REGULATION 2020

COURSE STRUCTURE

SYLLABUS

2 Years M.Tech Degree Programme

CONSTRUCTION TECHNLOGY & MANAGEMENT

GIET UNIVERSITY, GUNUPUR, ODISHA

CIVIL ENGINEERING DEPARTMENT

SCHOOL OF ENGINEERING AND TECHNOLOGY

Incorporated by Act 23 of Govt. of Odisha and under approval of UGC & AICTE

Accredited by NAAC with a CGPA of 3.28/4 at *A Grade*

Five UG Programs CSE, ME, CHE, AEIE & EEE Accredited by NBA

Gunupur - 765022 , Dist.- Rayagada, Odisha, INDIA

www.giet.edu

Choice Based Credit System

Outcome Based Assessment

Civil Engineering

Programme Educational Objectives

Programme educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve. Programme educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Graduates of the program will have a successful career of mechanical engineering by imparting Mechanical Engineering concepts and practical knowledge.

PEO2: Graduates of the program will pursue higher education and research in the field of mechanical engineering.

PEO3: Graduates of the program will exhibit Scientific and Engineering expertise and perform as a Professional Entrepreneur.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1: Ability to apply the acquired Mechanical Engineering knowledge for the development of composite materials for societal application.

PSO 2: Ability to implement the learned principles of Mechanical Engineering to analyze, evaluate and create more advanced mechanical systems by using state-of-art facilities.

PROGRAMME OUTCOMES (POs)

PO-1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

PO-2. Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-3. Design / Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO- 4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO- 5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO- 6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO- 7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO- 8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO- 9. Individual and team work: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-10.Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO-11.Project management and finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO- 12. Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

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DEPARTMENT OF CIVIL ENGINEERING
M.TECH – CONSTRUCTION TECHNOLOGY & MANAGEMENT
(R-2020)

I SEMESTER

Sl. No.	Course Category	Course Code	Course Title	L	T	P	C
THEORY							
1	PC	MPCCT1010	Advanced Concrete Technology	3	0	0	3
2	PC	MPCCT1020	Quality and Safety in Construction	3	0	0	3
3	PC	MPCCT1030	Construction Planning and Control	3	0	0	3
4	PC	MPCCT1040	Construction Contracts and Specifications	3	0	0	3
5	PE	MPECT1051	Energy Efficient Building	3	0	0	3
		MPECT1052	Pre-stressed Concrete Structures				
		MPECT1053	Geotechnical Investigation for Construction Projects				
PRACTICAL							
6	ES	MESCT1160	Advanced Concrete Technology Laboratory	0	0	8	4
TOTAL				**15**	**0**	**8**	**19**

II SEMESTER

Sl. No.	Course Category	Course Code	Course Title	L	T	P	C
THEORY							
1	PC	MPCCT2010	Construction Equipment and Methods	3	0	0	3
2	PC	MPCCT2020	HRM & Managerial Skills	3	0	0	3
3	PC	MPCCT2030	Building Services	3	0	0	3
4	PE	MPECT2041	Financial and BusinessManagement	3	0	0	3
		MPECT2042	Advanced ConstructionMaterials				
		MPECT2043	Risk Analysis and Decision Making				
5	PE	MPECT2051	Sustainable Construction Engineering	3	0	0	3
		MPECT2052	Infrastructure Planning				
		MPECT2053	Environmental Management				
PRACTICAL							
6	ES	MESCT2160	Construction Management Laboratory	0	0	4	2
7	CORE	MPCCT2170	Comprehensive viva voce I	0	0	4	2
8	Audit	MAUCT2180	Technical seminar I	0	0	0	0
TOTAL				**15**	**0**	**8**	**19**

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III SEMESTER [SECOND YEAR]

Sl. No.	Course Category	Course Code	Course Title	L	T	P	Credits
THEORY							
1.	PC		Research Methodology	3	0	0	3
2.	OE	MOECT3011	Advanced Construction Technology	3	0	0	3
		MOECT3012	Maintenance and Rehabilitation of Structures				
		MOECT3013	Energy Conversion and Environments				
PRACTICAL / SESSIONAL							
3			Dissertation Phase-I	0	0	18	9
TOTAL				**6**	**0**	**18**	**15**

IV SEMESTER

Sl. No.	Course Category	Course Code	Course Title	L	T	P	C
1			Dissertation Phase-II	0	0	30	15
TOTAL				**0**	**0**	**30**	**15**

SCHEME OF INSTRUCTION SUMMARY

SL. NO.	COURSE WORK - SUBJECTS AREA	CREDITS / SEMESTER				TOTAL CREDITS	%
		I	II	III	IV		
1	Professional Core (PC)	12	9	3		24	35.29
2	Professional Electives (PE)	3	6			9	13.23
3	Open Electives (OE)			3		3	4.41
4	Thesis Work , Seminar and VIVA-VOICE	4	4	9	15	32	49.23
	TOTAL					**68**	

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I SEMESTER

Sl. No.	Course Category	Course Code	Course Title	L	T	P	C
THEORY							
1	PC	MPCCT1010	Advanced Concrete Technology	3	0	0	3
2	PC	MPCCT1020	Quality and Safety in Construction	3	0	0	3
3	PC	MPCCT1030	Construction Planning and Control	3	0	0	3
4	PC	MPCCT1040	Construction Contracts and Specifications	3	0	0	3
5	PE	MPECT1051	Energy Efficient Building	3	0	0	3
		MPECT1052	Pre-stressed Concrete Structures				
		MPECT1053	Geotechnical Investigation for Construction Projects				
PRACTICAL							
6	ES	MESCT1160	Advanced Concrete Technology Laboratory	0	0	8	4
TOTAL				**15**	**0**	**8**	**19**

SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP

MPCCT1010	ADVANCE CONCRETE TECHNOLOGY	3	0	0	3	

Pre -Requisite:

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

CO1	Prepare a Concrete Mix Design with using environmental friendly materials such as Fly ash, Silica Fumes, Metakaolin&GGBS.
CO2	Understand the concept of workability, various factors affecting workability and tests to determine workability
CO3	Carry out Non Destruction Testing of Concrete using Core Test, UPV and ReboundHammer.
CO4	Gain brief knowledge on light weight, high strength, high performance and self-compacting concrete.

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2												
CO2	3	2												
CO3	3	3	1											
CO4	3	2	1											
Avg.														

SYLLABUS

UNIT:1 (13 Hours)

Review of properties of cement, their physical and chemical properties, special purpose cements, Classification and properties of aggregates, soundness of aggregates, alkali aggregate reaction, thermal properties of aggregates, Importance of shape and Surface area and grading, gap graded and aggregates. Admixtures & construction chemicals, Use of Fly Ash, Silica Fumes, Metakaolin& GGBS in concrete.

UNIT:2 (12 Hours)

Rheological behavior of concrete, requirements of workability of concrete, Effect of environmental conditions, Strength properties of hardened concrete, Impact, Dynamic and fatigue behavior of concrete, shrinkage and creep of concrete, behaviour of concrete under fire. Permeability and Durability of concrete, Parameters of durability of concrete, chemical attack on concrete, Production of concrete; batching mixing, transportation, placing, compaction of concrete. Special methods of concreting and curing of concrete, Hot weather and cold weather concreting, Guniting (Shotcreting).

UNIT:3 (13 Hours)

Concrete mix design, Basic considerations and choice a mix proportions, various methods

of mix designs including IS Code method. Quality control and quality assurance of concrete, Acceptance criteria, Quality management in concrete construction, Inspection and testing of concrete. Non-destructive testing of concrete, core test and load test.
UNIT:4 (13 Hours) Special concrete such as high strength, Lightweight, heavy weight, vacuum processed concrete. Mass concrete, high performance concrete, Pumpable concrete, Self Compacting concrete, Air entrained concrete, Ferro cement, fiber reinforced concrete, Polymer impregnated concrete. Jet concrete. Deterioration and repair technology of concrete, Distress and type of repairs, crack sealing techniques.
Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.
Text Books 1. Gambhir M.L: Concrete Technology Tata McGraw Hill (Second Edition)1995. 2. M.S. Shetty, Concrete Technology S.Chand& Company New Delhi 2005.
Ref. Books 1. P.KumarMehata, Paulo & J.M. Monteiro, Concrete microstructure, properties & materials, Prentice Hall INC &Mcgraw Hill USA. 2. Short &Kenniburg, Light Weight Concrete, Asia Publishing House, Bombay1963. 3. Orchard D.F.; Concrete Technology -Vol I. & II Applied Science Publishers (Fourth Edition)1979. 4. Neville A.M., J.J. Brook Properties of Concrete Addison Wesley1999.

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SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP
MPCCT1020	QUALITY & SAFETY IN CONSTRUCTION	3	0	0	3	

Pre -Requisite:

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

CO1	To introduce the students about quality and safety related challenges in constructionindustry.
CO2	To make students aware about the globally recognizedguidelines/theories for quality and safety in construction.
CO3	To make students self-efficient to audit quality and safety related challenges inconstruction.
CO4	To summarize about various safety policies, safety representatives and international agreements.

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2												
CO2	3	2												
CO3	3	3	1											
CO4	3	2	1											
Avg.														

SYLLABUS

UNIT:1 **(12Hours)**

otal quality management concepts; ISO9000; QA/QC systems and organizations, Quality Audits; Problem solving techniques; Statistical Quality Control; Quality Function Deployment; Material Quality Assurance; Specifications andTolerances.

UNIT:2 **(12Hours)**

Safety issues; Injury accidents and their causes; Safety program components; Role of workers, Supervisors, Managers and Owners.

UNIT:3 **(12Hours)**

Safety Procedures for various construction operations; Safety audits; Safetylaws.

UNIT:4(10Hours)

Safety Organization and Management: Safety policies, safety organization, safety committees, safety representatives, outside agencies – Govt. intervention, international agreements

Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.

Text Books

- Levitt, R.E. and Samelson, N.M., Construction Safety Management, Mc. Graw Hill Book Company, Inc., N.Y.1991.
- Juran Frank, J.M. and Gryna, F.M., Quality Planning and Analysis Tata McGraw Hill1982.
- Raymond Elliot Levitt&Nancy Morse SamelsonConstruction Safety Management Amazon Second edition.
- Grant E.L. and LeavensworthSatistical quality Control McGraw Hill1984.
- Hutchins G, ISO 9000, Visa Books, New Delhi,1993.
- Ron Baden Hellard, Total Quality in Construction Projects, Thomas Telford,London.

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SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP

MPCCT1030	**CONSTRUCTION PLANNING AND CONTROL**	**3**	**0**	**0**	**3**	

Pre -Requisite:

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

CO1	Students shall be able to Plan Bar Chart, CPM chart, PERT chart material requirement schedule, Manpower schedule, MachinerySchedule.
CO2	Student shall be able to carry out manpower resources levelingandsmoothing.
CO3	Overview of Construction Management and Present Status of ConstructionIndustry.
CO4	Student shall be prepare Project management reportingdocuments and labour law for project site.

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1	3												
CO2				3	2									
CO3	1	2												
CO4		2		1										
Avg.														

SYLLABUS

UNIT:1 **(12Hours)**

Understanding Project Management, Project manager, Organization structures, Stages of Construction, organizing and staffing the project office and team

UNIT:2 **(12Hours)**

Construction Planning, Project planning, milestone schedules, WBS, Network techniques, CPM, PERT and Prima Vera, Line of Balancing Techniques, Critical Chain Method, Resources leveling and smoothing.

UNIT:3 **(12Hours)**

Project Management Information system, MIS reporting, Daily, Weekly and monthly reporting, Actual vs. Planned reporting, Planning & Cost control document, Quality and safety documents at site. Material management-purchases management and inventory control, ABC analysis.

UNIT:4 **(12Hours)**

Management: Introduction for Management, History of Management

theory, Leadership, Motivational Theories, Project controls. Construction Labour, Payment of wages Act, Workmen's Compensation Act, Minimum Wages Act.
Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.
References: 1. Harold Kerzner Project Management CBS Publisers& Distributors 2nd Edition. 2. Frank Harris & Ronald McCafferModern Construction ManagementBlackwell science4th Edition. 3. Roy Pilcher Principles of Construction ManagementMcGrawHillLondon. 4. Kumar NeerajJha, Construction Project Management, PearsonPublication. 5. Project Management Body of Knowledge, 5th Edition, PMI GlobalStandard 6. Harvey Maylor, Project Management, 3rd Edition,Pearson 7. K.K. Chitkara, Construction Project Management, 2nd Edition, McGraw HillPublication 8. P G. Gahoit& B.M. Dhir, Construction Management New age international (p)Ltd

SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP

MPCCT1040	**CONSTRUCTION CONTRACTS AND SPECIFICATIONS**	**3**	**0**	**0**	**3**	

Pre -Requisite:

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

CO1	Students shall be able to distinguish various types of contracts
CO2	Detailed overlook on construction specifications, tender documents and tendering procedure
CO3	Students shall be able to analyze and design construction contract documents
CO4	To make students aware of various risks associated with formulation of contracts

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1	3												
CO2				3	2									
CO3	1	2												
CO4		2		1										
Avg.														

SYLLABUS

UNIT:1 **(10 Hours)**

Construction Contract: Agreement, Contract, essential conditions, Indian Contract Act 1872, types of contract, terminology of contract.

UNIT:2 **(12Hours)**

Construction Specifications: Standard specifications, general specification, development, interpretation. Tender and tender documents: Types of bidding, tender notice, tendering procedure.Construction claims: Extra item, excess quantity, deficit quantity, price escalation.

UNIT:3 **(12 Hours)**

Dispute resolution mechanism: litigation, arbitration, conciliation, mediation, dispute resolution board. Contractual Problems: Possible contractual problems, creation of claims, development of disputes. Contract document: Drafting of clauses, development, and interpretation, CPWD conditions of contract, FIDIC conditions of contract.

UNIT:4 **(10 Hours)**
BOT contract: Types of contract, PPP framework, types of risk, concession agreement, drafting of clauses, development, and interpretation.Laws affecting Engineers: Labour Law, Sales Tax, VAT, Service Tax, Excise Duty. Relational Contract: Partnering, alliancing, key elements, processes.
Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.
Text Books 1. L.S. RanagaRao Contract Management and Dispute Resolutions Engineering staff College of India January2008. 2. C. J. Schexnayder and R. E. Mayo,Construction Management Fundamentals,McGraw Hill, New Delhi.2003
Ref. Books 1. General Conditions of Contract,Central Public Works Department, NewDelhi,2010 2. S. RanagaRao,Contract Management & Dispute Resolutions,Engineering staff College of India,January2008 3. D.S. Berrie and B.c.Paulson,Professional construction management including C.M.,Design construct and general contracting,McGraw Hill InternationaL,Third Edition1992.. 4. V. K. Raina,Construction& Contract Management Practices,SPD, NewDelhi

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SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP
MPECT1051	ENERGY EFFICIENT BUILDINGS	3	0	0	3	

Pre -Requisite:

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

CO1	Understand the concept of conservation of energy and fundamental principles in building design
CO2	Analyze and evaluate the thermal performance of building and design the artificial ventilation system and insulators.
CO3	Demonstrate the concept of cost/benefit of energy conservation and can estimate carbon footprint.
CO4	Be able to demonstrate their learning about use of simulation tools to achieve energyefficiency.

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2	3	3												
CO3		1	3											
CO4	2		02											
Avg.														

SYLLABUS

UNIT- 1 **(15Hours)**

Conservation & energy efficiency concepts-overview of significance of energy use and energy processes in buildings. Solar energy fundamentals & practices in building design- solar astronomical relations and radiation physics and measurements, design decision for optimal orientation of building, shadow analysis.

UNIT- 2 **(13Hours)**

Heating and ventilation design- Human thermal comfort, climatological factors, material specifications and heat transfer principles, Thermal performance evaluation, Heat loss from buildings, design of artificial ventilation system, design of insulators.

UNIT- 3 **(12Hours)**

Design audits & economic optimization- Concept of cost/benefit of energy conservation & carbon footprintestimation.

UNIT- IV **(10Hours)**

Energy efficient lighting system design: Basic terminologies and standards, daylighting and artificial lighting design, auditing.Advances in computational energy conservation- implementation of computer energy simulation programs into building designs.
Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.
Text Books 1. Energy Efficient Buildings In India by MiliMajumdar The Energy ResearchInstitute
Ref. Books 1. Energy-Efficient Building Systems LalJayamahaMcGrawHillPublication. 2. Solar Energy and thermal processes J A Duffie& W A Beckman JohnWiley. 3. Energy Conservation Building Code,2007. 4. Handbook of functional requirement of buildings, SP:41:1987.

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SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP
MPECT1052	PRE-STRESSED CONCRETE STRUTURE	3	0	0	3	

Pre -Requisite:

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

CO1	To bring the civil engineers to such a level so to as enable them, to take the appropriate decision in respect of choice of Prestressed section overR.C.C.
CO2	To make the learners to beaware of suchahighly mechanized technology in civil engineering construction.
CO3	To understand the basic design considerations in prestressed concrete structures in relation to its applications.
CO4	To employ & develop new techniques in rehabilitation of distressed structures like buildings, Bridges &infrastructures.

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3		2											
CO2		3												
CO3	3	1												
CO4	3		2											
Avg.														

SYLLABUS

UNIT-1 **(12Hours)**

Design of high strength concrete mixes. Loss of prestress in single span and continuous beams. Use of IS 1343-1980, Analysis Limit State Design of beams for Tension Type II and III problems, Cracking moment, untensioned reinforcement, Partial prestressing, Stress Corrosion.Transfer of prestress by bond, Transverse tensile stresses, End zone reinforcement. Behaviour of Bonded and unbounded prestress concrete beams.

UNIT-2 **(12Hours)**

Deflection of Prestressed concrete members, short and long term, control of deflections. Crack width considerations. Flexural strength of prestressed concrete sections: Types of flexural failures, Limit state

concept.

UNIT-3 **(12Hours)**

Shear resistance of prestressed concrete members: Principal stresses and ultimate shear Resistance, Design of shear reinforcement, prestressed concrete, members in Torsion, Design of reinforcement in torsion shear and bending.

UNIT-4 **(12Hours)**

Stress distribution in end block, Analysis and Anchorage Zone reinforcement. Composite Construction of prestressed precast and cast in situ concrete. Statically Indeterminate structures: Continuous beams, primary and secondary moments, Continuity, concordant cable profile, Analysis and Design of continuous beams.

Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.

Text Books

1. Nigel R HewonPrestressed Concrete Bridge, Design and construction Thomas Telford London 2003.
2. Plan Cast Precast and Prestressedconcrete(A Design Guide) DevidA.Sheppard& William R. PhillpsMcgraw Hill Publication Co.1989.

Ref. Books

1. N. KrishnarajuPrestressed Concrete Tata McGraw Hill (Third Edition)1981.
2. Lin T.Y,Burns N.H. Design of Prestressed Concrete Structures. John Wiley & sons (Third Edition).1982.

SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP
MPECT1053	GEOTECHNICAL INVESTIGATIONS FOR CONSTRUCTION PROJECTS	3	0	0	3	

Pre -Requisite:

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

CO1	To make the students capable of solving real problems related to Geotechnical engineering, once he/she join industries as a fresh geotechnical engineer.
CO2	In this course all the topics will be taught from the application point of view with examples from case histories and a student will get a chance to apply his theoretical knowledge to solve real geotechnical challenges.
CO3	Introduction with advance methodology, techniques and tools related to geotechnical investigation
CO4	To discuss ground improvement with variousmethodologies.

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3		2											
CO2			2											
CO3	2		2											
CO4	3													
Avg.														

SYLLABUS

UNIT-1 **(12Hours)**

Site Investigations: Planning of investigation programs, Information required for planning different stages of investigations. Geophysical methods, Methods of site investigations: Direct methods, semi-direct methods and indirect methods, Drilling methods. Boring in soils and rocks, methods of stabilizing the bore holes, measurement of water table, field record. Field tests: In-situ shear test, in-situ permeability test, SPT, DCPT, SCPT, in-situ vane shear test, pressure meter test, plate loadtest.

UNIT-II **(10Hours)**

Sampling techniques, Sampling disturbances, storage, labeling and transportation of samples, sampler design, influence on properties.Geotechnical specification and proposal and report writing, boring log preparation, Safety measures, and Geotechnical risks

UNIT-III **(10Hours)**

Geotechnical Processes: Field compaction, field compaction techniques-static, vibratory, impact, Earth moving machinery, Compaction control in field.In-situ stabilization with additives: Lime, fly ash, cement and other chemicals and bitumen.
UNIT-IV **(12Hours)** Deep Stabilization: sand column, stone column, sand drains, prefabricated drains, electro-osmosis, lime column. soil-lime column. Grouting: permeation, compaction and jet. Vibro-floatation, dynamic compaction, thermal, freezing. Dewatering systems
Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.
Text Books 1. Raj Purushothama, Ground Improvement Techniques , LaxmiPublications 2. S. K. Saxena, S. A. Gill and R. G. Lukas , Subsurface Exploration and Soil Sampling , American Society of CivilEngineers

II SEMESTER

Sl. No.	Course Category	Course Code	Course Title	L	T	P	C
THEORY							
1	PC	MPCCT2010	Construction Equipment and Methods	3	0	0	3
2	PC	MPCCT2020	HRM & Managerial Skills	3	0	0	3
3	PC	MPCCT2030	Building Services	3	0	0	3
4	PE	MPECT2041	Financial and BusinessManagement	3	0	0	3
		MPECT2042	Advanced ConstructionMaterials				
		MPECT2043	Risk Analysis and Decision Making				
5	PE	MPECT2051	Sustainable Construction Engineering	3	0	0	3
		MPECT2052	Infrastructure Planning				
		MPECT2053	Environmental Management				
PRACTICAL							
6	ES	MESCT2160	Construction Management Laboratory	0	0	4	2
7	CORE	MPCCT2170	Comprehensive viva voce I	0	0	4	2
8	Audit	MAUCT2180	Technical seminar I	0	0	0	0
TOTAL				**15**	**0**	**18**	**19**

SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP
MPCCT2010	CONSTRUCTION EQUIPMENT AND METHODS	3	0	0	3	

Pre -Requisite:

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

CO1	Student can able to decide which types and capacity of construction equipment can be used for excavating, compacting grading, and dozing, concretingoperation.
CO2	Student can able to prepare mass diagram for excavation particularly useful for road project
CO3	Student can able to describe various pile driving equipments and its types
CO4	Student can able to prepare cost analysis for Excavating and concretingequipment.

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1													
CO2				3	2									
CO3	1	2												
CO4		2		1										
Avg.														

SYLLABUS

UNIT-I **(11Hours)**

Excavating Equipments: Different types of Excavator such as Front shovel, hoes. Their selection, calculation of shovel production, height & cut of shovel, angle of swing effect on shovel production., calculation of hoe production, Type of loaders their bucket attachments, loader production rates , calculation of wheel loader production

UNIT-II **(11Hours)**

Compacting and Stabilization Equipment : Compaction of soil and rock, types of compacting equipment, roller production estimating, Dynamic compaction, Soil stabilization- Lime stabilization and Cement stabilization.Planning for Earthwork Construction : Graphical presentation of earthwork, earthwork quantities, Mass Diagram, Estimation of Cost production.Study of equipments with reference to

available types and their types and their capacities, factors affecting their performance

UNIT-III **(13Hours)**

Earthmoving Equipment: Tractors and attachments, dozers and rippers, scrapers , shovels, draglines, trenching machines, clamshell, hoes, trucks and wagons, dumpers, rollers and compactors.Pile driving equipments: Types, pile driving hammers, single acting and double acting, differential acting hammers, hydraulic and diesel hammers, vibratory drivers

UNIT-IV **(13Hours)**

Pumping equipments: Reciprocating, diaphragm & centrifugal pumps, well point system. Concrete manufacture, transport, placing and compacting equipment, mixers, central batching and mixing plants, pavers, transit mixers, concrete pumps shotcrete Air Compressor Equipments for moving materials, builder's hoists, forklifts , cranes, belt-conveyors, cableways, ropeways.

Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.

Text Books

1. Construction planning, Equipments and Methods. R. L. Peurify, TMH,1996
2. Constuction Equipment and its Planning and Applications, Mahesh Varma, Metropolitan BookCo. (P) Ltd., New Delhi, India.
3. Construction Macinery and Equipment in India, (A compilation of articles Published in Civil Engineering and Construction Review), Publish by Civil Engineering and Construction Review NewDelhi,1991

SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP
MPCCT2020	HRM & MANAGERIAL SKILLS	3	0	0	3	

Pre -Requisite:

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

CO1	To introduce and explain different phenomenon of Human Resource Management (HRM).
CO2	To enrich the students' understanding on HRM , which may enable them to implement the concepts in the workplace.
CO3	To direct the attention of students towards some of the emerging concepts of HRM.
CO4	To develop a marketing and product relationship between employee and industries.

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1													
CO2				3	2									
CO3	1	2												
CO4		2												
Avg.														

SYLLABUS

UNIT-1 **(10hours)**

Definitions and Objectives of Human Resource Management(HRM); Functions of HRM; Process of HRM; Evolution of HRM; Strategic HRM and its role in the organization; Human Resource Planning(HRP):Meaning and Process, Job analysis: Job description and Job specification; Recruitment: Meaning, Sources, Process and Yield; Selection: Meaning and Process, Tests and Interviews, Induction and Socialization.

UNIT-2 **(12hours)**

Performance Appraisal: Meaning, Objective, Process and Methods; Potential Appraisal; Biases in performance appraisal; Methods of job evaluation; Meaning of Compensation; Types of compensation; Types of wages and theories; Wage differentials; Pay structure, Wage Law in India, Executive Compensation.

UNIT-3. **(12hours)**

Concepts of Career, Career planning process, Career Stages; Training &Development: Concept, Training need analysis and Methods of training (on-the-job and offthe-job training), Evaluation of Training effectiveness; Concepts of Promotion, Transfer and Separation.

UNIT:4 **(12hours)**

Industrial Relations (IR): Concept and Approaches to IR, John T. Dunlop's System Theory of IR, Positive and Negative IR, Role of State in IR; Trade Unions: Concept and Registration; Structure and Functions of Trade Union, International HRM: Definitions and Approaches, Concepts of Expatriate, Parent country National (PCN), Host Country National (HCN)and Third Country National (TCN). Challenges of HRM in dynamic business environment; Ethical issues in HRM HR Outsourcing; Employee Engagement; Organization Citizenship Behaviour(OCB), Talent Management, Competency Mapping.

Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.

Ref. Books

1. T HRM Text &Cases, Aswathappa,TMH. 21
2. Personnel &Human Resource Management, P.SubbavRao,HPH
3. Human Resource Management, Jyoti,Venkates, Oxford
4. HR, Denisi and Sarkar, Cengage.
5. Human Resource Management (SeemaSanghi (Vikas)
6. Human Resource Management – S.S. Khanka – (S. Chand)
7. Human Resource Management – Dessler and Verkky, Pearson
8. Human Resource Management – VSP Rao , Excel

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SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING
M.TECH – CONSTRUCTION TECHNOLOGY & MANAGEMENT
(R-2020)

SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP
MPCCT2030	BUILDINGSERVICES	3	0	0	3	

Pre -Requisite:

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

CO1	Demonstrate the various classifications of buildings and its services
CO2	Detailed explanation about rain water harvesting systems and de-centralized waste water treatment
CO3	Acquired the knowledge of fire fighting services, building security and access services
CO4	Collaborate effectively with others and demonstrate intellectual independence and autonomy to solve problems and/or address industry issues andimperatives.

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1													
CO2				3	2									
CO3	1	2												
CO4		2												
Avg.														

SYLLABUS

UNIT-1 **(10hours)**

Classification of buildings, Importance of building services, Role of Construction Manager, Planning and designing of building services, Water supply and Distribution to Multi-storey buildings.

UNIT-2. **(12hours)**

)e-centralized water Treatment units and Swimming pool for building complexes, storm water drainage and Rain Water Harvesting , sanitation services-Soil Pipe system, de-centralized waste water Treatment, Solid Waste Disposal System.

UNIT-3. **(12hours)**

Lift and Escalators, Fire Fighting Services, HVAC systems and services, Building security and Access services, Acoustic and Integrated Services, Design of Parking systems, Lighting design,Electricaldistribution,building automation, intelligent green buildings.

UNIT:4 **(12 hours)**

Environmental Clearance for Buildings. Evaluation of Building Services, Integrated planning and Designing of Different services in Important Buildings viz. Multi-storeys/ High

Rise Building, Institutional Building, Auditorium and stadiums, Office Complexes, Shopping complexes, Airport, storage and ware house, Hazardous Building
Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.
Text Books 1. National Building Code 2005, Part 0-10, Bureau of Indian Standards. 2. F. Hall (Author), Roger Greeno (Author), Building Services Handbook: Incorporating Current Building and ConstructionRegulations.
Ref. Books (1) Building Services Research and Development Association Staff Building Services Materials Handbook - Heating, Sanitation and FireRoutledge (2) Willan T. Mayer Energy economics and buildingdesign. (3) E.C. Butcher and A.C. Parnell. Designing for Firesafety. (4) Peter R. Smith and Warden G. Julian, BuildingServices. V.K. Jain, Handbook of Designing and Installation of Services in High Rise Building

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SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP
MPECT2041	FINANCIAL AND BUSINESS MANAGEMENT	3	0	0	3	

Pre -Requisite:

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

CO1	Acquired Knowledge about the role of manager and his tasks and responsibilities and describe about the managerial skills and SWOT analysis
CO2	Summarize the concept of business and strategic management and methods of obtaining finance from external sources
CO3	Brief overlook on value engineering and quality assurance, total quality management and technological innovation
CO4	Recognize the need to undertake lifelong learning in financial management, capital budgeting, budgeting control and investment appraisal

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1		3											
CO2					2									
CO3	1	2												
CO4		2												
Avg.														

SYLLABUS

UNIT-1 **(10hours)**

Principles of management and Personnel management: Economic environment of business, Introduction to managerial economics, ; Role of a Manager: Tasks and responsibilities of a professional manager, Human Resource development systems Organization structure & design, manpower planning Processes Managerial skills and Management Systems, techniques and processes, SWOTAnalysis.

UNIT-2. **(12 hours)**

Business Policy and Strategic Management; Assessment of capital requirement and sources of capital planning the establishment and development of business, fixed and current assets, liquid resources, Forecasting of business, cash flow, effect of taxation, Public and private

sources of finance, methods of obtaining finance from external sources and internal sources, cost of capital, forms of capital structures.

UNIT-3. **(12hours)**

Value engineering and quality assurance, marketing planning & organization, marketing research & Marketing strategies, determinants of consumer behaviour, Models of consumer behaviour, Pricing & promotion strategies., Business forecasting. Modern Control Systems, Total quality Management (TQM), JIT, DSS, ERP, Strategic Management, Technological innovation & creativity.

UNIT:4 **(12 hours)**

Financial Management; Meaning and Scope, Economics and Scope, Supply and Demand Mechanism, analysis and forecasting. balance sheet, profit & loss account, fund flow statement; Production and Cost theory, analysis. Pricing; objectives, determinants, absorption, marginal costing. Financial analysis, Decisions. Capital Budgeting, budgetary control, standard costing and variance, investmentappraisal.

Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.

Text Books

1. Peterson, H.C., Lewis, W.C. Managerial Economics, Prentice Hall of India Pvt. Ltd.,2001
2. Parkin, M. & Bade R., Modern Macroeconomics 4th Edition, Prentice Hall,1996

Ref. Books

1. Werther& Davis, Human Resources & Personnel Management, McGraw Hill,1996
2. Edwards, John et.al., 1983 Manpower planning, John Wiley: NewYork
3. Anthony, R.N. Govindrajan, V., Irwin, Management control systems, McGraw Hill 10th Edition, 2000
4. Baumel, W.J., A.S. Blinder and W.M. Scarth, Economics: Principles and policy, Academic Press Canada, Tornoto,1985
5. Anthony & Reece, accounting Principles, AITBS, SixthEdition,1998
6. Koontz O'Donnel : Essentials of Management; Tata McGraw Hill,1982
7. Monappa A., Personnel Management, Tata McGrawHill,

SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP

MPECT2042	**ADVANCED CONSTRUCTION MATERIALS**	**3**	**0**	**0**	**3**	

Pre -Requisite:

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

CO1	Discuss the benefits and importance of construction materials and its physical, mechanical and thermo-physical properties.
CO2	Describe about the raw materials for mortar and concrete and various types of mortars and its properties.
CO3	Brief summary of the polymeric materials and their applications and brief description about types of structural steel.
CO4	Analyze the importance of fibers and composites, ahesives and sealants and their uses in building physics.

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1	3												
CO2														
CO3	1	2												
CO4		2												
Avg.														

SYLLABUS

UNIT-1 **(10hours)**

Construction Materials: Classifications of Construction Materials. Consideration of physical, Mechanical, thermo-physical Properties, characteristics behaviour under stress, selection criteria for construction materials, green building materials, waste products, reuse and recycling.

UNIT-2. **(12hours)**

Materials for making Mortar and concrete: Lime manufacture, properties, hardening of lime, types of lime, lime concrete uses, cement, aggregates, water, characteristics, properties and uses of Pozzolana materials, Types of mortars, special mortars, properties and applications, admixtures.Ceramic Materials: Classification, Refractories, glass, glass wool, mechanical, thermal and electrical properties, fire resistance materials, Uses and application.

UNIT-3. **(12hours)**

Polymeric Materials: Polymerization mechanism and depolymerisation. Rubber and plastics, properties, effect of temperature on mechanical properties. Uses and application. Types of structural steels, special steel, alloy steel, stainless steel, light gauge steel.

UNIT:4 **12 hours)**

Corrosion of concrete in various environments. Corrosion of reinforcing steel. Electro-chemical process, measures of protection. Ferro-cement, material and properties. Polymers in Civil Engineering Polymers, fibres and composites, Fibre reinforced plastic in sandwich panels, modeling. Architectural use and aesthetics of composties. Adhesives and sealants. Structural elastomeric bearings and resilient seating. Moisture barriers, Polymer foams and polymers in Building Physics. Polymer concretecomposites.

Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.

Text Books

1. Rangawala S.C. Engineering Materials Chortor Publications1991.
2. S.K. Duggal Building Materials, New Age International Publications 2006.
3. Bruntley L.R Building Materials Technology Structural Performance & Environmental Impact McGraw Hill Inc1995.
4. R Chudley Construction Technology, Vol I - IV Longman Group Construction Ltd.1973.

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SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP
MPECT2043	RISK ANALYSIS AND DECISION MAKING	3	0	0	3	

Pre -Requisite;

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

CO1	Learn decision and risk analysis (D&RA) concepts & terminology that are most used inindustry and understand the impact of uncertainty indecision-making
CO2	Learn specific tools & processes for analyzing& making decisions - useful both professionally and personally
CO3	Learn to evaluate and interpret the output of D&RA tools and processes - to make the bestdecision
CO4	Develop a critical-thinking, problem-solving, value-creating approach todecision-making

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1													
CO2	3													
CO3	1	2												
CO4		2												
Avg.														

SYLLABUS

UNIT-1 **(10hours)**

Need of Decisions and Risk analysis for construction management, Decision Models, Risk and Uncertainty, Theory and Techniques of Decision and Risk Analysis, Qualitative and Quantitative risk analysis tools /methods.

UNIT:2. **(12hours)**

Modelling Value Systems, Value Management for Construction, Competitive Bidding and Risk Sharing, Strategic and integral planning, Decisions making for site selection, construction , execution and operation of projects.

UNIT-3. **(12hours)**

Documentation, Project proposals, Economic Analysis, Legal Aspects of project management, Environmental appraisal, ISO 14000, Hazards identification, analysis and risk assessment.

UNIT:4 **(12hours)**

Accident and incident Analysis and control systems, IS 3786, S.H.E.

Management IS15001, Training &Education Management Oversight and risk tree, Risk control and Treatment, Risk management and Internal control, Risk mitigation, Risk management plan, IT and IS for Riskmanagement
Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.
Text Books 1. Melvin W. Lifson, Edward F. Shaifer, Decision and Risk Analysis for Construction Management, John Wiley &Sons1st.
Ref. Books 1. Ian Cameron, Raghu Raman, Process Systems Risk managementElseveir AcademicsPress2005. 2. Chris MarrisonFundamentals of Risk MeasurementsTata McGrawHill2002. 3. Han Buhliman, Mathematical Methods in Risk TheorySpringler- Verlang BerlinHeidelberg1970. 4. CalowPHand book of Environmental Risk Assessment and MnagementBlackwell Science Ltd. Oxford,Uk1998.

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SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP
MPECT2051	SUSTAINABLE CONSTRUCTION ENGINEERING	3	0	0	3	

Pre -Requisite:

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

CO1	Create new engineering materials to improve the performance ofinfrastructure
CO2	Characterize and mitigate natural and man-madehazards
CO3	Improve fundamental knowledge of the inter-relationships between the built environment and naturalsystems.
CO4	Develop the technological innovations needed to safeguard, improve, and economize infrastructure andsociety.

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1													
CO2		3												
CO3	2	3												
CO4	3	2												
Avg.														

SYLLABUS

UNIT1 **(12 Hrs)**

Fundamentals of Sustainable Construction Engineering- Sustainability and resources, need, present practices at national and international level, The Sustainability Quadrant- challenges & Issues, Government initiatives.

UNIT-2 **(10Hrs)**

Construction Product, Process Design and Development- Sustainability of construction resources, process modifications, product performance evaluation.

UNIT-3 **(12Hrs)**

Sustainability assessment using standard approaches- LEED/GRIHA rating evaluation process.Socio-economic feasibility of sustainable construction products- Innovative & customized sustainable product design based on social constraints, tools & aids available for sustainable construction products.

UNIT-4 **(10Hrs)**
Life Cycle Assessment and Costing-Various aspects related to construction cost, present value analysis, life cycle stages, cost calculation & measures, evaluation criteria, uncertainty assessment, sensitivity analysis, break evenanalysis.
Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.
Text Books 1. Sustainable Engineering Practice ASCE Publication2010.
Ref. Books 1. Hagger Sustainable Industrial Design and Waste Management, Techniz Book2010. 2. Helmut Rechberger, Practical handbook of Material Flow Analysis, Taylor & Francis.2010. 3. Michael Z. Hou, HepingXie, Jeoungseok Yoon Underground Storage of CO_2 and Energy Taylor & Francis,2010. 4. LEED for India: Reference Guide,2011.

SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP
MPECT2052	INFRASTRUCTURE PLANNING	3	0	0	3	

Pre -Requisite:

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

CO1	Gather background information and research and describe its impact on the project.
CO2	Apply the basic principles of project appraisal and evaluation, and determining feasibility of projects to procedures using methods such as Cost-Benefit Analysis.
CO3	Describe and explain the principles of financial planning and cost planning of a civil infrastructure project.
CO4	Describe and explain the basic features of risk and quality management of a project, and the extent that these management areas need to beimplemented.

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1		1		1									
CO2	1	2	1											
CO3	1				1									
CO4	1	2	3	2	2									
Avg.														

SYLLABUS

UNIT-1 **(12Hrs)**

)efinitions of infrastructures; Typical infrastructure planning steps; Planning and appraisal of major infrastructure projects; Screening of project ideas.

UNIT-2 **(10Hrs)**

Life cycle analysis; Multi criteria analysis for comparison of infrastructure alternatives; Procurement strategies; scheduling and management of planning activities.

UNIT-3 **(12Hrs)**

conomic analysis – concept and applications, principles of methodologies for economic analysis of public works, social welfare function, Demand curves and price elasticises; Shadow pricing; Accounting for risk and uncertainty.

UNIT-4 **(12Hrs)**

inancial evaluation; Financial estimates and projections; Project risk analysis; Political and social perspectives of infrastructure planning; Case studies.

Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.

Text Books

1. A.S. Goodman and M. Hastak, *Infrastructure planning handbook: Planning, Engineering and economics*, McGraw Hill, New York,2006.
2. J. Parkin and D. Sharma, *Infrastructure Planning*, Thomas Telford, London,1999.

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SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP
MPECT2053	ENVIRONMENTAL MANAGEMENT	3	0	0	3	

Pre -Requisite:

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

CO1	Understand the environmental, social and economic framework in which environmental management decisions are made understand the life cycle perspective, systems approach and environmental technologies for converting process, products and service related industrial environmental problems into opportunities to improve performance
CO2	Anticipate, recognize, evaluate, and control environmental issues in a variety of sectors and industries and liaison with federal, state, and local agencies and officials on issues pertaining to environmentalprotection
CO3	Recognize, evaluate, and control factors in the workplace and the environment that cause health and environmental hazards and utilize quantitative knowledge and skills and modern tools and technologies to assess, analyze, plan, and implement environmental managementsystems
CO4	Prepare, review, and update environmental monitoring and assessment Reports and Monitor progress of environmental improvement programs.

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3		2											
CO2		3	1											
CO3		3												
CO4	3	1												
Avg.														

SYLLABUS

UNIT:1 **(10Hours)**

Environmental problems and issues at global and national level, sustainable development (SD), Indicators of sustainable development, regional carrying capacity based planning, National Environmental Policy (NEP), Climate change, its impacts, adaptation and mitigation.

UNIT:2 **(10Hours)**

Waste minimization and pollution prevention strategies – Tools of corporate

environmental management; ISO 14000, TC 207 structure, Environmental Management System (ISO: 14001), General requirements; Cleaner technology (CT) of production, waste management hierarchy implementation of CT, barriers for adoption of CT

UNIT:2 **(12Hours)**

Life cycle assessment, methodological framework. Environmental impact assessment, Methodologies for EIA, Environmental management plan (EMP), environmental monitoring plan, EIS, case studies of infrastructure and industrial projects

UNIT:4 **(10Hours)**

Indian environmental legislations and major environmental acts such as Water Act (1974), Air Act (1981), Environmental (Protection) Act (1986); International Environmental Treaties; Kyoto protocol, Montreal protocol, COP21, CDM. Ecomark, objectives, criteria, general and specific requirements. Design for Environment (DFE), strategy, implementation. Environmental audit, methodology, Benefits of EA to Industry. Overview of technologies, regulatory standards for industrial wastewaters and atmospheric emission.

Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.

Ref. Books

1. Richard Welford, Corporate Environmental Management Systems and Strategies, Universities Press (I) Ltd., Hyderabad, 1996.
2. Paul L. Bishop, Pollution Prevention: Fundamental and Practice, McGraw Hill, International, 2000. Freeman, H.M., Industrial Pollution Prevention Handbook, McGraw Hills1995
3. Ministry of Environment, Forests and Climate Change(MoEFCC), Govt. of India website

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III SEMESTER [SECOND YEAR]

Sl. No.	Course Category	Course Code	Course Title	L	T	P	Credits
THEORY							
1.	PC		Research Methodology	3	0	0	3
2.	OE	MOECT3011	Advanced Construction Technology	3	0	0	3
		MOECT3012	Maintenance and Rehabilitation of Structures				
		MOECT3013	Energy Conversion and Environments				
PRACTICAL / SESSIONAL							
3			Dissertation Phase-I	0	0	18	9
TOTAL				**6**	**0**	**18**	**15**

Subject Code		L	T	P	C	QP
	RESEARCH METHODOLOGY	**3**	**0**	**0**	**3**	

Pre -Requisite:

Course Outcome

CO1	Understand some basic concepts of research and its methodologies
CO2	Select and define appropriate research problem and parameters
CO3	To provide an insight into the application of dynamic analytical techniques to face the stormy challenges
CO4	Understand research problem formulation and research related information

Unit I [12 hours]

Introduction to RM: Meaning and significance of research. Importance of scientific research in decision making. Types of research and research process. Identification of research problem and formulation of hypothesis. Research Designs.

Unit II [12 hours]

Measurement and Data Collection. Primary data, Secondary data, Design of questionnaire; Sampling fundamentals and sample designs. Measurement and Scaling Techniques, Data Processing.

Unit III [12 hours]

Data Analysis – I: Hypothesis testing; Z-test, t-test, F-test, Chi-square test. Analysis of variance. Non-parametric Test – Sign Test, Run test, Krushall – Wallis test

Unit IV [12 hours]

Data Analysis – II: Factor analysis, Multiple Regressions Analysis. Discriminant Analysis, Use of SPS Package.

Teaching Methods: Chalk& Board/ PPT/Video Lectures

Reference Books

1. Research Methodology, Chawla and Sondhi, Vikas
2. Research Methodology, Paneersevam, PHI

SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP

MPECT3011	**ADVANCED CONSTRUCTION TECHNOLOGY**	**3**	**0**	**0**	**3**	

Pre -Requisite:

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

CO1	Students will be familiar with the technology of major construction methods and various methods of placing and handling concrete.
CO2	Students will be able to describe, analyze and compare various steel and composites construction methods
CO3	Students will learn about tunneling and major equipment's of tunneling
CO4	Students will be able to describe, analyze, compare and evaluate the technology of high-rise construction

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3			3										
CO2		1												
CO3	2		2											
CO4		2	3											
Avg.														

SYLLABUS

UNIT:1 **(15Hours)**

Concrete Construction methods: form work design and scaffolding, slip form and other moving forms, pumping of concrete and grouting, mass concreting (roller compacted concrete), ready mixed concrete, various methods of placing and handling concrete, Accelerated curing, Hot and cold weather concreting, Under water concreting, Prestressing.

UNIT:2 **(12Hours)**

Steel and composites construction methods: Fabrication and erection of structures including heavy structures, Prefab construction, industrialized construction, Modular coordination.Erection Techniques : Major types of mobile crane, Lifting capacities of cranes, modification in cranes for heavy lifting, crane booms, Rated loads for lattice and telescopic boom cranes, Working ranges of cranes, Tower cranes: - classification, operation, tower crane selection.

UNIT:3 **(10Hours)**

Tunneling: Tunneling equipment, Tunnel boring machine, Pipe Jacking, selection of tunnel alignment, tunneling using Road Headers, Cut and fill techniques, jack down techniques, box type tunneling techniques.
UNIT:4 **(16Hours)**
Special construction methods: Construction in Marine environments, High rise construction, Bridge construction including segmental construction, incremental construction and push launching techniques, River valley projects.
Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.
Text Books 1. Purifoy, Schexnayder, Construction Planning, Equipment and Methods, Tata McGrawHill 2. Edward Nawy , Concrete Construction and engineering Handbook , CRCPress.

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SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING
M.TECH – CONSTRUCTION TECHNOLOGY & MANAGEMENT
(R-2020)

SUBJECT CODE	TITLE OF THE SUBJECT	L	T	P	C	QP
MPECT3012	MAINTENANCE AND REHABILITATION OF STRUCTURES	3	0	0	3	

Pre -Requisite:

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

CO1	To recognize the mechanisms of degradation of concrete structures
CO2	Provide the students with the knowledge of available techniques and their application for strengthening or upgrading existing structural systems
CO3	Analyze and supervise the damage of reinforced concrete and its repair techniques.
CO4	also provides how to conduct field monitoring and non-destructive evaluation of concretestructures.

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2		1	2											
CO3	2		2											
CO4		2	3											
Avg.														

SYLLABUS

Unit I **[12 hours]**

Performance of construction materials and components in services; Causes of deterioration; preventive measurements and maintenance.

Unit II **[12 hours]**

Principles of assessment of weathering and durability; Characteristics of materials; Diagnosis of construction failures; Dealing with cracks; Methods of repair in concrete.

Unit III **[12hours]**

Steel and timber structural components; Corrosion damage of reinforced concrete and its repair and prevention measures; Surface deterioration, Efflorescence , causes, prevention and protection.

Unit IV **[12hours]**

Surface coatings and painting; Water proofing; Grouting; Strengthening of existing structures; Special repairs, maintenance Inspection and planning, Budgeting and management.

Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.

Ref. Books

1. Diagnosis and treatment of structures in distress by R.N.Raikar,

Published by R&D Centre of Structural Designers & Consultants Pvt.Ltd., Mumbai,1994.
2. Earthquake resistant design of structures by PankajAgarwal and Manish Shrikhande, Prentice-Hall of India, 2006
3. Handbook on Repair and Rehabilitation of RCC buildings, Published by CPWD, Delhi,2002.
4. Denison Campbell, Allen and Harold Roper , Concrete Structures, materials, maintenance and repair , Long man, Scientific and Technical UK1991.

MPECT3013	**ENERGY CONVERSION AND ENVIRONMENT**	**3**	**0**	**0**	**3**	

Pre -Requisite:

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

CO1	Understand the importance of energy conversion and overview of global and Indian energy scenario
CO2	Summarize the concepts renewable and non renewable energy sources and their principles and applications
CO3	Detailed description of biogas technology and future technologies for waste to energy systems
CO4	Knowledge of energy and resources conservation strategies and policies and explanation about green buildings.

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3			2										
CO2		1												
CO3	2		2											
CO4		2	3											
Avg.														

SYLLABUS

UnitI **[12hours]**

Significance of Energy Conversion and Environment, Overview of Global and Indian Energy Scenario; Environmental Impacts of Energy Conversion, Principles of Waste Minimization and Energy Recovery.

Unit II **[12hours]**

Renewable and Non- Renewable Energy Sources; Estimation of Potential of Energy Recovery form various Sources, Energy economics; Energy Conversion Methods: Thermal, hydro, nuclear, solar, wind, tidal etc., their principles and application.

Unit III **[12hours]**

Waste to Energy options: physical, thermo chemical and bio chemical processes: pelletization, bricquetiation, Combustion, Gasification, pyrolysis; Fuels Derived anaerobic digestion , Biogas Technology, Future Technologies for Waste to Energy Systems; Introduction to Microbial Fuel cell, Gas generations and collection in landfills, Measurements and Control

Unit IV **[12hours]**

Energy and Resources Conservation Strategies and Policies; Environmental Appraisal, Energy audit, Carbon Foot prints, Sustainable Energy-Efficient systems, Intelligent Green

Building, Case studies of sustainable Energy Projects in the field of Water Resources, Infrastructure and EnvironmentalSystem.
Teaching Methods: Chalk& Board/ PPT/Video Lectures/Lecture by Industry Expert.
Text Books 1. Fowler J. M. Energy and the Environment McGraw Hill New York 2nd edition. 2. B.H. Khan, Non Conventional Energy Resources, 2nd Edition , McGraw HillCompanies.
Ref. Books 1. G.D. Rai, Non Conventional Energy Source, Standard PublishersDistributors. 2. D. O. Hall, G. W. Barnard and P. A. Moss, Biomass for Energy in the Developing Countries, Current Roles, Potentials, Problems, Prospects, Pergamon Press Ltd, 1st edition. 3. W. C. Turner, Energy Management Handbook Wiley Newyork 1st edition. 4. P. Meier, Energy System Analysis for Developing countries, SringerVerlag 1st edition. 5. Dorthy J De Renzo, Energy from Bioconversion of Wate materials, Noyes data Corporation USA 1st edition. 6. Francis A.Domino Energy from Solid Waste – Recent Development, Noyes data Corporation USA 1st edition. 7. Oliver S. Owen , Daniel D. Chiras, Natural Resource Conservation – Management for Sustainable Future Prentice Hall Publications 6th edition. 8. McGraw Hill George Tachonobanoglous, Hilary Thesin, Samuel Vigil 1st InternationalEdn.

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IV SEMESTER

Sl. No.	Course Category	Course Code	Course Title	L	T	P	C
1			Dissertation Phase-II	0	0	30	15
TOTAL				**0**	**0**	**30**	**15**

Total Credits for the programme = 19 + 19 +15 +15 = 68

SCHEME OF INSTRUCTION SUMMARY

SL. NO.	COURSE WORK - SUBJECTS AREA	CREDITS / SEMESTER				TOTAL CREDITS	%
		I	II	III	IV		
1	Professional Core (PC)	12	9	3		24	35.29
2	Professional Electives (PE)	3	6			9	13.23
3	Open Electives (OE)			3		3	4.41
4	Thesis Work , Seminar and VIVA-VOICE	4	4	9	15	32	49.23
	TOTAL					**68**	