hyderabad.
- Dikshit R. D., (1997): Geographical Thought: A Contextual History of Ideas, Prentice– Hall India.
- Hartshorne, R., (1939). The Nature of Geography: A Critical Survey of Current Thought in the Light of the Past, Association of American Geographers, Washington.
- Hartshorne, R., (1959). Perspective on the Nature of Geography, Association of American Geographers, Washington.
- Harvey, D., (1969). Explanation in Geography, Edward Arnold, London.
- Hussain, M., (2015). Evolution of Geographical Thought, sixth edition, Rawat Publications, Jaipur.
- Johnston, R. J., and Sidaway, J. D., (2004). Geography & Geographers: Anglo-American Human Geography since 1945, sixth edition, Arnold, London.
- Johnston, R.J., Gregory, D., Pratt, G. and Watts, M. (eds), (2000). The Dictionary of Human Geography, fourth edition, Blackwell Publishers, New Jersey.
- Moss, P.(ed), (2002). Feminist Geography in Practice: Research and Methods, Wiley-Blackwell, New Jersey.
- Peet, R., (1998). Modern Geographical Thought, Wiley, New Jersey.
- Smith, D. M., (1977). Human geography: a welfare approach, Edward Arnold, London.
- Soja, E.W., (1989). Postmodern Geographies: The Reassertion of Space in Critical Social Theory, Verso, London.

SEMESTER VI

Type: Major
PAPER: X (Practical)
COURSE CODE: GEOG-M-P-10
COURSE TITLE: QUANTITATIVE TECHNIQUES IN GEOGRAPHY

Total Marks: 75 **Credits: 6**

Course Evaluation: Semester End Examination (50+10* = 60 Marks) and Internal Assessment (15 Marks)

***Laboratory Note Book + Viva-voce: 5+5 = 10**

***Course Objectives**:*

- To develop practical knowledge in applying quantitative techniques in Geography
- To develop ability, skills and expertise in data tabulation, data analysis and interpretation
- To enhance ability in graphical presentation of Geographical data
- To develop ability to solve Geographic questions using quantitative techniques

Course Learning Outcomes:

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

- acquire practical knowledge and skills in the application of quantitative techniques in Geography
- Enhance ability and skills in tabulation, analysis and interpretation of Geographical data
- acquire knowledge and skills in in graphical presentation of Geographical data
- develop expertise in quantitative analysis of Geographical issues

***Professional Skill Development Opportunities of the Course**:*

The course will be effective to build basic foundation of the learners for further studies and research in the application of quantitative techniques to solve Geographic questions. This course will be highly efficient to enhance data analysis skills, analytical skills, spatial analysis skills, critical thinking skills, observational skills and data visualisation skills. This course offers employment opportunities.

Course Content:

1. Nature and classification of data: Discrete and Continuous Data; Spatial and Non-spatial data, Population and Samples; Scales of Measurement: Nominal, Ordinal, Interval and Ratio; Sources of Data
2. Tabulation and Formation of Statistical Tables and Graphical Representation: Histogram, Frequency Polygon, Frequency Curve and Ogives
3. Measures of Central Tendency: Mean, Median and Mode
4. Measures of Dispersion: Mean Deviation, Standard Deviation and Coefficient of Variation
5. Concept of Probability and Normal Distribution, Skewness (Pearson's method); Z-score
6. Sampling: Sampling plans for spatial and non-spatial data, sampling distributions, sampling estimates for large and small samples tests involving means and proportions
7. Correlation and Regression Analysis: Rank Correlation and Product Moment Correlation; Scatter Diagram and Linear Regression using Least Square method, Residuals from Regression
8. Time Series Analysis: Time Series Components, Moving Mean method, Least Square method

Suggested Readings:

- Alvi, Z., (2002). Statistical Geography: Methods & Applications, Rawat Publications, Jaipur.
- Dadson, S.J., (2017). Statistical Analysis of Geographical Data: An Introduction, John Wiley & Sons Ltd., Sussex.
- Das, N. G., (2017). Statistical Methods (combined volumes) McGrew Hill Education.
- Mahmood, A., (1999). Statistical Methods in Geographical Studies, Rajesh Publications, Delhi.
- McCarroll, D. (2017). Simple Statistical Tests for Geography, CRC Press, Taylor & Francis Group, Florida.
- Pal, S.K., (1998). Statistics for Geoscientists: Techniques and Applications, Concept publishing Company, New Delhi.
- Robinson, G.M., (1998). Methods and Techniques in Human Geography, John Wiley & Sons Ltd., New Jersey.
- Rogerson, P., (2001). Statistical Methods for Geography, Sage Publications Ltd., London.
- Silk, J., (1979). Statistical Concepts in Geography, George Allen & Unwin, London.
- Spiegel, M. R. and Stephens, L.J., (2017). Schaum's Outline of Statistics, McGraw-Hill.
- Walford, N., (1995). Geographical Data Analysis, John Wiley & Sons, Chichester.