

Syllabus Geography (Major & Minor)

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NEP-2020 and UGC-CCFUP, 2022 based CBCS
Syllabus for 4-Year Undergraduate
Honours/Honours with Research Course in
GEOGRAPHY



BANKURA UNIVERSITY

Bankura, West Bengal, 722155



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1. Introduction

The syllabus for Geography at undergraduate level using the Choice Based Credit System (CBCS) has been framed in compliance with model syllabus given by the UGC. The structure of the syllabus is based on the NEP-2020 proposed student centric “Curriculum and Credit Framework for Undergraduate Programme” (CCFUP-2022), incorporating a flexible CBCS, multidisciplinary approach with multiple entry-exit options in view of preparing students in the current competitive job scenario.

The main objective of framing this new syllabus is to give the students a holistic understanding of the subject, giving substantial weightage to both the core contents and techniques used in Geography. The syllabus has given equal importance to both the two main branches of geography – Physical and Human.

The aim of the syllabus is to prepare the students of Geography as good, socially conscious, thoughtful, well-rounded and creative individuals so that at the end of the course they are able to secure a job and can contribute beneficially to the process of nation building. Keeping in mind and in tune with the changing nature of the subject, adequate emphasis has been given on new techniques of mapping and understanding of the subject.

The syllabus has also been framed in such a way that the students can easily exit at different levels with basic skillsets and general understanding of the discipline to be able to fit for the current job market.

The syllabus has introduced a number of new DSE (Discipline Specific Electives) keeping in view the changing nature of the discipline. The introduction of *Geography of Tourism, Rural Development, Political Geography, Medical Geography and Climate Change Vulnerability and Adaptation* will definitely boost students’ analytical skills and the *Computer Applications in Geography* will enable students to develop their data analysis and interpretation skill which will definitely boost their zeal for higher study and research.



2. Scheme for CBCS Curriculum

2.1 Credit Distribution across Courses

Course Type	Number of Papers	Number of Credits	
		Theory*	Practical
Core Courses (MJC)	18	12 x 3 =36 12 x 1 =12	6 x 4 =24
Discipline Specific Electives (MJE)	6	6 x 3 =18 6 x 1 =6	
Minor Courses (MN)	8	4 x 3 =12 4 x 1 =4	4 x 4 =16
Multidisciplinary Courses (MD)	3		3 x 3 =9
Ability Enhancement Language Courses (AEC)	4	4 x 2 =8	
Skill Enhancement Courses (SEC)	3		3 x 3 =9
Value Added Courses (VAC)	2	2 x 4 =8	
Summer Internship (INT)*	1		1 x 2 =2
Research Project (RP)*	1		1 x 12 =12*
Total Papers/Credits	46	104 (92)	60 (72)*

*Tutorials of 1 Credit will be conducted in case there is no practical component.

*Students who want to exit after first or second year have to complete one **Summer Internship** of 4 credits in addition to the 40 credits of First Year and 82 credits after Second Year.

*Students have to successfully complete a **Summer Internship** of 2 credits in Semester-V to qualify for the Degree in Geography.

*Honours with Research in Geography can be awarded to a student if he/she completes Research Project of 12 credits (in lieu of 3 DSE papers of Semester-VIII) with total 164 credits (Theory-92 + Practical-72) in all Semesters.

**2.2 Major Courses (MJ)**

Major Core (MJC)				
Year	Course Title	Semester	Theory	Practical
First	Fundamentals of Physical Geography	I	T	
	Fundamentals of Human Geography	II	T	
Second	Climatology	III	T	
	Statistical Methods in Geography	III		P
	Regional Planning and Development	IV	T	
	Geography of Economic Activities	IV	T	
	Mapping Techniques in Geography	IV		P
Third	Cartograms and Spatial Mapping	IV		P
	Geography of India and West Bengal	V	T	
	Hydrology and Oceanography	V	T	
	Techniques in Environmental Geography	V		P
	Soil and Biogeography	VI	T	
	Evolution of Geographical Thought	VI	T	
Fourth	Remote Sensing Techniques	VI		P
	Population Geography	VII	T	
	Urban Geography	VII	T	
	Research Methodology and Field Work	VII		P
	Disaster Management	VIII	T	
Major Electives (MJE)				
Third	Advanced Geomorphology Or, Cultural and Settlement Geography	V	T	Any one
	Geography of Tourism Or, Political Geography	VI	T	Any one
Fourth	Climate Change Vulnerability and Adaptation Or, Rural Development	VII	T	Any one
	Geography of Transport and Trade*	VIII	T	
	Medical Geography*	VIII	T	
	Historical Geography*	VIII	T	

*Students opt for Project Work of 12 credits in Semester-VIII will not have to study DSE-8, 9 & 10

2.3: Minor Courses (MN)

Sl. No	Course Title	Semester	Theory	Practical
1.	Fundamentals of Physical Geography	I	T	
2.	Fundamentals of Human Geography	II	T	
3.	Climatology	III	T	
4.	Cartograms and Spatial Mapping	IV		P
5.	Regional Planning and Development	V	T	
6.	Statistical Methods in Geography	VI		P
7.	Disaster Management	VII	T	
8.	Remote Sensing Techniques	VIII		P



2.4: Multidisciplinary Courses (MD)

Sl. No	Course Title	Semester	Theory	Practical
1.	Surveying and Mapping Techniques	I		P
2.	GIS and GNSS	II		P
3.	Remote Sensing Techniques	III		P

2.5: Skill Enhancement Courses (SEC)

Sl. No	Course Title	Semester	Theory	Practical
1.	Elementary Practicals in Geography	I		P
2.	GIS and GNSS	II		P
3.	Computer Applications in Geography	III		P

2.6: Summer Internship (INT)

Year	Conditions	Credits	Course Type
First	The students who want to exit after first year for Certificate Course in Geography have to secure 4 credits in addition to 40 credits after successfully completing Summer Internship/Apprenticeship (in Semester-I or II) in a firm, industry or organization or Training in Labs or any government office/organization as may be decided by the department or college. Those who completed Summer Internship of 4 credits in First Year will be allowed to re-enter the degree programme within three years and complete it within the stipulated maximum of seven years.	4 (Additional for Certificate Course in Geography)	Practical
Second	The students who want to exit after second year for Diploma in Geography have to secure 4 credits in addition to 82 credits after successfully completing Summer Internship/Apprenticeship (in Semester-I, II, III or IV) in a firm, industry or organization or Training in Labs or any government office/organization as may be decided by the department or college. Those who completed Summer Internship of 4 credits in Second Year will be allowed to re-enter within three years and complete the degree programme within the maximum period of seven years.	4 (Additional for Diploma in Geography)	Practical
Third	The students who want Degree in Geography have to secure mandatory 2 credits in addition to 124 credits after successfully completing Summer Internship/Apprenticeship (in Semester-V) in a firm, industry or organization or Training in Labs or any government office/organization as may be decided by the department or college.	2 (Mandatory for Degree in Geography)	Practical



3. SEMESTER-WISE STRUCTURE AND CREDIT FRAMEWORK

First Year: Certificate Course in Geography

SEM	Course ID	Course Code	Course Title	Credit	Marks				Teaching Hours/Week			
					IA	ESE		Total	L	T	P	
						T	P					
SEMESTER - I	11901 11911	S/GEO/101/MJ C-1T	Fundamentals of Physical Geography	4	10	40		50	3	1		
	11902 11912	S/GEO/102/MN -1T*	Other than Geography Major students: Fundamentals of Physical Geography	4	10	40		50	3	1		
	11903 11923	S/GEO/103/MD -1P*	Other than Geography Major students: Surveying and Mapping Techniques	3	10		40	50	3		3	
	11904 11924	S/GEO/104/SE C-1P	Elementary Practicals in Geography	3	10		40	50	3		3	
	11800 11810	ACS/105/AEC-1	Compulsory English: Literature & Communication	2	10	40		50	2			
	11801 11811	ACS/106/VAC-1	Environmental Studies	4	10	40		50	4			
	TOTAL IN SEMESTER-I				20	60	160	80	300	18	2	6
SEMESTER - II	21901 21911	S/GEO/201/MJ C-2P	Fundamentals of Human Geography	4	10	40		50	3	1		
	21902 21912	S/GEO/202/MN -2P	Other than Geography Major students: Fundamentals of Human Geography	4	10	40		50	3	1		
	21903 21923	S/GEO/203/MD -2P	Other than Geography Major students: GIS and GNSS	3	10		40	50	3		3	
	21904 21924	S/GEO/204/SE C-2P	GIS and GNSS	3	10		40	50	3		3	
	21800 21810	ACS/205/AEC-2	MIL (Bengali/Sanskrit/Santali)	2	10	40		50	2			
	21801 21811	ACS/206/VAC-2 (any one)	2A: Health & Wellness 2B: Understanding India 2C: Basics of Indian Constitution 2D: Arts & Crafts of Bengal 2E: Historical Tourism in West Bengal	4	10	40		50	4			
	21802 21812	ACS/207/INT-1	Summer Internship (Additional)	4	10		40	50				
	TOTAL IN SEMESTER-II				20+4	60	160	80	300	18	2	6
	TOTAL IN FIRST YEAR				40+4	120	320	160	600	36	4	12
MJC- Major Core; MN- Minor Course; MD- Multidisciplinary Course ; AEC- Ability Enhancement Course; SEC- Skill Enhancement Course; VAC- Value Added Course; INT- Internship												



***Certificate Course in Geography can be awarded to a student if he/she completes Summer Internship of 4 credits in addition to total 40 credits in Semesters-I & II**

Second Year: Diploma in Geography												
SEM	Course ID	Course Code	Course Title	Credit	Marks				Teaching Hours/Week			
					IA	ESE		Total	L	T	P	
						T	P					
SEMESTER - III	31901 31911	S/GEO/301/MJ C-3T	Climatology	4	10	40		50	3	1		
	31902 31922	S/GEO/302/MJ C-4P	Statistical Methods in Geography	4	10		40	50	4		4	
	31903 31913	S/GEO/303/MN -3T	Other than Geography Major students: Climatology	4	10	40		50	3	1		
	31904 31924	S/GEO/304/MD -3P	Other than Geography Major students: Remote Sensing Techniques	3	10	40		50	3		3	
	31805 31825	S/GEO/305/SE C-3P	Computer Applications in Geography	3	10		40	50	3		3	
	31800 31810	ACS/306/AEC-3		2	10	40		50	2			
	TOTAL IN SEMESTER-III				20	60	160	80	300	18	2	10
SEMESTER - IV	41901 41911	S/GEO/401/MJ C-5T	Regional Planning and Development	4	10	40		50	3	1		
	41902 41912	S/GEO/402/MJ C-6T	Geography of Economic Activities	4	10	40		50	3	1		
	41903 41923	S/GEO/403/MJ C-7P	Mapping Techniques in Geography	4	10	40		50	4		4	
	41904 41924	S/GEO/404/MJ C-8P	Cartograms and Spatial Mapping	4	10		40	50	4		4	
	41905 41925	S/GEO/405/MN -4P	Other than Geography Major students: Cartograms and Spatial Mapping	4	10		40	50	4		4	
	41800 41810	ACSHP/406/AEC-4		2	10	40		50	2			
	41801 41811	ACS/407/INT-2	Summer Internship (Additional)*	4								
	TOTAL IN SEMESTER-IV				22+4	60	160	80	300	20	2	12
	TOTAL IN SECOND YEAR				42+4	120	320	160	600	38	8	22
MJC- Major Core; MN- Minor Course; MD- Multidisciplinary Course; AEC- Ability Enhancement Course; SEC- Skill Enhancement Course; VAC- Value Added Course; INT- Internship												
*Diploma in Geography can be awarded to a student if he/she completes Summer Internship (at least 1 in 2 years) of 4 credits in addition to total 82 credits in Semesters-I, II, III & IV												



4. Major Courses Syllabus (Core)

4.1 S/GEO /101/MJC-1T: Fundamentals of Physical Geography

Fundamentals of Physical Geography

4 Credits (60 Hours)

Total Marks: 50 (IA-10 Marks + ESE-40 Marks)
Question Pattern: Section-A Definition Oriented (5x2=10)
Section-B Short Answer Type (5x4=20)
Section-C Long Answer Type (1x10=10)

Learning Outcome

1. Understanding origin and evolution of Earth with special reference to cross-cutting approach like Big Bang Model
2. To have an idea of our dynamic earth and its geological make up.
3. Understanding major processes that are responsible for its surface features.
4. Understanding major pedologic and biospheric processes of the earth.

Unit 1: Earth: Origin and Tectonic Processes (20 Hours)

- 1.1 Origin of Universe (Big Bang Model), Origin of Earth (Nebular Hypothesis of Laplace and Interstellar Dust Cloud Hypothesis of Schimdt)
- 1.2 Internal Structure of the Earth: Seismological Evidences, physical, chemical and seismic properties of Earth layers
- 1.3 Isostasy: Models of Airy and Pratt; Continental Drift Theory of Alfred Wegener
- 1.4 Sea Floor Spreading; Plate Tectonic Theory- Processes at plate margins and Triple Junctions

Unit 2: Landform Development (20 Hours)

- 2.1 Degradational Processes: Weathering, Mass Wasting and resultant landforms
- 2.2 Evolution of landforms on Uniclinal, Folded and Faulted Strata
- 2.3 Landscape Evolution Models: Davis, Penck and Hack
- 2.4 Processes of landform development in Karst, Fluvial, Glacial and Aeolian environment

Unit 3: Biosphere (20 Hours)

- 3.1 Factors of Soil formation
- 3.2 Soil profile: origin and profile characteristics of Laterite, Podzol and Chernozem soils
- 3.3 Concepts of Biosphere, Ecosystem, Biome and Ecotone
- 3.4 Concepts of Trophic structure, Food Chain and Food Web. Energy Flow in ecosystem



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2. Bridges E. M., 1990: World Geomorphology, Cambridge University Press, Cambridge.
3. Christopherson, Robert W., (2011), Geosystems: An Introduction to Physical Geography, 8 Ed., Macmillan Publishing Company
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29. Maity, A.K.; Manna, S. (2020), Bhugathonik o Bhumirupbidya Prosonge in Bengali, Deb Prakashani, Kolkata
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- ▶ <http://www.solarviews.com/eng/earth.htm>
- ▶ <http://www.moorlandschool.co.uk/earth/tectonic.htm>
- ▶ <https://www.usgs.gov>

4.2 S/GEO /201/MJC-2T: Fundamentals of Human Geography

Fundamentals of Human Geography

4 Credits (60 Hours)

Total Marks:	50 (IA-10 Marks + ESE-40 Marks)
Question Pattern:	Section-A Definition Oriented (5x2=10) Section-B Short Answer Type (5x4=20) Section-C Long Answer Type (1x10=10)

Learning Outcome

1. Gain knowledge on major issues of Human Geography.
2. Holistic understanding of different approaches and processes of Human Geography.
3. Developing concepts of society and its structure with an idea about space and social well being.
4. Understanding culture and its different elements

Unit-1: Nature and Principles (20 Hours)

- 1.1 Nature and Scope of Human Geography
- 1.2 Approaches of Study: Resource, Landscape, Environmental and Contemporary
- 1.3 Recent Trends of Human Geography
- 1.4 Human Population and Environment with special reference to Development-Environment Conflict

Unit-2: Concept of Human Society (20 Hours)

- 2.1 Evolution of Human Societies: Hunting, Food Gathering and Pastoral Nomadism
- 2.2 Concept and Types of Space
- 2.3 Social Structure and Social Processes
- 2.4 Social Well Being

Unit-3: Concept of Culture (20 Hours)

- 3.1 Elements of Culture; Culture and Civilization
- 3.2 Concept of Race and Ethnicity
- 3.3 Language and Religion
- 3.4 Human Adaptation to Environment: Eskimo and Santal



Reference Books

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5. Minor Courses Syllabus (MN)

5.1 S/GEO /102/MN-1T: Fundamentals of Physical Geography

Fundamentals of Physical Geography

4 Credits (60 Hours)

Total Marks:	50 (IA-10 Marks + ESE-40 Marks)
Question Pattern:	Section-A Definition Oriented (5x2=10)
	Section-B Short Answer Type (5x4=20)
	Section-C Long Answer Type (1x10=10)

Learning Outcome

1. Understanding origin and evolution of Earth with special reference to cross-cutting approach like Big Bang Model
2. To have an idea of our dynamic earth and its geological make up.
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- 1.7 Isostasy: Models of Airy and Pratt; Continental Drift Theory of Alfred Wegener
- 1.8 Sea Floor Spreading; Plate Tectonic Theory- Processes at plate margins and Triple Junctions

Unit 2: Landform Development (20 Hours)

- 2.5 Degradational Processes: Weathering, Mass Wasting and resultant landforms
- 2.6 Evolution of landforms on Uniclinal, Folded and Faulted Strata
- 2.7 Landscape Evolution Models: Davis, Penck and Hack
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Unit 3: Biosphere (20 Hours)

- 3.5 Factors of Soil formation
- 3.6 Soil profile: origin and profile characteristics of Laterite, Podzol and Chernozem soils
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31. Choudhury, S.K. (2017), Bhougolik Bastubidya in Bengali, Central Book Agency, Kolkata
32. Das, C.; Pramanik, T.K. (2020), Poribesh Bhugol in Bengali, Innova Publications, Kolkata
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35. Sil, A. (2015), Mritwika Bhugol in Bengali, The Himalayan Books, Kolkata
36. Das, P.K. (2013), Adhunik Mritwika Bhugol in Bengali, Naboday Publications, Kolkata
37. Basu, P. (2012), Mritwika Bigyan: Tathya o Abhigyota, Books and Allied, Kolkata

Reference Websites

- ▶ <http://www.solarviews.com/eng/earth.htm>
- ▶ <http://www.moorlandschool.co.uk/earth/tectonic.htm>
- ▶ <https://www.usgs.gov>



5.2 S/GEO /202/MN-2T: Fundamentals of Human Geography

Fundamentals of Human Geography

4 Credits (60 Hours)

Total Marks:	50 (IA-10 Marks + ESE-40 Marks)
Question Pattern:	Section-A Definition Oriented (5x2=10)
	Section-B Short Answer Type (5x4=20)
	Section-C Long Answer Type (1x10=10)

Learning Outcome

1. Gain knowledge on major issues of Human Geography.
2. Holistic understanding of different approaches and processes of Human Geography.
3. Developing concepts of society and its structure with an idea about space and social well being.
4. Understanding culture and its different elements

Unit-1: Nature and Principles (20 Hours)

- 1.5 Nature and Scope of Human Geography
- 1.6 Approaches of Study: Resource, Landscape, Environmental and Contemporary
- 1.7 Recent Trends of Human Geography
- 1.8 Human Population and Environment with special reference to Development-Environment Conflict

Unit-2: Concept of Human Society (20 Hours)

- 2.5 Evolution of Human Societies: Hunting, Food Gathering and Pastoral Nomadism
- 2.6 Concept and Types of Space
- 2.7 Social Structure and Social Processes
- 2.8 Social Well Being

Unit-3: Concept of Culture (20 Hours)

- 3.5 Elements of Culture; Culture and Civilization
- 3.6 Concept of Race and Ethnicity
- 3.7 Language and Religion
- 3.8 Human Adaptation to Environment: Eskimo and Santal



Reference Books

1. Bergman, E.F (1995): Human Geography-Culture, Connections and Landscape, Prentice Hall, New Jersey
2. Chisholm. (1975): Human Geography, Penguin Books, Hermondsworth.
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4. Johnston R, Gregory D, Pratt G. et al. (2008): The Dictionary of Human Geography, Blackwell Publication.
5. Jordan-Bychkov et al. (2006): The Human Mosaic: A Thematic Introduction to Cultural Geography, W. H. Freeman and Company, New York.
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7. Dhara, S. (2013), Janasonkhya o Basoti Bhugol in Bengali, Naboday Publications, Kolkata
8. Mandal, M. (2016), Samajik Bhugol in Bengali, Naboday Publications, Kolkata
9. Raw, M. (1986): Understanding Human Geography: A Practical Approach, Bell and Hyman. London
10. Rubenstein, J.M. (2002), The Cultural Landscape, 7th edition, Prentice Hall, Englewood Cliffs
11. Smith D M (1982): Human Geography: A Welfare Approach, Edward Arnold, London
12. Mac Iver & Page (1950), Society: An Introductory Analysis, MacMillan, India.
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14. Giddens, A. and Sutton P.W. (2013) Sociology (8th edition) Polity.
15. Macionis John, (2006): Sociology, Pearson Education.
16. Rawat, H.K. (2007) Sociology: Basic Concepts, Rawat, New Delhi



6. Multidisciplinary Courses Syllabus (MD)

6.1: S/GEO/103/MD-1P: Surveying and Mapping Techniques

Surveying and Mapping Techniques

3 Credits (45 Hours)

Total Marks:	50 (IA-10 Marks + ESE-40 Marks)	
Question Pattern:	Question-1	(1x10=10)
	Question-2	(1x10=10)
	Question-3	(1x10=10)
	Lab Note Book & Viva-Voce	(5+5=10)

Instruction for Laboratory Note Book

- Practical works are to be completed in the classroom.
- Works to be done manually and signed by class teachers.
- Laboratory Note Book has to be submitted in the examination.

Learning Outcome

1. Learning measurement of the various features of the earth by developing expertise on cartographic methods and techniques.
2. Measuring the earth's surface features on horizontal and vertical planes through learning of different surveying and levelling operations.
3. Develop skills of map making and basics of cartography.

Unit-1: Scale and Cartograms (15 Hours)

- 1.1 Construction of Linear and Comparative (Unit)
- 1.2 Cartograms: Proportional Circle and Pie graph
- 1.3 Age-Sex Pyramid
- 1.4 Dependency Ratio

Unit-1: Surveying (15 Hours)

- 1.1 Concepts and Principles: Angle and Bearing, Traversing, Radiation, Intersection
- 1.2 Prismatic Compass: Preparation of land use maps by open and closed traverse
- 1.3 Computations of compass traverse- Included Angle, Area of traverse
- 1.4 Levelling by Dumpy Level: Profile and Contouring

Unit 3: Mapping Techniques (15 Hours)

- 3.1 Population Maps and Diagrams: Choropleth method
- 3.2 Measures of Inequality: Location Quotient
- 3.3 Measures of Interaction: Nearest Neighbour Analysis
- 3.4 Combinational Analysis: Weaver's Crop Combination



References

1. Anson R. and Ormelling F. J., 1994: International Cartographic Association: Basic Cartographic Vol. Pregmen Press.
2. Gupta K.K. and Tyagi, V. C., 1992: Working with Map, Survey of India, DST, New Delhi.
3. Mishra R.P. and Ramesh, A., 1989: Fundamentals of Cartography, Concept, New Delhi.
4. Monkhouse F. J. and Wilkinson H. R., 1973: Maps and Diagrams, Methuen, London.
5. Rhind D. W. and Taylor D. R. F., (eds.), 1989: Cartography: Past, Present and Future, Elsevier, International Cartographic Association.
7. Robinson A. H., 2009: Elements of Cartography, John Wiley and Sons, New York.
8. Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.
9. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
10. Agor, R. (1999), Textbook of Surveying and Levelling, Khanna Publishers, Delhi
11. Venkatramaiah, C. (2011), Textbook of Surveying, Universities Press, Hyderabad
12. Adhikari, S. (2005), Honours Byaboharik Bhugol, Vol-I, Dove Publishing House, Midnapore
13. Das, N.; Khatun, S. (2021), Kartographi- Dharona o Prayog in Bengali, Kalyani Publishers, Kolkata



6.2: S/GEO/203/MD-2P: GIS and GNSS

GIS and GNSS		3 Credits (45 Hours)
Total Marks:	50 (IA-10 Marks + ESE-40 Marks)	
Question Pattern:	Question-1	(1x10=10)
	Question-2	(1x10=10)
	Question-3	(1x10=10)
	Lab Note Book & Viva-Voce	(5+5=10)

Instruction for Laboratory Note Book

- Practical works are to be completed in the classroom.
- Works to be done in computer and signed by class teachers.
- Laboratory Note Book has to be submitted in the examination.

Learning Outcome

1. Students will have practical experience on handling GIS softwares and its theoretical background.
2. Students will also be able to make their own maps in GIS software and they will have hands on experience on Digital Cartography.
3. They will also be able to handle GPS/GNSS devices, collect waypoints and working with them in MS-EXCEL as well as in GIS platforms.

Unit-1: Geographical Information System (15 Hours)

- 1.1 GIS: Basic Concepts
- 1.2 Components of GIS
- 1.3 Development of GIS Technology
- 1.4 GIS Data structure: Raster and Vector

Unit-2: Introduction to GNSS (15 Hours)

- 2.1 Basic Concept: GPS and GNSS, Segments, PRN Code, Waypoints and Tracks
- 2.2 Distance Calculation, Open and Closed Traverse.
- 2.3 Plotting of Data in Microsoft Excel
- 2.4 GNSS/GPS data downloading in QGIS software and mapping.

Unit 3: Mapping in GIS (15 Hours)

- 3.1 Geo-referencing and Reprojection of maps using QGIS Software
- 3.2 Digitization of maps using QGIS Software
- 3.3 Attribute data creation and uses: Choropleth, Isopleth, Dot Map, Bargraph and Proportionate Pie Diagram
- 3.4 Map Composition and Map Layout



References

1. Jatin Pandey and Darshana Pathak, 2013, Geographic Information System, TERI Publishing House.
2. Chor Pang Lo, 2009, Concepts and Techniques of Geographic Information System, Prentice Hall.
3. Michael N. Demers, 2012, Fundamentals of Geographic Information Systems, Willy.
4. Chairman, N. 1992. Exploring Geographical Information Systems, John
5. Willey and Sons Inc., New York, 198p



7. Skill Enhancement Courses Syllabus (SEC)

7.1: S/GEO/105/SEC-1P: Elementary Practicals in Geography

Elementary Practicals in Geography		3 Credits (45 Hours)
Total Marks:	50 (IA-10 Marks + ESE-40 Marks)	
Question Pattern:	Question-1	(1x10=10)
	Question-2	(1x10=10)
	Question-3	(1x10=10)
	Lab Note Book & Viva-Voce	(5+5=10)
<u>Instruction for Laboratory Note Book</u>		
<ul style="list-style-type: none"> • Practical works are to be completed in the classroom. • Works to be done manually in note books and signed by class teachers. • Laboratory Note Book has to be submitted in the examination. 		
<u>Learning Outcome</u>		
<ol style="list-style-type: none"> 1. Learning measurement of the various features of the earth by developing expertise on cartographic methods and techniques 2. Developing concepts in projecting the earth as a planet. 3. Students will be capable of identifying major rocks and minerals that make up our planet and have hands on training on different meteorological instruments. 		
Unit-1: Map Scale (15 Hours)		
<ol style="list-style-type: none"> 1.1 Definition and Types of Map Scale 1.2 Construction of Linear, Comparative (Unit), Diagonal and Vernier scales. 1.3 Scale Enlargement and Reduction (Computations) 1.4 Calculation of area from maps (Graphical Methods) 		
Unit-2: Map Projections (15 Hours)		
<ol style="list-style-type: none"> 2.1 Map Projections: Nature, Classification and Uses 2.2 Basic Concepts: Parallels and Meridians, Datum, Geoid, Scale Factor, Deformation, Orthodrome and Loxodrome. 2.3 Principles, Theories, Construction and Properties of select Map Projections: Conical Case- Simple Conical with one Standard Parallel and Polyconic; Cylindrical Case- Equal Area, Mercator; Zenithal Case- Gnomonic, Stereographic 2.4 UTM Grid System. 		
Unit-3: Rocks-Minerals and Instruments (15 Hours)		
<ol style="list-style-type: none"> 3.1 Megascopic Identification of Rocks: Granite, Basalt, Limestone, Shale, Sandstone, Slate, Marble and Schist 3.2 Megascopic Identification of Minerals: Bauxite, Calcite, Chalcopryite, Feldspar, Galena, Haematite, Magnetite and Quartz 3.3 Recording of Maximum-Minimum Thermometer (Six's) 3.4 Recording of Fortin's Barometer, Hygrometer 		



Reference Books

1. Anson R. and Ormelling F. J., 1994: International Cartographic Association: Basic Cartographic Vol. Pregmen Press.
2. Gupta K.K. and Tyagi, V. C., 1992: Working with Map, Survey of India, DST, New Delhi.
3. Mishra R.P. and Ramesh, A., 1989: Fundamentals of Cartography, Concept, New Delhi.
4. Monkhouse F. J. and Wilkinson H. R., 1973: Maps and Diagrams, Methuen, London.
5. Rhind D. W. and Taylor D. R. F., (eds.), 1989: Cartography: Past, Present and Future, Elsevier, International Cartographic Association.
6. Robinson A. H., 2009: Elements of Cartography, John Wiley and Sons, New York.
7. Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.
8. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
9. Adhikari, S. (2005), Honours Byaboharik Bhugol, Vol-I, Dove Publishing House, Midnapore
10. Das, N.; Khatun, S. (2021), Kartographi- Dharona o Prayog in Bengali, Kalyani Publishers, Kolkata

Online Materials

- ▶ <https://egyankosh.ac.in/bitstream/123456789/66733/1/Experiment-1.pdf>
- ▶ <https://egyankosh.ac.in/bitstream/123456789/66739/1/Experiment-7.pdf>
- ▶ https://www.atri.edu.in/images/pdf/departments/Manual_Geology.pdf



7.2: S/GEO/205/SEC-2P: GIS and GNSS

GIS and GNSS		3 Credits (45 Hours)
Total Marks:	50 (IA-10 Marks + ESE-40 Marks)	
Question Pattern:	Question-1	(1x10=10)
	Question-2	(1x10=10)
	Question-3	(1x10=10)
	Lab Note Book & Viva-Voce	(5+5=10)

- Instruction for Laboratory Note Book**
- **Practical works are to be completed in the classroom.**
 - **Works to be done in computer and signed by class teachers.**
 - **Laboratory Note Book has to be submitted in the examination.**

- Learning Outcome**
1. Students will have practical experience on handling GIS softwares and its theoretical background.
 2. Students will also be able to make their own maps in GIS software and they will have hands on experience on Digital Cartography.
 3. They will also be able to handle GPS/GNSS devices, collect waypoints and working with them in MS-EXCEL as well as in GIS platforms.

Unit-1: Geographical Information System (15 Hours)

- 1.5 GIS: Basic Concepts
- 1.6 Components of GIS
- 1.7 Development of GIS Technology
- 1.8 GIS Data structure: Raster and Vector

Unit-2: Introduction to GNSS (15 Hours)

- 2.5 Basic Concept: GNSS and GPS, Segments, PRN Code, Waypoints and Tracks
- 2.6 Distance Calculation, Open and Closed Traverse.
- 2.7 Plotting of Data in Microsoft Excel
- 2.8 GNSS/GPS data downloading in QGIS software and mapping.

Unit 3: Mapping in GIS (15 Hours)

- 3.5 Geo-referencing and Reprojection of maps using QGIS Software
- 3.6 Digitization of maps using QGIS Software
- 3.7 Attribute data creation and uses: Choropleth, Isopleth, Dot Map, Bargraph and Proportionate Pie Diagram
- 3.8 Map Composition and Map Layout



References

1. Jatin Pandey and Darshana Pathak, 2013, Geographic Information System, TERI Publishing House.
2. Chor Pang Lo, 2009, Concepts and Techniques of Geographic Information System, Prentice Hall.
3. Michael N. Demers, 2012, Fundamentals of Geographic Information Systems, Wiley. New York
4. Chairman, N. 1992. Exploring Geographical Information Systems, John Wiley and Sons Inc., New York, 198p



8. Course Objectives

The principal objectives of this undergraduate course in Geography are:

- i. To understand the core content and techniques particularly modern techniques in geography.
- ii. To explore the theories and techniques used in regional planning and development.
- iii. The syllabus also aims to develop basic skills of the subject to prepare students to pursue higher studies in geography and to make them successful in search of suitable employment.

9. Course Outcomes

The Geography is the study of distribution of elements over space as well as the mutual and reciprocal relationship between man and environment. It also studies different activities of man in different milieu of life in changing the face of the earth, how 'space' turns into 'place' with different values added to it by man's varied modes of life with due emphasis on major empirical questions of 'what', 'why', 'how' and 'where'. Therefore, the study of this discipline at undergraduate level would have the following learning outcomes in general:

- i. It helps to develop a holistic understanding of the earth as the home of man.
- ii. Student can understand what Geography really is. They shall come to know that geography is not merely a 'science of placenames', rather it is true science of distribution with expertise in various modern skills and techniques.
- iii. Students will be to find their place in job market both in academic as well as corporate sector.
- iv. Students also can explore the engineering aspects of the discipline particularly Geoinformatics, Geoinformation Science, Geomatics Engineering etc.
- v. At the end of the course, students will be capable of segmenting the whole discipline in three different components- physical, human and applied.

10. Programme Specific Outcomes (PSO)

Geography is widely accepted as the most emerging science in recent years due to its versatile character to include contents of both science and humanities. Therefore, students from both the streams can choose the subject at their undergraduate level. Bankura University offers B.Sc, degree in Geography keeping in view the demand of the students as well as towards making it more suitable for higher education where stiff competition is prevailed from other science students. Since its inception, the university follows CBCS curriculum based on UGC guidelines with slight modification in view of the local aspects. Geography basically deals with space. The spatial aspects of the earth, their guiding laws and theories, nature and evolution are recorded and represented through a number of instrumental and mechanical ways. A holistic view of the Earth as an entity and the features within the earth are taught to students. The evolution of natural landscape to cultural landscape is illustrated. The mapping techniques are guides to represent all the physical, social, cultural features through proper scaling and elaborative description. The project based studies and analyses are very helpful in building up a research outlook among the students. They learn about the sample drawing procedures and detailed idea about the important issues around them. The course is intersected into several small sections and put under expert faculties of that field to provide the students the desired benefit of the course. The Programme Specific outcomes can be listed as under:

PSO-1: Acquiring Knowledge of Physical Geography

Fundamentals of Physical Geography will help students to gain the knowledge of physical aspects of the earth. They will gather knowledge about the processes that make up the planet earth. Imbibing knowledge,



skills and holistic understanding of the Earth, atmosphere, biosphere and the planet through analysis of landform development; crustal mobility and tectonics, and different biospheric processes.

PSO-2: Acquiring Knowledge of Human Geography

With base knowledge of Physical Geography, students can easily correlate the knowledge of physical geography with the human geography, establishing man-environment relationships; and exploring the place and role of Geography vis-a-vis other social and earth sciences. They will be able to analyze the problems of physical as well as cultural environments of both rural and urban areas. Moreover, they will try to find out the possible measures to solve those problems.

PSO-3: Developing Quantitative Skills

Students will be able to quantitatively measure earth and its surface features- both natural and man made by developing skills on map scales, different surveying and mapping techniques.

PSO-4: Training on Surveying and Meteorological Instruments

Students will have rigorous training on various conventional as well as modern surveying instruments, different meteorological instruments to make them suitable for current job market. This will learn how to collect primary data on earth and its surface features which they can apply in their higher studies.

PSO-5: Skill Enhancement in Automated Cartography and Data Analytics

In this age of data science, the Remote Sensing, Geographical Information System and GNSS techniques will enable students to collect data and will learn analytical procedures in computer softwares which will definitely enhance students' skillsets towards understanding of big data. Geographers in this field can surpass other disciplines because they are able to handle spatial data.

11. Technical Skillsets and possible Job opportunities after each exit

Semester	Exit Level	Credits	Technical Skillsets	Job Opportunities
II	Certificate	40+4	<ul style="list-style-type: none"> • Geomorphic Analysis • Map Interpretation • Surveying skill • GIS Mapping skill • GNSS Surveying 	<ul style="list-style-type: none"> • Field Surveyor • GIS Expert in Govt. and private sector • Digital Cartographer
IV	Diploma	82+4	<ul style="list-style-type: none"> • Climatic Data Analysis • Map Interpretation • Surveying skill • GIS Mapping skill • GNSS Surveying 	<ul style="list-style-type: none"> • Field Surveyor • GIS Expert in Govt. and private sector • Digital Cartographer
VI	Degree	124	<ul style="list-style-type: none"> • Map Interpretation • Surveying skill • GIS Mapping skill • GNSS Surveying • Tourism Management • Digital Image Processing 	<ul style="list-style-type: none"> • Field Surveyor • GIS Expert in Govt. and private sector • Project Assistants in academic institutions • Hotels and Tourist Industries such as Travel Agency, Transport Operators
VIII	Degree with Honours/ Research	164	<ul style="list-style-type: none"> • Map Interpretation • Disaster Management Techniques • Climate Change concepts • Knowledge on diseases and their distribution 	<ul style="list-style-type: none"> • Tourism Planner • Town Planner • Cartographer • GIS Consultant • Geography Teacher • Geography Researcher