West Bengal State Council of Technical & Vocational Education and Skill Development
(Technical Education Division)

Syllabus
of

Diploma in Geographic Information System & Global Positioning System [GISGPS]

Part-III (6th Semester)

2023

CURRICULAR STRUCTURE OF DIPLOMA IN GIS AND GPS

WEST BENGAL STATE COUNCIL OF TECHNICAL & VOCATIONAL EDUCATION AND SKILL DEVELOPMENT

BRANCH: GIS & GPS | **SEMESTER: VI**

SL NO	CATEGORY	CODE	COURSE TITLE	CREDIT	CLASS/WK			EVALUATION SCHEME						
								INTERNAL			ESE	PIA	PEA	TOTAL
					L	T	P	INT	AS/QZ	ATD				
1	Program core course	GISPC306	Application of GIS and Planning	2	2			20	10	10	60			100
2	Program Elective course	GISPE303	PROGRAMME ELECTIVE IV	3	3			20	10	10	60			100
3	Humanities and Social Science course	HS301	Entrepreneurship and Start-ups	3	2	1		20	10	10	60			100
4	Open Elective	GISOE301	OPEN ELECTIVE I	3	3			20	10	10	60			100
5	Open Elective	GISOE302	OPEN ELECTIVE II	3	3			20	10	10	60			100
6	Seminar	SE301	Seminar	1	1							60	40	100
7	Program core course	GISPC307	GIS LAB-III	2			4					60	40	100
8	Major Project	PR 302	PROJECT	3			6					60	40	100
TOTAL				20	14	1	10							800

GISPE303: Any one of the two subjects 1. Application of GIS In Environmental Science & Management. 2.Application of GIS In Disaster Management, Resources Management.
GISOE301: 1. Engineering Economics and Project management.
GISOE302: Any one of the two subjects 1. Industrial Safety 2. Internet of Things 3. Environmental Science & Engineering.

STUDENT CONTACT HOURS PER WEEK: 25 Hrs. Theories and Practical Period of 60 Minutes each.
L – Lecture, T –Tutorial, P – Practical, INT- Internal Assessment AS/QZ – Assignment / Quiz ATD- Attendance ESE - End Semester Exam, PIA-Practical Internal Assessment PEA-Practical External Assessment.

Name of the Course : Diploma in GIS & GPS		
Course Title: Application of GIS and Planning	**Course code : GISPC306**	
Number of Credit : 2	**Semester : SIXTH**	
Teaching Scheme	**Examination Scheme**	
Duration : 15 weeks	**Maximum Marks : 100**	
Theory : - 2 hrs/week	Continuous Internal Assessment	20 Marks
Tutorial: - NIL	Attendance	10 Marks
Practical : NIL	Assignment/Presentation/Quiz	10 Marks
Total Contact Hours: 30 Hours	**End Semester Examination**	60 Marks

Prerequisite: Basic knowledge of GIS and its application areas.

Aim: To study, understand and apply the concepts of GIS planning.

Course Objective :

Understand the Application areas of GIS like social science, and policy-related problems and to evaluate alternative options for addressing these.

Understand and develop the concepts of GIS planning.

Course Content :

Content (Theory)		Module	Hrs./Unit
Unit:1	Application of GIS in water resource development. 1.1 Concept of water resources: hydrological cycle, Darcy's law, Porosity, permeability, transmissibility, specific yield, specific retention and hydraulic conductivity Issues in water resources development, management and utilization. 1.2 Spectral characteristics of water and relevance of RS techniques for hydrological investigations.	Module 1	7
Unit: 2	Application of GIS in watershed management 2.1 Introduction, philosophy and concept. 2.2 Planning and management 2.3 Watershed characterisation and mapping 2.4 Runoff estimates from watersheds & GIS database for watershed management 2.5 Groundwater flow, surface and groundwater interaction, control and occurrence of groundwater movement		8
Unit: 3	Application of GIS in Forestry 3.1 Introduction and concept of forestry 3.2 Role of RS and GIS in forestry 3.3 Interaction of EMR with vegetation and spectral characteristics of vegetation 3.4 Temporal characteristics of vegetation 3.5 Vegetation indices 3.6 Forest cover mapping through RS and GIS	Module 2	8
Unit: 4	Application of GIS in Soil Study 4.1 Distribution of soil types in India 4.2 Introduction of remote sensing and GIS in soil survey. 4.3 Soil morphology and classification 4.4 Salt affected soil and mapping of salt affected soil using remote sensing and GIS	Module 3	7
Total			**30**

Examination Scheme of ESE (End Semester Examination)

Theoretical	Question Type	Question to be set	Questions to be answered

	Gr:A MCQ, Fill in the blanks, True or False (Carrying 1 mark each)	**25**	**20**
	Gr.:B Subjective type questions (carrying 8 marks each)	**10** **(At least 3 questions from each of 3 modules)**	**5**
TOTAL			**60**
References:			
Course outcomes:			
. After completion of this course student will be able to identify different application areas and plan accordingly for implementing the concept of GIS in that areas.			

Name of the Course : Diploma in GIS & GPS		
Course Title: Programme Elective IV **1. Application of GIS In Environmental Science & Management**	**Course code : GISPE303**	
Number of Credit : 3	**Semester : SIXTH**	
Teaching Scheme	**Examination Scheme**	
Duration : 15 weeks	**Maximum Marks : 100**	
Theory : - 3 hrs/week	Continuous Internal Assessment	20 Marks
Tutorial: - NIL	Attendance	10 Marks
Practical : NIL	Assignment/Presentation/Quiz	10 Marks
Total Contact Hours: 30 Hours	**End Semester Examination**	60 Marks

Prerequisite: To study analyses and acquire in depth knowledge of different practical problems in the field of Environmental Engineering.

Aim : To learn how to apply concept of GIS in different areas/ practical problems.

Course Objective:

Knowledge of Remote Sensing, GIS, and Digital Image Processing is required.

Course Content :

	Content (Theory)	Module	Hrs./Unit
Unit:1	1.1 Water and the environment, water quality-water pollution-sources of water pollution-water runoff. 1.2 Remote Sensing of fluorescence. 1.3 Remote Sensing and Water quality management. 1.4 Snow surface cover-flood prediction	Module 1	15
Unit: 2	2.1 Soils and land forms-soil erosion 2.2 salinity-flood damage assessment of soil degradation using Remote Sensing and GIS. 2.3 Ecology and ecosystem, Conservation and resource management. 2.4 Spectral reflectance from vegetated surface -Stress monitoring-forest conservation-wild life studies-GIS for monitoring non-point source and point source pollution.	Module 2	10
Unit: 3	3.1 Air pollution- sources of air pollution-Environmental degradation. 3.2 Urban environment, General consideration rural structure-urban areas 3.3 Impact of industrial pollution-chemical effluents. 3.4 Remote Sensing technique for Air quality monitoring. 3.5 case studies weather forecasting and climatology-emissivity characteristics.	Module 3	20
Total			**30**

Examination Scheme of ESE (End Semester Examination)

	Question Type	Question to be set	Questions to be answered	Marks
Theoretical	**Gr:A** MCQ, Fill in the	**25**	**20**	**10**

	blanks, True or False (Carrying 1 mark each)			
	Gr.:B Subjective type questions (carrying 8 marks each)	**10 (At least 3 questions from each of 3 modules)**	**5**	**40**
TOTAL				**60**

Reference Book

Course Outcomes:

Upon completion of this course, students should be able to:

1. Apply the knowledge of GIS in the field of environmental science & management.

Name of the Course : Diploma in GIS & GPS		
Course Title: Programme Elective IV **2. Application of GIS In Disaster Management, Resources Management.**	**Course code : GISPE303**	
Number of Credit : 3	**Semester : SIXTH**	
Teaching Scheme	**Examination Scheme**	
Duration : 15 weeks	**Maximum Marks : 100**	
Theory : - 3 hrs/week	Continuous Internal Assessment	20 Marks
Tutorial: - NIL	Attendance	10 Marks
Practical : NIL	Assignment/Presentation/Quiz	10 Marks
Total Contact Hours: 30 Hours	**End Semester Examination**	60 Marks

Prerequisite: To study analyse and acquire in depth knowledge of different disaster related to natural calamity.

Aim : To learn how to apply concept of GIS in different areas/ practical problems in disaster management.

Course Objective:

Knowledge of Remote Sensing, GIS, and Digital Image Processing is required.

Course Content :

Content (Theory)		Module	Hrs./Unit
Unit:1	1.1 Introduction to Fundamental concepts of hazards and disasters.-Types of hazards and disasters, characterization, zonation of hazards, natural and manmade disasters. 1.2 Disaster and National losses, history of disasters in India. 1.3 Fundamental concept of Disaster Management, Government, NGOs and peoples participation in disaster management. Existing organization structure for managing disasters in State Government and Central Government. 1.4 Geoinformatics in disaster mitigation.	Module 1	15
Unit: 2	2.1 Application of Geo-informatics in Hazards and Disasters Management. 2.2 Geological Hazards: Landslide, Earthquake, Mining hazards (subsidence, flooding etc.), Volcanic hazards, Groundwater hazards, Glacial hazards. 2.3 Hydro meteorological Hazards: Flash floods, River floods, Dam burst, Cloud burst, Cyclones, Coastal hazards and Drought. 2.4 Environmental hazards: Forest hazards-Deforestation, Degradation and Forest fire.	Module 2	10
Unit: 3	3.1 Land, soil degradation, desertification and Pollution (Water, air and soil) 3.2 Geoinformatics Applications: Geoinformatics models in managing forest fires, floods, landslides, cyclone and earthquake, multiple hazard mapping. 3.3 Case Studies: Earthquakes in India, Floods in Indo Gangetic plains, Landslides in Himalayan region, Drought in Indian plateau regions	Module 3	20

Total				**30**
Examination Scheme of ESE (End Semester Examination)				
Theoretical	**Question Type**	**Question to be set**	**Questions to be answered**	**Marks**
	Gr:A MCQ, Fill in the blanks, True or False (Carrying 1 mark each)	**25**	**20**	**10**
	Gr.:B Subjective type questions (carrying 8 marks each)	**10 (At least 3 questions from each of 3 modules)**	**5**	**40**
TOTAL				**60**

1.

Course Outcomes:

Upon completion of this course, students should be able to:

Apply the knowledge of GIS in disaster management.

Name of the Course : Diploma in GIS & GPS		
Course Title: Entrepreneurship and Start-ups	**Course code : HS 302**	
Number of Credit : 3	**Semester : SIXTH**	
Teaching Scheme	**Examination Scheme**	
Duration : 15 weeks	**Maximum Marks : 100**	
Theory : - 2 hrs/week	Continuous Internal Assessment	20 Marks
Tutorial: - 1	Attendance	10 Marks
Practical : NIL	Assignment/Presentation/Quiz	10 Marks
Total Contact Hours: 45 Hours	**End Semester Examination**	60 Marks

Prerequisite: None

Course Objective:

1. To raise awareness, knowledge and understanding of enterprise/ entrepreneurship.
2. To motivate and inspire students toward an entrepreneurial career.
3. To understand venture creation process and to develop generic entrepreneurial competences.
4. To introduce students to the basic steps required for planning, starting and running a business.
5. To familiarise students with the different exit strategies available to entrepreneurs.

Course Content :

Unit	Name of the Topic	Hours

Unit:1	**ENTREPRENEURSHIP – INTRODUCTION AND PROCESS**
	• Concept, Competencies, Functions and Risks of entrepreneurship
	• Entrepreneurial Values& Attitudes and Skills
	• Mindset of an employee/manager and an entrepreneur
	• Types of Ownership for Small Businesses
	  o Sole proprietorship
	  o Partnerships
	  o Joint Stock company- public limited and private limited companies
	• Difference between entrepreneur and Intrapreneur
		10

Unit: 2	**PREPARATION FOR ENTREPRENEURIAL VENTURES** • Business Idea- Concept, Characteristics of a Promising Business Idea, Uniqueness of the product or service and its competitive advantage over peers. • Feasibility Study – Concept – Locational, Economic, Technical and Environmental Feasibility. Structure and Contents of a standard Feasibility Study Report • Business Plan – Concept, rationale for developing a Business Plan, Structure and Contents of a typical Business Plan • Project Report- Concept, its features and components • Basic components of Financial Statements- Revenue, Expenses (Revenue & capital exp), Gross Profit, Net Profit, Asset, Liability, Cash Flow, working capital, Inventory. Funding Methods-Equity or Debt. Students are just expected to know about the features and key inclusions under, Business Plan and Project Report. They **may not** be asked to prepare	20

	a Business Plan/ Project Report/ Project Feasibility Report in the End of Semester Examination.	
Unit: 3	**ESTABLISHING SMALL ENTERPRISES** • Legal Requirements and Compliances needed for establishing a New Unit- o NOC from Local body o Registration of business in DIC o Statutory license or clearance o Tax compliances	3
Unit: 4	**START-UP VENTURES** • Concept & Features • Mobilisation of resources by start-ups: Financial, Human, Intellectual and Physical • Problems and challenges faced by start-ups. • Start-up Ventures in India – Contemporary Success Stories and Case Studies to be discussed in the class. Case studies have been included in the syllabus to motivate and inspire students toward an entrepreneurial career from the success stories. No questions are to be set from the case studies.	4
Unit: 5	**FINANCING START-UP VENTURES IN INDIA** • Communication of Ideas to potential investors – Investor Pitch • Equity Funding, Debt funding – by Angel Investors, Venture Capital Funds, Bank loans to start-ups • Govt Initiatives including incubation centre to boost start-up ventures • MSME Registration for Start-ups –its benefits	6
Unit: 6	**EXIT STRATEGIES FOR ENTREPRENEURS** • Merger and acquisition exit, Initial Public Offering (IPO), Liquidation, Bankruptcy – **Basic Concept only**	2
Total		**45**

Examination Scheme of ESE (End Semester Examination)

	Question Type	Question to be set	Questions to be answered	Marks
Theoretical	**Gr:A** MCQ, Fill in the blanks, True or False (Carrying 1 mark each)	**25**	**20**	**20**
	Gr.:B Subjective type questions (carrying 8 marks each)	**10**	**5**	**40**
TOTAL				**60**

References:

Sl. No.	Title of Book	Author	Publication
1.	Entrepreneurship Development	Sangeeta Sharma	Prentice Hall of IndiaLearning Private Ltd
2.	Entrepreneurship Development	S. Anil Kumar	New Age International
3.	Fundamentals of Entrepreneurship	Sangram Keshari Mohanty	Prentice Hall of India Learning Private Ltd
4.	Fundamentals of Entrepreneurship	Dr. G.K. Varshney	Sahitya Bhawan Publication
5.	Managing New Ventures: Concepts and Caseson Entrepreneurship	Anjan Raichaudhuri	Prentice Hall of India Learning Private Ltd

6.	How to Start a Business in India	Simon Daniel	Buuks, Chennai
7.	Entrepreneurship and Small Business Management	S.S. Khanka	S. Chand & Sons, New Delhi
8.	Entrepreneurship Development and Business Ethics	Abhik Kumar Mukherjee & Shaunak Roy	Oxford University Press
9.	Entrepreneurship Development and Business Ethics	Dr B Chandra & Dr B Biswas	Tee Dee Publications
10.	Entrepreneurship Development Small Business Entrepreneurship	Poornima Charantimath	Pearson Education India

Course Outcomes
CO1: Identify qualities of entrepreneurs, develop awareness about entrepreneurial skill and mindset and express knowledge about the suitable forms of ownership for small business
CO2: Comprehend the basics of Business idea, Business plan, Feasibility Study report, Project Report and Project Proposal
CO3: Understand the concept of start-up business and recognise its challenges within legal framework and compliance issues related to business.
CO4: Make a Growth Plan and pitch it to all stakeholders and compare the various sources of funds available for start-up businesses

Name of the Course : Diploma in GIS & GPS		
Course Title: OPEN ELECTIVE I Engineering Economics & Project Management	**Course code : GISOE 301**	
Number of Credit : 3	**Semester : SIXTH**	
Teaching Scheme	**Examination Scheme**	
Duration : 15 weeks	**Maximum Marks : 100**	
Theory : - 3 hrs/week	Continuous Internal Assessment	20 Marks
Tutorial: - NIL	Attendance	10 Marks
Practical : NIL	Assignment/Presentation/Quiz	10 Marks
Total Contact Hours: 45 Hours	**End Semester Examination**	60 Marks
Course Objective:		
Details syllabus as per common syllabus of all discipline		

Name of the Course : Diploma in GIS & GPS		
Course Title: OPEN ELECTIVE II **1. Industrial Safety**	**Course code : GISOE 302**	
Number of Credit : 3	**Semester : SIXTH**	
Teaching Scheme	**Examination Scheme**	
Duration : 16 weeks	**Maximum Marks : 100**	
Theory : - 3 hrs/week	Continuous Internal Assessment	20 Marks
Tutorial: - NIL	Attendance	10 Marks
Practical : NIL	Assignment/Presentation/Quiz	10 Marks
Total Contact Hours: 42 Hours	**End Semester Examination**	60 Marks
Details syllabus as per common syllabus of all discipline		

Name of the Course : Diploma in GIS & GPS		
Course Title: OPEN ELECTIVE II **2. Internet of Things**	**Course code : GISOE 302**	
Number of Credit : 3	**Semester : SIXTH**	
Teaching Scheme	**Examination Scheme**	
Duration : 15 weeks	**Maximum Marks : 100**	
Theory : - 3 hrs/week	Continuous Internal Assessment	20 Marks
Tutorial: - NIL	Attendance	10 Marks
Practical : NIL	Assignment/Presentation/Quiz	10 Marks
Total Contact Hours: 45 Hours	**End Semester Examination**	60 Marks
Details syllabus as per common syllabus of all discipline.		

Name of the Course : Diploma in GIS & GPS		
Course Title: OPEN ELECTIVE II **3. Environmental science & engineering**	**Course code : GISOE 302**	
Number of Credit : 3	**Semester : SIXTH**	
Teaching Scheme	**Examination Scheme**	
Duration : 15 weeks	**Maximum Marks : 100**	
Theory : - 3 hrs/week	Continuous Internal Assessment	20 Marks
Tutorial: - NIL	Attendance	10 Marks
Practical : NIL	Assignment/Presentation/Quiz	10 Marks
Total Contact Hours: 45 Hours	**End Semester Examination**	60 Marks
Details syllabus as per common syllabus of all discipline.		

Name of the Course : Diploma in GIS & GPS

Course Title: GIS LAB-III	**Course code : GISPC307**	
Number of Credit : 2	**Semester : SIXTH**	
Teaching Scheme	**Examination Scheme**	
Duration : 15 weeks	**Maximum Marks : 100**	
Theory : - NIL	Continuous Internal Assessment	50 Marks
Tutorial: - NIL	Attendance	10 Marks
Practical : 4 hrs/week		
Total Contact Hours: 60 Hours	**End Semester Examination**	40 Marks

Prerequisite: Concept of GIS LAB-II

Aim : Developing the knowledge of Application of GIS in different areas like Urban Planning,Disaster Management,Agriculture etc.

Course Objective:

Students will be able to:

Implement the concept of GIS.in real world problem.

Prepare report on the basis of Analysis.

Instructions:

Group size for practical work should be formed in such a way that each student from a group can handle software independently to understand the functions of different components of the subject/software.

Content :

Sl. No.	Assignments / Practical	Hrs./Unit
1	1.1 Soil mapping 1.2 Crop estimation 1.3 Identification of forest species from aerial photographs 1.4 Vegetation mapping from satellite images 1.5 Digital image enhancements for vegetation/forest 1.6 NDVI analysis 1.7 Digital classification for forest cover mapping 1.8 Forest change detection studies	60
2	1.1 Route location 1.2Dam site location studies 1.3Digital Terrain Modelling 1.4Drainage mapping. 1.5Morphometric analysis 1.6Estimation of potential evapotranspiration and water balance through empirical equation 1.7 Hydro-morphologeo-logic interpretation 1.8Preparation of groundwater potential zone maps	

Note: All the application of GIS should be done by using QGIS/ Arc GIS / tNT Mips / ERDAS IMAGINE

Total	**60**

Examination Scheme (End Semester Assessment)

	Assessment type	Marks
Practical/Sessional	**Assignment on the day of viva-voce and practical report submission**	**20**
	Viva-voce	**20**

Total	40
Course Outcomes:	
Upon completion of this course, students should be able to 1. Acquire skills for implementing concept of GIS in different application areas.	

Name of the Course : Diploma in GIS & GPS

Course Title: SEMINAR	**Course code : SE301**	
Number of Credit : 1	**Semester : SIXTH**	
Teaching Scheme	**Examination Scheme**	
Duration : 15 weeks	**Maximum Marks : 100**	
Theory : - NIL	Continuous Internal Assessment	50 Marks
Tutorial: - NIL	Attendance	10 Marks
Practical : 1 hrs/week		
Total Contact Hours: 15 Hours	**End Semester Examination**	40 Marks

Prerequisite:

Good presentation skills.

Aim : 1. Development of presentation skills.
2.Enhancement in soft skills through innovation.
3. Development of professional approach

Course Objective:

Students will be able to

1. Acquire information from different sources.
2. Prepare presentation for given topic or project.
3. Present given topic in a seminar using different audio visual method.
4. Interact with audience to share thoughts.
5. Defend their projects by answering queries from audience.

Instructions:

1. Seminar should be presented by Group/individual. This will be decided by respective lecturer.

Content :

Seminar is intended to provide opportunity to the student to present their project related work in front of a technical gathering with the help of different oral, aural and visual communication aids. To prepare the presentation of seminar, students have to go through the proper research methodology. Students are expected to defend the project or topic while answering questions arising out of their presentation.

Examination Scheme (End Semester Assessment)

	Assessment type	**Marks**
Practical/Sessional	Assignment on the day of viva-voce and practical report submission	**20**
	Viva-voce	**20**
Total		**40**

Course Outcomes:

Upon completion of this course, students should be able to:

1. Present given topic in a seminar using different audio visual method .

Name of the Course : Diploma in GIS & GPS		
Course Title: PROJECT	**Course code : PR 302**	
Number of Credit : 3	**Semester : SIXTH**	
Teaching Scheme	**Examination Scheme**	
Duration : 15 weeks	**Maximum Marks : 100**	
Theory : - NIL	Continuous Internal Assessment	50 Marks
Tutorial: - NIL	Attendance	10 Marks
Practical : 6 hrs/week		
Total Contact Hours: 90 Hours	**End Semester Examination**	40 Marks

Prerequisite: Knowledge of GIS and Digital Image Processing.

Aim : Developing skill for undertaking a project related to advanced GIS concepts.

Course Objective:

Identify and use different advanced GIS techniques.

Overall idea of carrying out a project on GIS.

Prepare report including drawing/chart/tables etc. using GIS software.

Instructions:

Project may be done individually or in Group. Subject teacher may take decision in this regard considering the vastness of the project.

Content :

Sl. No.	Assignments / Practical	Hrs./Unit
1	A project on GIS may be performed covering all the knowledge / technics taught in previous Semesters. Domain area: Project taken in 5th semester may be continued or any Special domain selected by subject teacher.	60
Total		**60**

Examination Scheme (End Semester Assessment)

	Assessment type	Marks
Practical/Sessional	**Assignment on the day of viva-voce and practical report submission**	**20**
	Viva-voce	**20**
Total		**40**

Course Outcomes:

Upon completion of this course, students should be able to:

1. Identify application areas and may undertake any advanced project on GIS.