BOS, GEOGRAPHY

CSJM University, Kanpur-208024

For Approval of

M.Sc. Geography (with Specialisation in Remote sensing and GIS)

MINUTES OF MEETING

Date: 23 July 2025
Time: 03:00 PM
Venue: CSJM University, Kanpur
Mode: Offline/Online

A Meeting of the Board of Studies (BOS) for the subject Geography was held on 23 July 2025 at 3:00 PM via online mode (Google Meet), with video conferencing at the CSJM University Campus, Kanpur. The agenda was to discuss and approve the course structure and syllabus of the **M.Sc. Geography (with Specialisation in Remote sensing and GIS)**

The detailed course structure and syllabus for programs had already been shared with all BOS members. These programs have been designed in accordance with the Curricular & Credit Framework for the Two-Year postgraduate Programme. During the meeting, a presentation on the course structure and syllabus was delivered. After a thorough discussion on each aspect of the syllabus, the following suggestions and recommendations were made by the BOS members:

1. The proposed syllabus for the two-year M.Sc. Geography (with Specialisation in Remote Sensing and GIS) program was circulated among all BOS members. An online presentation of the proposed syllabus was made from the convener's side. The members reviewed the syllabus and made necessary modifications.

2. A few corrections related to the practicals were incorporated as per the members' suggestions.

3. All other minor recommendations were incorporated into the syllabus as advised by the Board members. The members unanimously approve the final syllabus.

4. Feedback and acceptance of the syllabus were sought from both external and internal experts via email.

The Meeting was attended by the Following BOS Members:

Sl No	Name and Affiliation	Convener/Member
1.	Prof. Sadhana Rani VSSD College, Kanpur	Convener
2.	Dr. Udai Raj Scientist-SE, Uttar Pradesh Remote Sensing Applications Centre, Lucknow	External Expert
3.	Prof. Virendra Kumar Head Department of Geography Central University of Nagaland, University	External Expert
4.	Dr. Durgesh Singh Department of Geography CSJM University Campus, Kanpur	Member
5.	Dr. Pradeep Kumar Rajput Department of Geography CSJM University Campus, Kanpur	Member
6.	Dr. Kashif Imdad Department of Geography PPN College, CSJM University, Kanpur.	Member

Prof. Sadhana Rani
Convener- Geography
CSJM University, Kanpur

Prof. Sadhana Rani
Convener, Geography
C.S.J.M. University, Kanpur

MSC GEOGRAPHY (WITH SPECIALISATION IN REMOTE SENSING AND GIS)

Academic Session 2025-26

CSJM University, Kanpur
Uttar Pradesh India

Introduction

The M.Sc. in Geography with Specialization in Remote Sensing and Geographic Information Systems (GIS) is a two-year postgraduate program designed to provide students with an in-depth understanding of the spatial and analytical aspects of geography. The program integrates traditional geographical knowledge with advanced geospatial technologies to address contemporary environmental, urban, and developmental challenges. With the growing demand for spatial data analysis and digital mapping in multiple sectors such as agriculture, forestry, urban planning, disaster management, and environmental monitoring, this specialization equips students with the skills to analyze spatial phenomena using state-of-the-art remote sensing tools and GIS software.

Programme Objectives

1. To impart comprehensive knowledge of physical and human geography with a strong foundation in geospatial technologies.
2. To develop students' technical skills in satellite image interpretation, digital image processing, spatial data analysis, and GIS-based modeling.
3. To promote interdisciplinary approaches in solving real-world problems through geospatial applications in environmental studies, land use planning, resource management, and disaster mitigation.
4. To enhance students' capabilities in field surveys, data collection, statistical analysis, and report writing with an emphasis on scientific research methodology.
5. To prepare students for careers in academia, government agencies, research institutions, and the geospatial industry.

Programme Outcomes

After successful completion of the program, students will be able to

1. Demonstrate a deep understanding of the core concepts of geography integrated with remote sensing and GIS applications.
2. Acquire hands-on experience in using software tools such as ArcGIS, QGIS, ERDAS Imagine, ENVI, and other open-source platforms for spatial analysis.
3. Analyze, visualize, and interpret spatial and non-spatial data for resource management, environmental monitoring, and spatial planning.
4. Conduct independent research and develop geospatial models to support data-driven decision-making.
5. Effectively communicate geographic and geospatial information in the form of maps, reports, and presentations to a wide range of stakeholders.
6. Pursue further studies or professional careers in geoinformatics, urban planning, environmental consultancy, disaster risk reduction, and academic research.

NEP Two-Year Post Graduate Syllabus Committee

M.Sc. Geography (with Specialisation in Remote Sensing and GIS)

Sl No	Name and Affiliation	Convener/Member
1.	Prof. Sadhana Rani Department of Geography VSSD College, Kanpur	Convener
2.	Dr. Durgesh Singh Department of Geography CSJM University Campus, Kanpur	Member
3.	Dr. Pradeep Kumar Rajput Department of Geography CSJM University Campus, Kanpur	Member
4.	Dr. Kashif Imdad Department of Geography PPN College, CSJM University, Kanpur	Member

Semester I

Year	Sem	Course Code	Type	Course Title	Credits	CIA	ESE	Max Marks
1st	1st	B270701T	Core	Oceanography	4	25	75	100
	1st	B270702T	Core	Basic of Remote Sensing and Photogrammetry	4	25	75	100
	1st	B270703T	Core	Geomorphology	4	25	75	100
	1st	B270704T	Core	Advance geography of India	4	25	75	100
	1st	B270705P	Practical	Geostatistics Methods, Cartography and Basic GIS	4	25	75	100

Semester II

Year	Sem	Course Code	Type	Course Title	Credits	CIA	ESE	Max Marks
1st	2nd	B270801T	Core	Geographical Information System (GIS)	4	25	75	100
	2nd	B270802T	Core	Disaster Management	4	25	75	100
	2nd	B270803T	Core	Climatology	4	25	75	100
	2nd	B270804T	Elective	Environmental geography and planning	4	25	75	100
	2nd	B270805T	Elective	Biogeography				
	2nd	B270806T	Elective	Urban and Regional Development				
	2nd	B270807P	Practical	GIS and Spatial Modelling	4	25	75	100

Semester III

Year	Sem	Course Code	Type	Course Title	Credits	CIA	ESE	Max Marks
2nd	3rd	B270901T	Core	Advanced Remote Sensing and GIS	4	25	75	100
	3rd	B270902T	Core	Research Methodology	4	25	75	100
	3rd	B270903T	Core	Natural Resource management	4	25	75	100
	3rd	B270904T	Elective	Ecology and Planning	4	25	75	100
	3rd	B270905T	Elective	Agricultural geography				
	3rd	B270906T	Elective	Health Geography				
	3rd	B270907P	Practical	Remote sensing and GIS	4	25	75	100

Semester IV

Year	Sem	Course Code	Type	Course Title	Credits	CIA	ESE	Max Marks
2nd	4th	B271001D	core	Dissertation**	14	-	-	100
	4th	B271002P	core	Presentation	4	-	-	100
	4th	B271003V	Core	Viva-Voce	2	-	-	100

****General Guidelines for Students Pursuing Dissertation Work Outside the University Campus/Department:

1. The primary supervisor must be a faculty member from the parent department. Students may choose a co-supervisor from an external organization, institution, or department.
2. The co-supervisor should possess relevant expertise or research experience in the field.
3. The external research institution or organization must have essential facilities, including but not limited to GPS equipment and a GIS/Remote Sensing laboratory.
4. The final approval for conducting the dissertation outside the campus will rest with the Department.

Prof. Sadhana Rani
Convener, Geography
C.S.J.M. University, Kanpur

Programme/Class: MSc	Year: First	Semester: First
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code: B270701T	Course Title: **Oceanography**	

Course outcomes: Students will be able to understand;

- Understand the structure and composition of ocean basins and their role in the Earth system.
- Analyse physical, chemical, biological, and geological processes in oceans.
- Apply oceanographic knowledge to marine resources, climate studies, and environmental

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Introduction to Oceanography, Definition, Scope and Branches, Distribution of Land and Water, Ocean Floor Topography and Submarine Relief Features Continental Shelf, Slope, Abyssal Plains, Trenches	10
II	Physical and Chemical Properties of Sea Water, Temperature, Salinity, Density Ocean Currents: Causes and Patterns, Waves and Tides: Types and Theories, Ocean-Atmosphere Interactions (ENSO, Monsoon)	11
III	Marine Resources, Biological, Mineral, and Energy Resources, Marine Biodiversity and Conservation, Coral Reefs and Mangroves, Coastal Ecosystems and Marine Pollution	11
IV	Human and Environmental Impacts, Climate Change and Sea Level Rise, Marine Hazards: Tsunamis, Cyclones, Oceanographic Research and Remote Sensing, Laws of the Sea and Ocean Governance, application of remote sensing and GIS in oceanography , Monitoring Coastal Zones, Coral Reef and Marine Habitat Mapping, Chlorophyll and Ocean Productivity, Sea Surface Temperature (SST) Monitoring, bathymetric survey	14

Suggested Readings:

1. Duxbury, A.C. & Duxbury, A.B. (2000): An Introduction to the World's Oceans, McGraw-Hill.
2. Thurman, H.V. (2003): Introductory Oceanography, Prentice Hall.
3. Shepard, F.P. (1973): Submarine Geology, Harper & Row.
4. King, C.A.M. (1972): Beaches and Coasts, Edward Arnold.
5. Garrison, T. (2012): Oceanography: An Invitation to Marine Science, Cengage Learning.

Programme/Class: MSc	Year: First	Semester: First
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code:B270702T	Course Title: **Basic of Remote Sensing and Photogrammetry**	

Course outcomes: Students will be able to:

- Understand the basic principles, components, and types of remote sensing.
- Interpret aerial and satellite imagery for geographical applications.
- Apply remote sensing techniques in environmental monitoring and resource management.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	History and development - Electro Magnetic Spectrum - Components and types of remote sensing Energy interaction with atmosphere and Earth (Rocks, Soil, Water, Vegetation etc.,) Resolutions (Spectral, Spatial, Temporal & Radiometric) - Platforms Sensors Scanning & Orbiting Mechanism of Satellites and Data Acquisition. Optical Remote Sensing: Basic concepts - Optical sensors and scanners	10
II	Historical development definition types of aerial photography and uses - aerial videography airborne imaging spectrometer - airborne visible - infrared imaging spectrometer (AVIRIS) Aerial Cameras - Components of Aerial Cameras. -Planning and execution ground control for aerial photography.	11
III	Definition, history of photogrammetry Geometry of vertical aerial photograph, scale of vertical aerial photograph, relief displacement. - Stereoscopic parallax - Aerial triangulation - Digital photogrammetry - use of GPS in photogrammetry, Total Station Surveying, Unmanned Aerial Vehicle	12
IV	Thermal Remote Sensing: Basic concepts Thermal sensors & scanners Thermal Inertia. Microwave Remote Sensing: Basic concepts Microwave sensors and Radiometers Geometric characters RADAR, principles LiDAR data characteristics advantages limitations comparison with RADAR and photogrammetry uses of LiDAR data Hyper spectral Remote Sensing: basic concepts hyperspectral sensors, data formats and systems, AVIRIS, CASI, MODIS and Hyperion	13

Suggested Readings:

1. Jensen, J. R. (2007): Remote Sensing of the Environment: An Earth Resource Perspective, Pearson Education.
2. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2015): Remote Sensing and Image Interpretation, Wiley.
3. Sabins, F. F. (1996): Remote Sensing: Principles and Interpretation, Waveland Press.
4. Campbell, J. B., & Wynne, R. H. (2011): Introduction to Remote Sensing, Guilford Press.
5. Joseph, G. (2005): Fundamentals of Remote Sensing, Universities Press.

Programme/Class: MSc	Year: First	Semester: First
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code: B270703T	Course Title: **Geomorphology**	

Course outcomes: Students will be able to understand;

- Understand the structure and functioning of major physical systems of the Earth.
- Analyse the dynamic processes shaping landforms, weather, climate, and ecosystems.
- Apply physical geography knowledge to environmental management and spatial planning.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Introduction to Geomorphology, Nature and Scope, Geological Time Scale, Interior Structure of the Earth, Isostasy and Continental Drift	10
II	Plate Tectonics and Endogenic Processes, Plate Boundaries and Earthquakes, Volcanism and Mountain Building, Folds, Faults and Earth Movements, Geosynclines and Orogeny	11
III	Exogenic Processes and Landforms, Weathering and Mass Wasting, Fluvial Processes and Landforms, Glacial and Periglacial Landforms, Aeolian and Coastal Landforms	12
IV	Applied Geomorphology, Geomorphological Hazards: Landslides, Earthquakes, Soil Formation and Erosion, Drainage Basin Analysis, Theories of Landform Evolution (Davis, Penck, King), application of Remote sensing and GIS in geomorphology, Landform Mapping and Classification, Change Detection Studies, Terrain Analysis, Drainage Basin and Watershed Analysis, Hazard Zonation and Risk Mapping	12

Suggested Readings:

1. Thornbury, W. D. (1969): Principles of Geomorphology, Wiley Eastern.
2. Strahler, A. N. (1984): Elements of Physical Geography, Wiley.
3. Kale, V. S., & Gupta, A. (2001): Introduction to Geomorphology, Orient Blackswan.
4. Bloom, A. L. (2004): Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, Pearson.
5. Dayal, P. (1996): A Textbook of Geomorphology, Shukla Book Depot.

Programme/Class: MSc	Year: First	Semester: First
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code: B270704T	Course **Title: Advance geography of India**	

Course outcomes: Students will be able to understand;

- Understand the diverse physical, economic, and social geography of India.
- Analyze spatial patterns and regional disparities across Indian states.
- Apply geographic methods to assess development and planning in India.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Geographical Personality of India, Location, Extent, and Structure, Physiographic Divisions and their Evolution, Drainage System and Water Resources, Climate and Climatic Regions.	10
II	Natural Resources, Soils: Types and Distribution, Forests and Biodiversity, Mineral and Energy Resources, Agricultural Development and Green Revolution	11
III	Population and Settlement Geography, Population Growth and Distribution, Migration and Urbanization Trends, Rural Settlements and Regional Disparities, Human Development Index in India.	12
IV	Regional Planning and Development, Planning Regions in India, Industrial Development and Economic Corridors, Transport and Communication Networks, Environmental Issues and Sustainable Development.	12

Suggested Readings:

1. Tirtha, R. (2002): *Geography of India*, Rawat Publications.
2. Singh, R.L. (1971): *India – A Regional Geography*, NGSI, Varanasi.
3. Sharma, T.C. (2012): *Economic and Commercial Geography of India*, Vikas Publishing.
4. Khullar, D.R. (2022): *India: A Comprehensive Geography*, Kalyani Publishers.
5. Deshpande, C.D. (1992): *India – A Regional Interpretation*, ICSSR.

Programme/Class: MSc	Year: First	Semester: First
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code: B270705P	Course Title: **Geostatistics Methods, Cartography and Basic GIS**	

Course outcomes: Students will be able to understand;

- Understand fundamental and advanced concepts of Geostatistics.
- Apply statistical methods to spatial data for geographical analysis.
- Gain proficiency in modern and traditional cartographic techniques.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Introduction to Geostatistics, Meaning, Scope, and Applications, Types of Data: Spatial and Non-Spatial, Basic Descriptive Statistics in Geography, Probability Distributions and Sampling Methods.	5
II	Statistical Techniques, Measures of Central Tendency and Dispersion, Correlation and Regression Analysis, Hypothesis Testing and Chi-square, Time Series and Trend Analysis.	10
III	Spatial Statistics and Interpolation, Spatial Autocorrelation and Kriging, inverse Distance Weighting (IDW) Point Pattern Analysis and Nearest Neighbour.	8
IV	Cartography, Principles of Cartographic Design, Types of Maps: Thematic, Topographic, Choropleth, Map Projections and Coordinate Systems, Digital Cartography and GIS Mapping Tools	12
V	Definition, components, and functions of GIS, Spatial and non-spatial data, Data models: raster and vector Data Input and Digitization Coordinate systems and projections. Map scanning and on-screen digitization Attribute data entry and table management, spatial Data Editing and Analysis Data editing and topology creation Buffering, overlay, and query operations Simple spatial analysis exercises	10

Suggested Readings

1. Burrough, P.A. and McDonnell, R.A. (1998): *Principles of Geographical Information Systems*, Oxford University Press.
2. Hengl, T. (2009): *A Practical Guide to Geostatistical Mapping*, 2nd Ed., University of Amsterdam.
3. Gregory, S. (1978): *Statistical Methods and the Geographer*, Longman.
4. Robinson, A.H., et al. (1995): *Elements of Cartography*, Wiley.
5. Monmonier, M. (1996): *How to Lie with Maps*, University of Chicago Press.

Programme/Class: MSc	Year: First	Semester: Second
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code: B270801T	Course Title: **Geographical Information System (GIS)**	

Course outcomes: Students will be able to understand;

- Understand the fundamental principles and components of GIS.
- Apply GIS techniques for spatial data analysis and problem-solving.
- Develop skills in GIS software for mapping, spatial analysis, and decision-making.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Definition, Evolution, and Components of GIS, Spatial vs Non-Spatial Data, GIS Data Models: Raster and Vector, Coordinate Systems and Map Projections.	10
II	Data Input and Management, Data Sources: Remote Sensing, GPS, Survey Data Input Techniques: Digitizing, Scanning, Attribute Data and Database Management, Topology and Spatial Relationships	11
III	Spatial Analysis and Modelling, Spatial Query and Overlay Analysis, Buffering and Network Analysis, Interpolation and Surface Analysis, Digital Elevation Models (DEM) and Terrain Analysis.	12
IV	Applications and Trends in GIS, Urban and Regional Planning, Environmental Management, Disaster Management and Agriculture, Recent Trends: Web GIS, Mobile GIS, Open-source GIS.	12

Suggested Readings:

1. Burrough, P.A. & McDonnell, R.A. (1998): *Principles of Geographical Information Systems*, Oxford University Press.
2. Heywood, I., Cornelius, S., & Carver, S. (2011): *An Introduction to Geographical Information Systems*, Pearson Education.
3. Longley, P.A., Goodchild, M.F., Maguire, D.J., & Rhind, D.W. (2015): *Geographic Information Systems and Science*, Wiley.
4. Chang, K.T. (2018): *Introduction to Geographic Information Systems*, McGraw Hill.
5. Lo, C.P. & Yeung, A.K.W. (2009): *Concepts and Techniques of Geographic Information Systems*, Prentice Hall.

Programme/Class: MSc	Year: First	Semester: second
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code:B270802T	Course Title: **Disaster Management**	

Course outcomes: Students will be able to understand;

- Understand the types, causes, and consequences of natural and human-induced disasters.
- Analyze the principles of disaster preparedness, mitigation, and response.
- Apply geographical tools for disaster risk reduction and management strategies.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Definition, types and classification of disasters, Natural and human-induced disasters: Earthquakes, Floods, Cyclones, Landslides, Droughts, Industrial and Technological hazards, Disaster risk and vulnerability.	10
II	Disaster Preparedness and Mitigation, Risk assessment and hazard zonation, Preparedness and early warning systems, Structural and non-structural mitigation strategies, Role of media and communication.	12
III	Disaster Response and Recovery, Disaster response strategies and emergency management, Relief and rehabilitation, Institutional frameworks: NDMA, SDMA, NDRF, UNDRR ,Community-based disaster management (CBDM)	10
IV	Geospatial and Policy Approaches, Role of Remote Sensing and GIS in disaster management, Disaster management policies in India, Climate change and disaster risk, Case studies: Tsunami, Bhopal Gas Tragedy, Uttarakhand floods and others. Hazard Mapping, Risk and Vulnerability Assessment, Monitoring and Early Warning, Damage Assessment, Emergency Response Planning	13

Suggested Readings:

1. Singh, R.B. (2006): *Natural Hazards and Disaster Management: Vulnerability and Mitigation*, Rawat Publications.
2. Sharma, V.K. (2001): *Disaster Management*, National Centre for Disaster Management, IIPA, New Delhi.
3. Bryant, E. (2005): *Natural Hazards*, Cambridge University Press.
4. NDMA (National Disaster Management Authority) Guidelines (Various years).
5. Kapur, A. (2010): *Vulnerable India: A Geographical Study of Disasters*, Sage Publications.

Programme/Class: MSc	Year: First	Semester: second
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code:B270803T	Course Title: **Climatology**	

Course outcomes: Students will be able to understand;

- Understand atmospheric processes and global climate systems.
- Analyze weather elements and climatic classifications.
- Apply climatological knowledge to environmental and climate-related challenges.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Introduction of Climatology, Nature and scope of climatology, Structure and composition of the atmosphere, Insolation and heat budget, Temperature distribution and factors controlling temperature.	12
II	Atmospheric Pressure and Winds, Pressure belts and wind systems, Jet streams, local winds, monsoons, Air masses and atmospheric disturbances: cyclones and anticyclones, El Niño, La Niña, and ENSO phenomena.	10
III	Precipitation and Climatic Types, Humidity, evaporation and condensation, Types of rainfall and mechanisms, World distribution of precipitation, Climatic classifications: Köppen and Thornthwaite.	10
IV	Climate Change and Applications, Climate variability and global warming, Greenhouse gases and climate feedbacks, Urban climate and human impact, Applications of Remote Sensing and GIS in climatology, Climate Data Acquisition and Monitoring, Land Surface Temperature (LST) Analysis, Vegetation Climate Interaction, Precipitation and Hydrological Studies, Extreme Weather Events Mapping.	13

Suggested Readings:

1. Critchfield, H.J. (2011): *General Climatology*, Prentice-Hall of India.
2. Barry, R.G. and Chorley, R.J. (2009): *Atmosphere, Weather and Climate*, Routledge.
3. Lal, D.S. (2019): *Climatology*, Sharda Pustak Bhawan, Allahabad.
4. Trewartha, G.T. and Horn, L.H. (1980): *An Introduction to Climate*, McGraw Hill.
5. Singh, M.B. (2005): *Climatology*, Prayag Pustak Bhawan.

Programme/Class: MSc	Year: First	Semester: second
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code:B270804T	Course Title: **Environment Geography and Planning**	

Course outcomes: Students will be able to understand;

- Understand the fundamental concepts and approaches in environmental geography.
- Examine the interaction between environment and human activities.
- Evaluate planning strategies for environmental management and sustainability.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Concept and Approach, Nature and scope of Environmental Geography, Human-environment relationship, Environmental determinism, possibilism, and probabilism, Systems approach in environmental studies.	10
II	Components of the Environment, Lithosphere: Soil degradation and conservation, Atmosphere: Pollution and climate change, Hydrosphere: Water pollution and management, Biosphere: Biodiversity loss and conservation strategies.	10
III	Environmental Problems and Planning, Urban environmental issues: Air, water, and waste, Rural environmental issues: Deforestation, overgrazing, land degradation, Environmental impact assessment (EIA), Environmental laws and governance.	12
IV	Sustainable Development and Environmental Planning, Concepts and indicators of sustainable development, Environmental planning at national and regional levels, Role of Remote Sensing and GIS in environmental management, Case studies: Smart cities, eco-sensitive zones, watershed management.	13

Suggested Readings:

1. Singh, Savindra (2022): *Environmental Geography*, Prayag Pustak Bhawan, Allahabad.
2. Kumar, H.D. (2004): *Modern Concepts of Ecology*, Vikas Publishing.
3. Saxena, H.M. (2006): *Environmental Geography*, Rawat Publications.
4. Kasperson, R.E. and Kasperson, J.X. (2001): *Global Environmental Risk*, Earthscan.
5. UNEP (Various Reports): *Global Environment Outlook*.

Programme/Class: MSc	Year: First	Semester: Second
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code:B270805T	Course Title: **Biogeography**	

Course outcomes: Students will be able to understand;

- Understand the distribution of flora and fauna in relation to physical and climatic factors.
- Analyze ecological patterns and biotic responses to environmental changes.
- Apply biogeographical knowledge to biodiversity conservation and resource management.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Introduction Biogeography, Definition, scope, and significance, Historical development of Biogeography, Concepts of ecosystem and ecology, Energy flow and nutrient cycling.	10
II	Distribution of Life, Factors affecting distribution of flora and fauna, Biomes and their global distribution, Endemism, extinction, and biodiversity hotspots, Plant and animal adaptations to different environments.	12
III	Ecological Theories and Models, Ecological succession and climax, Island Biogeography theory, Species-area relationship, Dispersal, migration, and barriers.	12
IV	Applied Biogeography, Conservation strategies: In-situ and Ex-situ, Biodiversity and climate change, Role of Remote Sensing and GIS in biogeographical analysis, Biogeographical regions of India.	11

Suggested Readings:

1. Cox, C.B., Moore, P.D., & Ladle, R. (2016): *Biogeography: An Ecological and Evolutionary Approach*, Wiley-Blackwell.
2. Lomolino, M.V., Riddle, B.R., & Brown, J.H. (2010): *Biogeography*, Sinauer Associates.
3. Singh, S. (2004): *Biogeography*, Prayag Pustak Bhawan, Allahabad.
4. Huggett, R.J. (1998): *Fundamentals of Biogeography*, Routledge.
5. Richard, J. et al. (1998): *Global Biodiversity Assessment*, Cambridge University Press.

Programme/Class: MSc	Year: First	Semester: second
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code:B270806T	Course Title: **Urban and Regional Planning**	

Course outcomes: Students will be able to understand;

- Understand the dynamics of urbanization and regional development processes.
- Analyse theoretical and empirical frameworks of urban and regional planning.
- Apply spatial planning tools to assess and guide sustainable urban and regional growth.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Urbanization: Concept and Trend ,Definition, nature and scope of urban geography, Urbanization processes in developed and developing countries, Urban morphology and structure (Burgess, Hoyt, Harris-Ullman), Urbanization in India: Trends and issue.	10
II	Theories and Models of Regional Development, Concept of region and regional development, Growth Pole Theory (Perroux), Core-Periphery Model, Myrdal's Cumulative Causation and Hirschman's Linkage Theory, Regional disparities and development in India.	11
III	Urban Planning and Policies, Principles and types of urban planning, Master Plan, Smart Cities Mission, AMRUT, Urban governance and institutions (ULBs, 74th Amendment), Land use planning and zoning regulations.	12
IV	Sustainable Urban and Regional Development, Issues in urban environment and infrastructure, Urban poverty and informal settlements, Regional development planning: Backward Region Grant Fund, NITI Aayog's initiatives, Role of geospatial technologies in urban-regional planning.	12

Suggested Readings:

1. Hall, P. (2002): *Urban and Regional Planning*, Routledge.
2. Misra, R.P. (1992): *Regional Planning: Concepts, Techniques, Policies and Case Studies*, Concept Publishing.
3. Ramachandran, R. (1997): *Urbanisation and Urban Systems in India*, Oxford University Press.
4. Kundu, A. (2006): *Trends and Processes of Urbanisation in India*, IIED, London.
5. Singh, R.L. & Singh, K.N. (1975): *Readings in Regional Planning and Development*, National Geographical Society of India.

Programme/Class: MSc	Year: First	Semester: second
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code:B270807P	Course Title: **GIS and Spatial Modelling**	

Course outcomes: Students will be able to understand;

- Understand the basic principles of Geographic Information Systems (GIS).
- Apply spatial modelling techniques for data analysis and problem solving.
- Gain hands-on experience in spatial data processing, analysis, and visualization.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Fundamentals of GIS: Concepts and components, Types of spatial data: Raster and Vector, Data input methods: Digitization, Geo-referencing, Use of open-source GIS software (e.g., QGIS).	10
II	Data Processing and Map Design, Coordinate systems and projections, Topology and attribute data linking, Map layout design and symbology, Preparation of thematic maps (land use, slope, etc.).	11
III	Spatial Analysis and Modelling, Buffering, overlay, and proximity analysis, Interpolation and surface modelling (IDW, Kriging), Raster analysis and suitability modelling, Watershed and terrain analysis.	12
IV	Applications and Project Work, Case study-based spatial modelling (urban, forest, hydrology, etc.), Project work involving spatial data collection and analysis, Report writing and presentation.	12

Suggested Readings:

1. Burrough, P.A. & McDonnell, R.A. (1998): *Principles of Geographical Information Systems*, Oxford University Press.
2. Longley, P.A. et al. (2015): *Geographic Information Systems and Science*, Wiley.
3. Heywood, I., Cornelius, S., & Carver, S. (2011): *An Introduction to Geographical Information Systems*, Pearson.
4. Lo, C.P. & Yeung, A.K.W. (2009): *Concepts and Techniques of Geographic Information Systems*, PHI.
5. QGIS Documentation and Tutorials (https://docs.qgis.org)

Programme/Class: MSc	Year: Second	Semester: Third
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code:B270901T	Course Title: **Advance Remote sensing and GIS**	

Course outcomes: Students will be able to understand;

- Understand the principles and techniques of advanced remote sensing and GIS.
- Apply image processing and spatial analysis for environmental and geographical studies.
- Utilize geospatial technologies for research and decision-making.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Fundamentals of Remote Sensing, EMR and its interaction with atmosphere and earth surface, Satellite sensors and platforms, Resolution: spatial, spectral, radiometric, temporal, Digital image formats and data products	10
II	Image Processing Techniques, Image rectification and restoration, Image enhancement, classification (supervised, unsupervised), Accuracy assessment, Change detection techniques.	11
III	GIS Concepts and Data Models, Components and functions of GIS, Spatial and non-spatial data, Data input, editing, and topology, Raster and vector data models, GPS integration	12
IV	Applications of RS and GIS, Land use/land cover mapping, Natural resource management, Urban and environmental planning, Disaster management and climate analysis, Web GIS and emerging geospatial technologies	12

Suggested Readings:

1. Lillesand, T.M., Kiefer, R.W., & Chipman, J.W. (2015): Remote Sensing and Image Interpretation, Wiley.
2. Jensen, J.R. (2007): Remote Sensing of the Environment: An Earth Resource Perspective, Pearson.
3. Burrough, P.A., & McDonnell, R.A. (1998): Principles of Geographical Information Systems, Oxford University Press.
4. Heywood, I., Cornelius, S., & Carver, S. (2011): An Introduction to Geographical Information Systems, Pearson.
5. Chuvieco, E. (2009): Fundamentals of Satellite Remote Sensing, CRC Press.

Programme/Class: MSc	Year: Second	Semester: Third
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code:B270902T	Course Title: **Research Methodology**	

Course outcomes: Students will be able to understand;

- Understand the philosophical foundations and processes of scientific research.
- Formulate research problems, hypotheses, and design methodologies.
- Apply quantitative and qualitative techniques for data collection, analysis, and interpretation.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Fundamentals of Research, Meaning, objectives, and types of research, Research process and scientific methods, Research in geography: Historical development and trends, Identification and formulation of research problems.	10
II	Research Design and Hypothesis, Research design: Types and significance, Sampling techniques and methods, Hypothesis: Concept, types, and formulation, Review of literature and research ethics.	11
III	Data Collection and Techniques, Primary and secondary data sources, Methods of data collection: Surveys, interviews, questionnaires, field observation, Tools and techniques: Scales, measurements, coding, Fieldwork in geographical research.	12
IV	Data Analysis and Report Writing, Statistical tools: Central tendency, dispersion, correlation, regression, Use of SPSS/Excel/R for basic data analysis, Interpretation of data and cartographic representation, Report writing: Structure, referencing, and presentation.	12

Suggested Readings:

1. Kothari, C.R. (2004): *Research Methodology: Methods and Techniques*, New Age International Publishers.
2. Singh, R.L. (ed.) (1979): *Readings in Research Methodology in Geography*, NGSI.
3. Krishnaswamy, O.R. (1993): *Methodology of Research in Social Sciences*, Himalaya Publishing.
4. Clifford, N. & Valentine, G. (2003): *Key Methods in Geography*, Sage Publications.
5. Gomez, B. & Jones III, J.P. (2010): *Research Methods in Geography: A Critical Introduction*, Wiley-Blackwell.

Programme/Class: MSc	Year: Second	Semester: Third
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code:B270903T	Course Title: **Natural Resource management**	

Course outcomes: Students will be able to understand;

- Understand the classification, distribution, and management of natural resources.
- Evaluate the spatial and temporal dynamics of resource utilization.
- Apply sustainable approaches to the planning and conservation of resources using geographical tools.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Conceptual Framework, Definition, Nature, and Scope of Resource Geography, Classification of Resources: Renewable and Non-renewable, Resource appraisal and inventory methods, Resource-Environment Relationship.	10
II	Resource Distribution and Utilization, Distribution and management of land, water, and forest resources, Mineral and energy resources: types and global distribution, Agricultural resources and food security, Changing patterns of resource consumption.	11
III	Resource Development and Planning, Resource regions and typology, Sustainable resource development, Resource planning and conservation, Integrated resource management and regional planning.	12
IV	Issues and Policies in Resource Use, Resource depletion and environmental degradation, Resource conflicts: inter-state and international, Technological advances and resource use, Resource policies in India and international cooperation. Application of Remote sensing and GIS	12

Suggested Readings:

1. Zimmerman, E.W. (1951): *World Resources and Industries*, Harper & Brothers, New York.
2. Guha, R. & Gadgil, M. (1994): *Ecology and Equity: The Use and Abuse of Nature in Contemporary India*, Oxford University Press.
3. Negi, B.S. (1990): *Geography of Resources*, Kedarnath Ramnath Publications, Meerut.
4. Holechek, J.L., et al. (2010): *Natural Resources: Ecology, Economics and Policy*, Pearson.
5. Singh, R.B. (Ed.) (2013): *Resource and Environmental Management: Indian Perspectives*, Rawat Publications.

Programme/Class: MSc	Year: Second	Semester: Third
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code:B270904T	Course Title: **Ecology and Planning**	

Course outcomes: Students will be able to understand;

- Acquire practical skills in ecological survey methods and environmental analysis.
- Apply ecological principles to planning and sustainable development.
- Use geospatial tools and field data for ecological planning and management.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Introduction to Ecology and Environment Basic ecological concepts: ecosystem, community, habitat, Sampling techniques: quadrat, transect methods Measurement of ecological parameters (density, frequency, dominance)	10
II	Biodiversity Assessment and Conservation Planning**,** Vegetation sampling and species identification, Biodiversity indices: Shannon, Simpson, Mapping and zoning for conservation areas.	11
III	Environmental Quality and Impact Assessment**,** Field methods for soil, water, and air quality analysis, Preparation of an Environmental Impact Assessment (EIA) report (mini-case), Use of environmental standards and guidelines	12
IV	Ecology in Urban and Regional Planning, Land use and land cover mapping using GPS/RS, Green belt and open space planning, Preparation of an ecological plan for a selected site (field-based exercise)	12

Suggested Readings:

1. Odum, E.P. (1971): *Fundamentals of Ecology*, W.B. Saunders Co.
2. Singh, J.S., Singh, S.P., & Gupta, S.R. (2014): *Ecology, Environmental Science and Conservation*, S. Chand.
3. Misra, R. (1968): *Ecology Workbook*, Oxford & IBH Publishing Co.
4. Chandna, R.C. (2012): *Environmental Geography*, Kalyani Publishers.
5. Kumar, H.D. (1996): *Modern Concepts of Ecology*, Vikas Publishing.
6.

Programme/Class: MSc	Year: Second	Semester: Third
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code:B270905T	Course Title: **Agricultural geography**	

Course outcomes: Students will be able to understand;

- Understand the spatial characteristics and patterns of agricultural systems.
- Analyze the role of physical and socio-economic factors influencing agriculture.
- Evaluate agricultural regionalization and modernization in a global context.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Nature, Scope, and Significance of Agricultural Geography, Origin and evolution of agriculture, Approaches to study agriculture: Commodity, Systemic, and Regional, Determinants of agriculture: Physical, economic, and technological.	10
II	Agricultural Systems and Typologies, Classification of agricultural systems (Whittlesey's classification), Intensive and extensive agriculture, Plantation, mixed farming, subsistence, and commercial agriculture, Shifting cultivation and organic farming.	11
III	Agricultural Land Use and Models, Land use classification and cropping pattern, Von Thünen's model and its applicability, Agricultural productivity and efficiency, Green Revolution and its impact.	12
IV	Agricultural Regionalization and Contemporary Issues, Agricultural regionalization in India, Food security and sustainable agriculture, Climate change and agriculture, Globalization and agricultural trade.	12

Suggested Readings:

1. Symons, L. (1972): Agricultural Geography, G. Bell & Sons.
2. Grigg, D. (1984): Introduction to Agricultural Geography, Routledge.
3. Singh, Jasbir & Dhillon, S.S. (1994): Agricultural Geography, Tata McGraw-Hill.
4. Hussain, M. (2004): Agricultural Geography, Rawat Publications.
5. Shafi, M. (2000): Agricultural Geography of South Asia, Macmillan India.

Programme/Class: MSc	Year: Second	Semester: Third
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code:B270906T	Course Title: **Health Geography**	

Course outcomes: Students will be able to understand;

- Understand the spatial dimensions of health, disease, and healthcare systems.
- Examine the relationship between environmental, social, and economic factors affecting health.
- Analyse the role of geographical tools and techniques in health research and planning.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Foundation of Health Geography, Definition, scope, and development of Health Geography, Concept of health, disease, and wellness, Historical perspective and evolution of health care systems, Ecology of disease: host, agent, and environment.	10
II	Disease Patterns and Determinants, Spatial patterns of infectious and non-infectious diseases, Environmental, socio-economic, and behavioural determinants of health, Urban vs. rural health disparities, Epidemiological transition and demographic impacts.	11
III	Healthcare Systems and Accessibility, Distribution of healthcare facilities and services, Health care delivery models: public vs. private, Measuring accessibility and availability of health services, Health inequality and Vulnerability mapping.	12
IV	GIS and Applications in Health Geography, Role of Remote Sensing and GIS in disease mapping and surveillance, Case studies: COVID-19, Malaria, Tuberculosis, and Vector-borne diseases, Health risk assessment using geospatial tools, Policies and programs in health geography: National and international perspectives.	12

Suggested Readings:

1. Meade, M.S., Florin, J.W., & Gesler, W.M. (2010): *Medical Geography*, Guilford Press.
2. Gatrell, A.C., & Elliott, S.J. (2015): *Geographies of Health: An Introduction*, Wiley-Blackwell.
3. Learmonth, A.T.A. (1988): *Patterns of Disease and Hunger: A Study in Medical Geography*, David & Charles.
4. Cliff, A.D., & Haggett, P. (1998): *Atlas of Disease Distributions*, Blackwell.
5. Kumar, S. (2012): *Health Geography: A Spatio-Temporal Perspective*, Rawat Publications.

Programme/Class: MSc	Year: Second	Semester: Third
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code:B270907P	Course Title: **Remote sensing and GIS**	

Course outcomes: Students will be able to understand;

- Understand the structure and functioning of major physical systems of the Earth.
- Analyse the dynamic processes shaping landforms, weather, climate, and ecosystems.
- Apply physical geography knowledge to environmental management and spatial planning.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

Total No. of Lectures-Tutorials-Practical (in hours per week): L- 4/w

Unit	Topics	No. of Lectures
I	Visual Interpretation of Aerial Photographs Land use/Land Cover Mapping Physical and cultural features Visual Interpretation of Satellite Images Metadata Land Use/Land Cover Mapping	10
II	Remote Sensing Data Import/Export Image Display Grey scale image, Pseudo image and False Colour Composite Image Info Link/Unlink Viewers Blend, Swipe and Flicker Spatial Profile Spectral Profile.	11
III	Digital Image Processing: Pre-processing Layer stacking and Band Combinations Image registration through GCP image to image registration Mosaicking Image sub setting Image Reproject Rubber sheeting – Spatial Enhancement Convolution Focal Analysis Resolution Merge, Texture Crisp Adaptive Filter Statistical Filter Radiometric enhancement stretch Histogram equalization Histogram match Brightness Spectral enhancement Principal Components Indices	12
IV	Topographic analysis Slope Aspect Level Slice Shaded relief Painted relief DEM height converter View shed Analysis Spatial Modeller Map Composer	12

Suggested Readings:

1. Lillesand, T.M., Kiefer, R.W., & Chipman, J.W. (2015): *Remote Sensing and Image Interpretation*, Wiley.
2. Jensen, J.R. (2007): *Remote Sensing of the Environment*, Pearson.
3. Burrough, P.A. & McDonnell, R.A. (1998): *Principles of Geographical Information Systems*, Oxford University Press.
4. Heywood, I., Cornelius, S., & Carver, S. (2011): *An Introduction to Geographical Information Systems*, Pearson.
5. QGIS Documentation: https://docs.qgis.org/

Programme/Class: MSc	Year: second	Semester: fourth
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code:B271001D	Course Title: **Dissertation**	

Course outcomes: Students will be able to understand;

- Develop a comprehensive research project proposal with clear objectives and methodology.
- Carry out independent research aligned with departmental and academic standards.
- Demonstrate proficiency in literature review, fieldwork, data analysis, and scientific writing.
- Present and defend their research findings through a well-structured dissertation and viva voce.

Credits: 14	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

	Project Report Guidelines	
	Dissertations Shall be submitted as per guidelines of CSJM University, Kanpur.	

Students are instructed to design and conduct their research projects using Remote Sensing and Geographic Information System (GIS) techniques to address relevant Geography and Allied discipline. You should begin by selecting a clear and focused research topic related to land use/land cover analysis, urban geography, forest monitoring, water resource management, hydrology, Rural development , Biogeography or any other area where spatial and remote data is essential.

Programme/Class: MSc	Year: second	Semester: fourth
Subject: Geography (with specialization Remote sensing and GIS)		
Course Code:B271002P	Course Title: **Presentation**	

Course outcomes: Students will be able to understand;

- Develop an original research dissertation with clear objectives, robust methodology, and sound conclusions.
- Demonstrate competence in fieldwork, data analysis, and report writing.
- Present their research work effectively using appropriate presentation techniques and visual aids.
- Defend their research findings through a structured viva voce examination.

Credits: 4	Core Compulsory
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)

	Presentation Guidelines	

Presentation

- Each student shall make an oral Presentation summarizing their research objectives, methods, key findings, and conclusions.
- Presentations should include appropriate maps, charts, figures, and slides.
- The Presentation will be evaluated by the Supervisor and the Departmental Committee.

Programme/Class: MSc	Year: second	Semester: fourth
Subject: Geography (with specialization Remote sensing and GIS)		
Course CodeB271003V	Course Title: **Viva Voce**	
Credits: 2	Core Compulsory	
Max. Marks: 25(Internal) +75(External)	Min. Passing Marks:33 (Minimum 25 Marks in External)	

	Viva Voce	

Viva Voce

- A formal Viva Voce shall be conducted to assess the student's understanding of their research topic, methodology, analysis, and final outcomes.
- The Viva Voce shall be conducted by an External Examiner along with the Supervisor and Departmental Committee.
- Successful completion of both the Presentation and Viva Voce is mandatory for the award of the degree.