

**METHODIST COLLEGE  
OF ENGINEERING AND TECHNOLOGY**



**DEPARTMENT OF CIVIL ENGINEERING**

**HONOR COURSES**

*IN*

**CIVIL ENGINEERING**



## SUBJECT AREA WISE LIST OF COURSES AND ASSOCIATED CREDITS

### HONOR COURSES in CIVIL ENGINEERING

S. No	Code No.	Subject	Semester	Credits
1.	HCE1	Advance Geomatics	V	3
2.	HCE2	Watershed Management	V	3
3.	HCE3	Advance Concrete Technology	VI	3
4.	HCE4	Advance Concrete Technology Laboratory	VI	2
5.	HCE5	Analysis and Design of Transportation Infrastructure	VII	3
6.	HCE6	Project: Design and Analysis using STAAD Pro	VII	4
			<b>Total</b>	<b>18</b>



**B.E. (Civil Engineering) - V SEMESTER**

S. No.	Course Category	Course Title	Scheme of Instruction				Scheme of Examination		Credits
			L	T	Pr/Drg	Total Hours	CIE	SEE	
<b>THEORY COURSES</b>									
<b>Honor Courses</b>									
1.	HCE1	Advance Geomatics	3	-	-	3	40	60	3
2.	HCE2	Watershed Management	3	-	-	3	40	60	3
			<b>6</b>			<b>6</b>			<b>6</b>



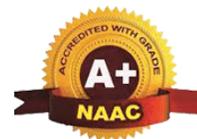
**B.E. (Civil Engineering) - VI SEMESTER**

S. No.	Course Category	Course Title	Scheme of Instruction				Scheme of Examination		Credits
			L	T	Pr/Drg	Total Hours	CIE	SEE	
<b>THEORY COURSES</b>									
<b>Honor Courses</b>									
1.	HCE3	Advance Concrete Technology	3	-	-	3	40	60	3
<b>PRACTICAL COURSES</b>									
<b>Honor Courses</b>									
2.	HCE4	Advance Concrete Technology Laboratory	-	-	4	4	40	60	2
			<b>3</b>		<b>4</b>	<b>7</b>			<b>5</b>



**B.E. (Civil Engineering) - VII SEMESTER**

S. No.	Course Category	Course Title	Scheme of Instruction				Scheme of Examination		Credits
			L	T	Pr/Drg	Total Hours	CIE	SEE	
<b>THEORY COURSES</b>									
<b>Honor Courses</b>									
1.	HCE5	Analysis and Design of Transportation Infrastructure	3	-	-	3	40	60	3
<b>PRACTICAL COURSES</b>									
<b>Honor Courses</b>									
2.	HCE6	Project: Design and Analysis using STAAD Pro	-	-	2	2	40	60	4
			<b>3</b>		<b>2</b>	<b>5</b>			<b>7</b>



Course code	Course Title	Core/ Elective					
		Core					
HCE1	Advanced Geomatics	L	T	P/D	Credits	SEE	CIE
		3	0	0	3	40	60

**Course Objectives:**

- The objective of this course is to impart knowledge of
1. Photogrammetric techniques of terrain measurement
  2. Basics of remote sensing and Sensor Characteristics
  3. Global Positioning System and methods of taking control points
  4. Map projections and Data models in GIS
  5. Spatial data and Terrain modelling analysis

**Course Outcomes:**

- After completion of the course, the student will be able to
- CO1.** Discuss basics of Photogrammetry and flight planning
  - CO2.** Determine elevations, scale and lengths of the lines from photographs
  - CO3.** Illustrate basics, energy interactions in Remote Sensing.
  - CO4.** Explain Segments, Errors and Positioning modes in GPS.
  - CO5.** Explain Map Projections, data models and analysis in GIS

**Unit-I:**

**Photogrammetric Surveying:** Types of Photogrammetry; Terrestrial Photogrammetry – Definitions, Horizontal and vertical angles from terrestrial photograph, Elevation of a point from photographic measurement; Aerial Photogrammetry – Definitions, Scale of a vertical photograph, computation of length of line between different elevations measured from vertical photograph, Relief displacement, flight planning.

**Unit-II:**

**Remote Sensing:** Definition, Electromagnetic spectrum, Basic Radiation laws; Components of Remote Sensing System; Energy Source, Energy Interaction with Atmosphere and Surface Materials, Spectral Signatures. Aircrafts and Satellites – Sun synchronous and Geostationary satellites;  
**Sensor Characteristics:** Spatial Resolution, Spectral Resolution, Radiometric Resolution, Temporal Resolution, radiometric resolution

**Unit-III:**

**Global Positioning System:** Overview of GPS, Types of Global Navigation Satellite Systems, GPS Segments, Current GPS satellite constellation; GPS Errors and Biases – Selective Availability, Satellite and Receiver Clock Errors, Multipath Error, Ionospheric delay, Tropospheric delay; GPS positioning modes – Point, Relative(DGPS), Static, Fast static, Stop & go, RTK

**Unit-IV:**

**Introduction to GIS:** Introduction, Components of GIS, Applications of GIS; Concept of Datum & Map Projections  
**Data Models:** Spatial and Non-Spatial Data models; Spatial Digital formats

**Unit-V:**

**Spatial Data Analysis:** Raster data analysis; Vector data analysis - Buffering, Overlay, Union, Intersect, Merging, splitting operations  
**Digital Elevation Models:** Types, Methods of Generation, Available Open source and Commercial Digital Elevation Models.  
**Terrain Modelling & Analysis:** Contouring, Vertical profiling, Hill shading, 3D perspectives; Slope & Aspect analysis.



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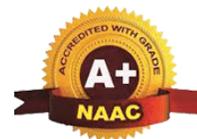


### **Text Books**

- T1. Punmia, B.C. & Jain A.K.—"Higher Surveying", 15<sup>th</sup> Edition, Laxmi Publications, 2005.
- T2. K.T.Chang —"Introduction to Geographic Information Systems", 4<sup>th</sup> Edition, McGraw Hill International Edition, 2016

### **Reference Books:**

- R1. Lillesand, T., Kiefer, R. W., & Chipman, J. – "Remote Sensing and Image Interpretation", 7<sup>th</sup> Edition, John Wiley & Sons, 2015
- R2. M.Anji Reddy – "Textbook of Remote Sensing and Geographic Information Systems", 3<sup>rd</sup> Edition, BS Publications, 2008.



Course code	Course Title	Core/ Elective					
		L	T	P/D	Core Credits	CIE	SEE
HCE2	Watershed Management	3	0	0	3	40	60
<b>Course Objectives:</b> The objective of this course is to impart knowledge of 1. Different watershed behaviour. 2. Runoff data and soil control of erosion 3. Rainwater harvesting and harvesting methods 4. Land use classification and impact of land use changes 5. Planning the watershed by the application of RS & GIS.			<b>Course Outcomes:</b> After completion of the course, the student will be able to CO.1 Interpret the watershed behaviour. CO.2 Summarize the rainfall-runoff relation and the reasons of soil erosion. CO.3 Identify various Rainwater harvesting methods. CO.4 Identify the land use classification and their impacts CO.5 Plan the watershed by the application of RS & GIS				
<b>Unit-I INTRODUCTION</b> Introduction to Watershed and Watershed Management, Problems and Prospects in Watershed Management, History of Watershed Management in India, Components of watershed and need of watershed management; Principal factors influencing watershed operations, Land classification and Watershed based land use planning, Planning for Watershed Management							
<b>Unit-II WATERSHED CHARACTERISTICS</b> Physical and Geo-morphological Factors affecting Watershed Management, Watershed Characteristics: Classification and Measurement, Importance of Watershed Properties for Watershed Management, Prioritization of Watersheds.							
<b>Unit-III HYDROLOGY IN SOIL AND WATER CONSERVATION</b> Hydrological Data for Watershed Planning, Rainfall runoff relationships, Water Yield Assessment and Measurement from Watersheds. Principles of soil erosion, Soil Erosion Mechanism, Estimation of soil loss from small watersheds, Measurements and Estimation of Sediment Yield, Soil Erosion Control Measures – Engineering and Agronomical.							
<b>Unit-IV RAINWATER HARVESTING</b> Water Harvesting Concepts and Methods, Principles of water harvesting, methods of rainwater harvesting, Rainwater Conservation Technologies and Water Harvesting Structures, Farm Ponds, Earthen Dams, Artificial recharge of groundwater in small watersheds, methods of artificial recharge.							
<b>Unit-V WATERSHED MANAGEMENT PLAN</b> Watershed management plan- Methodology of planning a watershed, identification of watershed problems, socioeconomic issues including application of Remote sensing and GIS in watershed management.							
<b>Text Books</b> T1. Murthy, J.V.S., ‘Watershed Management’, New Age International Publishers, 2nd Edition, 2017. T2. Suresh, R., ‘Soil and Water Conservation Engineering’, Standard Publishers, 2020.							
<b>Reference Books:</b> R1. Murthy, V.V.N., and Jha, M.K., ‘Land and Water Management’, Kalyani Publishers, 6th Edition, 2013. R2. I.K. Tripathi, ‘Water and Soil Management’, ABD Publisher, 2008.							





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