

SONA COLLEGE OF TECHNOLOGY, SALEM-5

(An Autonomous Institution)

M.E-Civil Engineering

(Construction Engineering and Management)

CURRICULUM and SYLLABI

[For students admitted in 2019-2020]

M.E / M.Tech Regulation 2019

Approved by BOS and Academic Council meetings

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for ME I Semester under Regulations 2019
Civil Engineering
Branch: Construction Engineering and Management

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	P19CEM101	Project Formulation and Appraisal	3	1	0	4
2	P19CEM102	Modern Construction Materials	3	1	0	3
3	P19CEM502	Elective -Advanced Concrete Technology	3	0	0	3
4	P19CEM507	Elective -Construction Project Management	3	0	0	3
5	P19GE101	Research Methodology and IPR	2	0	0	2
6	P19GE701	Audit Course -English for Research Paper Writing	2	0	0	0
Practical						
7	P19CEM103	Construction Engineering Laboratory	0	0	4	2
Total Credits						18

Approved by

Chairperson, Civil Engineering BOS

Dr.R.Malathy

Member Secretary, Academic Council

Dr.R.Shivakumar

Chairperson, Academic Council & Principal

Dr.S.R.R.Senthil Kumar

Copy to:-
HOD/Civil, First Semester ME CEM Students and Staff, COE

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for ME II Semester under Regulations 2019
Civil Engineering
Branch: Construction Engineering and Management

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	P19CEM201	Resource Management and Control in Construction	3	0	0	3
2	P19CEM202	Construction Laws and Regulations	3	0	0	3
3	P19CEM510	Elective - Project Safety Management	3	0	0	3
4	P19CEM511	Elective - Construction Equipment and Management	3	0	0	3
5	P19GE702	Audit Course: Stress Management by Yoga	2	0	0	0
Practical						
6	P19CEM203	Software Application Laboratory for Construction Management	1	0	4	3
7	P19CEM204	Mini Project	0	0	4	2
Total Credits						17

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Copy to:-
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Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for ME III Semester under Regulations 2019
Civil Engineering
Branch: Construction Engineering and Management

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	P19CEM301	Advanced Construction Techniques	3	0	0	3
2	P19CEM517	Elective: Quality control and quality assurance in construction	3	0	0	3
3	P19END601	Open Elective: Product Design and Manufacturing	3	0	0	3
	P19MDS601	Open Elective: Cloud Computing				
	P19ISE601	Open Elective: Transport Safety				
Practical						
4	P19CEM302	Technical Seminar	0	0	2	1
5	P19CEM303	Practical Training	0	0	4	2
6	P19CEM304	Project Phase – I	0	0	16	8
Total Credits						20

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Copy to:-
HOD/Civil, Third Semester ME CEM Students and Staff, COE

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for ME IV Semester under Regulations 2019
Civil Engineering

Branch: Construction Engineering and Management

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Practical						
1	P19CEM401	Project Phase – II	0	0	28	14
Total Credits						14

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Copy to:-

HOD/Civil, Fourth Semester ME CEM Students and Staff, COE

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for ME I Semester under Regulations 2019
Civil Engineering
Branch: Construction Engineering and Management

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	P19CEM101	Project Formulation and Appraisal	3	1	0	4
2	P19CEM102	Modern Construction Materials	3	1	0	3
3	P19CEM502	Elective -Advanced Concrete Technology	3	0	0	3
4	P19CEM507	Elective -Construction Project Management	3	0	0	3
5	P19GE101	Research Methodology and IPR	2	0	0	2
6	P19GE701	Audit Course -English for Research Paper Writing	2	0	0	0
Practical						
7	P19CEM103	Construction Engineering Laboratory	0	0	4	2
Total Credits						18

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Dr.S.R.R.Senthil Kumar

Copy to:-
HOD/Civil, First Semester ME CEM Students and Staff, COE

P19CEM101	PROJECT FORMULATION AND APPRAISAL	3 1 0 4
COURSE OUTCOMES		
<i>Upon completion of this course, the student will be able to...</i>		
CO1 Explain the process the formulation of project.		
CO2 Describe about the concepts of cash flows, time value of money and cost of capital		
CO3 Determine the various theories of project appraisal		
CO4 Interpret the various means of financing for a project		
CO5 Explain the private sector participation in projects		
Unit – I: PROJECT FORMULATION		12
Project – Concepts – Capital investments - Generation and Screening of project Ideas - Project identification – Preliminary analysis, Market, Technical, Financial, Economic and ecological - Pre-Feasibility report and its Clearance, Project estimates and Techno-economic Feasibility report, Detailed project report – Different project clearances required.		
Unit –II: PROJECT COSTING		12
Project cash flows – Time value of money – Cost of capital.		
Unit –III: PROJECT APPRAISAL		12
NPV – BCR – IRR – ARR – Urgency – Pay Back Period – Assessment of various methods – Indian practice of investment appraisal – International practice of appraisal – Analysis of risk – Different methods – Selection of a project and risk analysis in practice.		
Unit –IV: PROJECT FINANCING		12
Project financing – Means of finance – Financial institutions – Special schemes – Key financial Indicators - Ratios.		
Unit –V: PRIVATE SECTOR PARTICIPATION		12
Private sector participation in Infrastructure Development Projects – PPP- BOT, BOLT, BOOT - Technology transfer and foreign collaboration - Scope of technology transfer.		
		Total: 60 hrs.
REFERENCE BOOKS:		
1. Ambrish Gupta, Project Appraisal and Financing Paperback – 2017		
2. Prasanna Chandra, Projects – Planning, Analysis, Selection, Implementation Review, McGraw Hill Publishing Company Ltd., New Delhi. 2017.		
3. Barcus, S.W. and Wilkinson.J.W., Hand Book of Management Consulting Services, McGraw Hill, New York, 1986.		
4. Joy P.K., Total Project Management - The Indian Context, New Delhi, Macmillan India Ltd., 1994		
5. Manual for the Preparation of Industrial Feasibility Studies, (IDBI Reproduction)United Nations Industrial Development Organisation (UNIDO) Bombay, 2012.		

P19CEM102	CONSTRUCTION PLANNING SCHEDULING AND CONTROL	3	1	0	4
COURSE OUTCOMES					
<i>Upon completion of this course, the student will be able to...</i>					
CO1 Explain the concepts of construction Planning					
CO2 Compute the construction Schedules using CPM					
CO3 Formulate scheduling Procedures with uncertain durations					
CO4 Plan the project budget, cash flow and schedule information					
CO5 Explain the various types of Project information and organize the database of the project					
Unit – I: CONSTRUCTION PLANNING					12
Basic Concepts in the development of construction plans – Choice of technology and construction method – Defining work tasks – Defining precedence relationships among activities – Estimating activity Durations – Estimating resource requirements for work activities – Coding systems.					
Unit –II: SCHEDULING PROCEDURES USING CPM					12
Construction schedules – Critical Path Method – Scheduling calculations – Float – Presenting project schedules – Scheduling for Activity-on-Node and with leads, lags, and windows – Scheduling with resource constraints and precedence – Use of advanced scheduling techniques					
Unit –III: SCHEDULING PROCEDURES WITH UNCERTAINTY					12
Scheduling with uncertain durations – Calculations for Monte Carlo schedule simulation – Crashing and time/cost Trade-offs – Improving the scheduling process.					
Unit –IV: COST CONTROL, MONITORING AND ACCOUNTING					12
Cost control problem – Project budget – Forecasting for activity cost control – Financial accounting systems and cost accounts – Control of project cash flows –Schedule control – Schedule and budget updates – Relating cost and schedule information.					
Unit –V: ORGANIZATION AND USE OF PROJECT INFORMATION					12
Types of project information – Accuracy and use of information – Computerized organization and use of information – Organizing information in databases – Relational model of databases – Other conceptual models of databases – Centralized database management systems – Databases and applications Programs – Information transfer and flow.					
					Total: 60 hrs.
REFERENCE BOOKS:					
1. Calin M. Popescu, Chotchai Charoenngam, Project Planning, Scheduling and Control in Construction: An Encyclopedia of terms and Applications, Wiley, New York, 1995					
2. Chitkara, K.K. Construction Project Management: Planning, Scheduling and Control, McGraw-Hill Publishing Company, New Delhi, 2019.					
3. Chris Hendrickson and Tung Au, Project Management for Construction – Fundamental Concepts for Owners, Engineers, Architects and Builders, Prentice Hall, Pittsburgh, 2000.					
4. Halpin, D. W., Financial and Cost Concepts for Construction Management, John Wiley & Sons, New York, 1985. Willis, E. M., Scheduling Construction Projects, John Wiley & Sons, 2011.					

P19CEM103	CONSTRUCTION ENGINEERING LABORATORY	0 0 4 2
COURSE OUTCOMES		
<i>Upon completion of this course, the student will be able to...</i>		
CO1 Design high strength concrete and study the parameters affecting its performance		
CO2 Conduct Non-Destructive tests on existing concrete structures		
CO3 Apply Engineering principles to understand behaviour of structural elements		
CONTENTS:-		60
Study of stress-strain curve of high strength concrete		
Correlation between cube strength, cylindrical strength, split tensile strength and modulus of rupture		
Effect of cyclic loading on steel		
Non-Destructive testing of existing concrete members		
Behaviour of beams under flexure, shear and torsion		
		Total: 60 hrs.
REFERENCE BOOKS:		
1. Properties of Concrete, Neville A.M, 5 th Edition, Prentice Hall, 2013.		
2. Concrete Technology, Shetty M.S., S.Chand and Co., 2018.		

P19CEM502	ADVANCED CONCRETE TECHNOLOGY	3 0 0 3
COURSE OUTCOMES		
<p><i>Upon completion of this course, the student will be able to...</i></p> <p>CO1 discuss microstructure concrete and dimensional stability CO2 prepare a mix design for the various mix proportions CO3 enumerate the properties of ingredients used in concretes CO4 explain the different types of special concrete and their applications in construction. CO5 explain different types of non-destructive testing methods.</p>		
UNIT-I: CONCRETE CHARACTERIZATION		9
<p>Microstructure of concrete: Aggregate phase, hydrated cement paste, interfacial transition zone. Strength: strength-porosity relationship, failure modes in concrete, factors affecting compressive strength, behavior of concrete under various stress states. Dimensional stability: Elastic behavior, drying shrinkage and creep, thermal shrinkage and thermal properties of concrete.</p>		
UNIT-II: PROPORTIONING CONCRETE MIXTURES		9
<p>Significance and objectives, general considerations, procedures, Methods of concrete mix design, design of high strength and high performance concrete using relevant codes. Testing and control of concrete quality: Methods and significance, accelerated strength testing, core tests and quality control charts.</p>		
UNIT-III: DURABILITY OF CONCRETE		9
<p>Water as an agent of deterioration: structure of water, permeability, causes of deterioration of concrete: surface wear, crystallization of salts in pores, frost action, effect of fire, sulfate attack, alkali aggregate reaction, and corrosion of embedded steel in concrete: Mechanism-control, development of holistic model of concrete deterioration, concrete in the marine environment. Methods of providing durable concrete, short-term tests to assess long-term behaviour.</p>		
UNIT-IV: SPECIAL TYPES OF CONCRETE		9
<p>Roller compacted concrete-self compacted concrete-shrinkage compensation concrete, pervious concrete-concrete containing polymers-heavy weight concrete for radiation shielding-high performance concrete, high strength concrete, shotcrete, fibre reinforced concrete- bacterial concrete-Mass concrete – their materials, mix proportions, properties, applications and limitations.</p>		
Unit-V: Non-destructive methods		9
<p>Surface hardness methods, Penetration resistance techniques, pull out tests, maturity method, stress wave propagation methods, electrical methods, electrochemical methods, electromagnetic methods, Tomography of reinforced concrete.</p>		
		Total: 45 hrs.
REFERENCE BOOKS:		
<ol style="list-style-type: none"> 1. .Kumar Mehta, Paulo J.M Monteiro., Concrete Microstructure,properties and Materials,McGraw Hill Education(India) Pvt Ltd, New Delhi,2014 2. Gambhir.M.L., Concrete Technology, McGraw Hill Education, 2011. 3. Gupta.B.L., Amit Gupta, “Concrete Technology, Jain Book Agency, 2010. 4. Neville, A.M., Properties of Concrete, Prentice Hall, 2013, London. 5. Shetty M.S., Concrete Technology, S.Chand and Company Ltd. Delhi, 2008 		

P19CEM507	CONSTRUCTION PROJECT MANAGEMENT	3 0 0 3
COURSE OUTCOMES		
<i>Upon completion of this course, the student will be able to...</i>		
CO1 Explain the concept of project and role of project managers		
CO2 Develop the project plan and controlling systems		
CO3 illustrate the characteristics of working systems and monitoring contracts		
CO4 Describe the project direction and control the process at various stages		
CO5 Explain the various resource management and inventory control		
Unit- 1: INTRODUCTION TO PROJECT		9
Concept of a Project – Characteristic features – Project life cycle – Phases – Project management – tools and techniques for project management – Role of project managers.		
Unit –II: ROLE OF PROJECT MANAGEMENT		9
Development of project plan and objectives – Programming – Scheduling – Project organization – Organization and project team – Role of communication in project management – Controlling systems.		
Unit –III: WORKING SYSTEMS		9
Working systems – Characteristics – Class of systems – Design of systems – Work break down system (WBS) – Project execution plan – Project procedure manual –Sub systems of project management- monitoring of projects- Networks – Monitoring contracts.		
Unit –IV: PROJECT DIRECTION		9
Project direction – Direction during production stage – Value engineering review – Stages – Directives – Project coordination – Procedure – Interface management – Project control – Scope for progress control – Overall project progress control – Stages – Methods.		
Unit –V: RESOURCE MANAGEMENT		9
Basic concept – Labour requirements – Labour productivity – Site productivity – Equipment Management – Material management- Procurement organization – Procurement planning – Functions of material management – Inventory control		
		Total: 45 hrs.
REFERENCE BOOKS:		
1. Prasanna Chandra, “Project Planning, Analysis, Selection, Implementation and review”, Tata Mcgraw Hill ,2017.		
2. Chitkara, K.K “Construction Project Management: Planning Scheduling and control”, Tata McGraw-Hill Publishing Company, New Delhi- 2019..		
3. Frederick E. Gould, “Construction Project Management”, Pearson Publications, Vary E. Joyce, Massachusetts Institute of Technology, 2000.		
4. Choudhury, S “Project Management”, Pearson Publishing company New Delhi 2008.		
5. Sengutha .B, Guha .H, “Construction Management and Planning”, Tata Mc Graw Hill, 2001.		

COURSE OUTCOMES

At the end of the course, the student will be able to

1. Review the literature of the research problem
2. Choose appropriate data collection and sampling method according to the research problem.
3. Interpret the results of research and communicate effectively with their peers
4. Explain the Importance of intellectual property rights
5. Evaluate trade mark, develop and register patents

UNIT 1 INTRODUCTION TO RESEARCH METHODS 6

Definition and Objective of Research, Various steps in Scientific Research, Types of Research, Criteria for Good Research, Defining Research Problem, Research Design , Case Study Collection of Primary and Secondary Data, Collection Methods: Observation, Interview, Questionnaires, Schedules,

UNIT 2 SAMPLING DESIGN AND HYPOTHESIS TESTING 6

steps in Sampling Design, Types of Sample Designs, Measurements and Scaling Techniques - Testing of hypotheses concerning means (one mean and difference between two means -one tailed and two tailed tests), concerning variance – one tailed Chi-square test.

UNIT 3 INTERPRETATION AND REPORT WRITING 6

Techniques of Interpretation, Precaution in Interpretation, Layout of Research Report, Types of Reports, Oral Presentation, Mechanics of Writing Research Report

UNIT 4 INTRODUCTION TO INTELLECTUAL PROPERTY 6

Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights, Innovations and Inventions trade related intellectual property rights.

UNIT 5 TRADE MARKS, COPY RIGHTS AND PATENTS 6

Purpose and function of trade marks, acquisition of trade mark rights, trade mark registration processes, trademark claims –trademark Litigations- International trademark law

Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

THEORY: 30 Hours TUTORIAL: - PRACTICAL: - TOTAL: 30 Hours

TEXT BOOKS

1. C.R. Kothari, Gaurav Garg, Research Methodology Methods and Techniques ,4th Edition, New Age International Publishers, 2019.
2. Deborah E. Bouchoux, “Intellectual Property: The Law of Trademarks, Copyrights, Patents, and Trade Secrets”, Delmar Cengage Learning, 4th Edition, 2012.
3. Prabuddha Ganguli, “Intellectual Property Rights: Unleashing the Knowledge Economy”, Tata Mc Graw Hill Education, 1st Edition, 2008.

REFERENCE BOOKS

1. Panneerselvam, R., Research Methodology, Second Edition, Prentice-Hall of India, New Delhi, 2013.
2. Ranjith Kumar, Research Methodology – A step by step Guide for Begineers, 4th edition, Sage publisher, 2014.
3. D Llewelyn & T Aplin W Cornish, “Intellectual Property: Patents, Copyright, Trade Marks and Allied Rights”, Sweet and Maxwell, 1st Edition, 2016.
4. Ananth Padmanabhan, “Intellectual Property Rights-Infringement and Remedies”, Lexis Nexis, 1st Edition, 2012.
5. Ramakrishna B and Anil Kumar H.S, “Fundamentals of Intellectual Property Rights: For Students, Industrialist and Patent Lawyers”, Notion Press, 1st Edition, 2017.
6. M.Ashok Kumar and Mohd.Iqbal Ali :”Intellectual Property Rights” Serials Pub

Course Outcomes:

At the end of the course, the students will be able to

- Demonstrate research writing skills both for research articles and thesis
- Frame suitable title and captions as sub-headings for articles and thesis
- Write each section in a research paper and thesis coherently
- Use language appropriately and proficiently for effective written communication
- Exhibit professional proof-reading skills to make the writing error free

Unit – I	6
Planning and preparation, word order, breaking up long sentences, organising ideas into paragraphs and sentences, being concise and avoiding redundancy, ambiguity and vagueness	
Unit – II	6
Interpreting research findings, understanding and avoiding plagiarism, paraphrasing sections of a paper/ abstract.	
Unit- III	6
Key skills to frame a title, to draft an abstract, to give an introduction	
Unit – IV	6
Skills required to organise review of literature, methods, results, discussion and conclusions	
Unit – V	6
Usage of appropriate phrases and key terms to make the writing effective - proof-reading to ensure error-free writing.	

Text Books:

1. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011
2. Highman N , Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book, 1998.
3. Day R, How to Write and Publish a Scientific Paper, Cambridge University Press, 2006.
4. Goldbort R, Writing for Science, Yale University Press, 2006. (available on Google Books)

Total: 30 hours

REFERENCES

Martin Cutts, Oxford Guide to Plain English, Oxford University Press, Second Edition, 2006

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Civil Engineering
Branch: Construction Engineering and Management

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Theory						
1	P19CEM201	Resource Management and Control in Construction	3	0	0	3
2	P19CEM202	Construction Laws and Regulations	3	0	0	3
3	P19CEM510	Elective - Project Safety Management	3	0	0	3
4	P19CEM511	Elective - Construction Equipment and Management	3	0	0	3
5	P19GE702	Audit Course: Stress Management by Yoga	2	0	0	0
Practical						
6	P19CEM203	Software Application Laboratory for Construction Management	1	0	4	3
7	P19CEM204	Mini Project	0	0	4	2
Total Credits						17

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HOD/Civil, Second Semester ME CEM Students and Staff, COE

P19CEM201	Resource Management and Control in Construction	L T P C 3 0 0 3
<i>COURSE OUTCOMES</i>		
At the end of the course, the student will be able to: CO1 know the management and planning of various resources involved in construction. CO2 describe the effect of resource planning. CO3 illustrate the management of materials and equipment. CO4 explain the effect of time management. CO5 identify the process of resource allocation and resource levelling in construction		
UNIT-I: RESOURCE PLANNING		9 Hrs
Resource Planning, Procurement, Identification, Personnel, Planning for material, Labour, time schedule and cost control, Types of resources, manpower, Equipment, Material, Money, Time.		
UNIT –II: LABOUR MANAGEMENT		9 Hrs.
Systems approach, Characteristics of resources, Utilization, measurement of actual resources required, Tools for measurement of resources, Labour, Classes of Labour, Cost of Labour, Labour schedule, optimum use Labour- Productivity analysis for labour.		
UNIT –III: MATERIALS AND EQUIPMENT		9 Hrs.
Material: Time of purchase, quantity of material, sources, Transportation, Delivery and Distribution. Equipment: Planning and selecting by optimistic choice with respect to cost, Time, Source and handling.		
UNIT –IV: TIME MANAGEMENT		9 Hrs.
Personnel time, Management and planning, managing time on the project, forecasting the future, Critical path measuring the changes and their effects – Cash flow and cost control-Fast track construction.		
UNIT –V: RESOURCE ALLOCATION AND LEVELLING		9 Hrs.
Time-cost trade off, Computer application – Resource levelling, resource list, resource allocation, Resource loading, Cumulative cost –Value Management.		
		Total: 45 hrs.
REFERENCE BOOKS:		
<ol style="list-style-type: none"> 1. Andrew, D. Szilagg, “Hand Book of Engineering Management”, 2002. 2. Glenn .A, Sea's and Reichard, Clough .H, “Construction Project Management”, John Wiley and Sons, Inc, 2009. 3. Harvey, A. Levine, “Project Management using Micro Computers”, Obsome McGraw Hill C.A. Publishing Co., Inc. 2008. 4. James, A., Adrain, “Quantitative Methods In Construction Management”, American Elsevier Publishing Co., Inc., 2003. 		

P19CEM202	Construction Laws and Regulations	L T P C 3 0 0 3
COURSE OUTCOMES		
At the end of the course, the student will be able to: CO1 study the elements of concluding, and administering contracts CO2 know about the concepts of tendering procedures. CO3 achieve awareness on arbitrations and legal procedures CO4 explain the different taxes involved in construction activities CO5 gain knowledge on labour regulations and their impact on managing of contracts		
UNIT-I: CONTRACT AGREEMENTS		9 Hrs
Functions of Contracts in engineering- Introduction to Contract agreements, Terms involved in Contract agreements - Elements of Contracts -Types of Contracts – Standard Contract Document - Conditions of Contract-Law of Torts.		
UNIT –II: TENDERING CONCEPTS		9 Hrs
Tendering Process - tender documents – requirements for tendering –Methods of inviting tenders-Evaluation of Tender from Technical, financial aspects – Two Cover System- Preparation of the Documentation.		
UNIT –III: APPOINTMENT OF ARBITRATOR		9 Hrs
Earnest Money Deposit (EMD) – Security deposits - Arbitrator- appointment of arbitrator-power and duties of arbitrator – dispute review board- Violations – Certificates, Forms, and Schedules – Extension of time and extended stay-Case study.		
UNIT –IV: TYPES OF TAX INVOLVED IN CONSTRUCTION		9 Hrs
Potential Contractual Problems – price variation clause – fine and Liquidated Damages – insurance income tax – sales tax – VAT – Legal requirements of planning –Local government approval-Case study.		
UNIT –V: LABOUR LAWS		9 Hrs
Indian Contracts Act - Labour laws – workmen compensation act – minimum wages Act – Child labour Act- Industrial dispute Act- Maternity benefit Act – Domestic emerging on misconduct.		
		Total:45 hrs.
REFERENCE BOOKS:		
<ol style="list-style-type: none"> 1. John G. Betty., “Engineering Contracts”, McGraw Hill, 2003. 2. Gajaria G.T., “Laws Relating to Building and Engineering Contracts in India”, M. M. Tripathi Private Ltd., Bombay, 1982 Tamilnadu PWD Code, 2006. 3. Jimmie Hinze, “Construction Contracts”, McGraw Hill, 2001 4. Joseph T. Bockrath, “Contracts, the Legal Environment for Engineers and Architects”, McGraw Hill, 2000. 4. Joseph T. Bockrath, “Contracts, the Legal Environment for Engineers and Architects”, McGraw Hill, 2000. 		

P19CEM203	Software Application Laboratory for Construction Management	L T P C 1 0 4 3
<i>COURSE OUTCOMES</i>		
At the end of the course, the student will be able to: CO1 Prepare quantity takeoff and delivery of bid for construction projects. CO2 Prepare track project report using Primavera software. CO3 Plan scheduling and track construction projects using MS project and analyze the risks factors in projects		
<ol style="list-style-type: none"> 1. Quantity takeoff, Preparation and delivery of the bid or proposal of an engineering construction project. 2. Design of a simple equipment information system for a construction project. 3. Scheduling of a small construction project using Primavera scheduling systems including reports and tracking. 4. Scheduling of a small construction project using tools like MS project scheduling systems including reports and tracking. 5. Simulation models for project risk analysis. 		
		Total: 45 hrs.
REFERENCE BOOKS:		
<ol style="list-style-type: none"> 1. Krishnamoorthy .C.S and Rajeev .S, Computer Aided Design, Narosa publishing house, New Delhi, 2001. 2. Harrison .H .B, Structural Analysis and Design, vol. I & II, Pergamon press, 2001. 3. Billy E. Giliet Introduction to Operation Research - Computer Oriented Algorithmic Approach, Tata McGraw Hill, 2000. 4. Paulson. B.R., Computer Applications in Construction, McGraw Hill, 2005. 5. Feigenbaum .L, Construction Scheduling with Primavera Project Planner, Prentice Hall Inc., 2009. 		

P19CEM204	Mini Project	L T P C 0 0 4 2
<i>COURSE OUTCOMES</i>		
<p>At the end of the course, the student will be able to:</p> <p>CO1. Identify Construction Engineering problems reviewing available literature.</p> <p>CO2. Study different techniques used to analyze complex Construction Engineering and Management systems.</p> <p>CO3. Work on the solutions given and present solution by using his/her technique applying engineering principles.</p>		
Syllabus Contents:		30 Hrs.
<p>Mini Project will have mid semester presentation and end semester presentation. Mid Semester presentation will include identification of the problem based on the literature review on the topic referring to latest literature available.</p> <p>End semester presentation should be done along with the report on identification of topic for the work and the methodology adopted involving scientific research, collection and analysis of data, determining solutions highlighting individuals' contribution.</p> <p>Continuous assessment of Mini Project at Mid Semester and End Semester will be monitored by the departmental committee.</p>		

P19CEM510	Project Safety Management	L T P C 3 0 0 3
COURSE OUTCOMES		
At the end of the course, the student will be able to: CO1 study the accountabilities and responsibilities for the delivery of safety strategy and performance. CO2 know appropriate safety information and training related programme. CO3 describe the safety measurements and record keeping. CO4 ensure that all staff is provided with adequate and appropriate safety information CO5 provide the necessary training to build and maintain meaningful aerodrome operational safety leadership skills.		
UNIT-I: CONSTRUCTION ACCIDENTS		9 Hrs
Accidents and their Causes – Human Factors in Construction Safety – Costs of Construction Injuries – Occupational and Safety Hazard Assessment – Legal Implications.		
UNIT –II: SAFETY PROGRAMMES		9 Hrs
Problem Areas in Construction Safety – Elements of an Effective Safety Programme – Job-Site Safety Assessment – Safety Meetings – Safety Incentives-Implementation of 5’S		
UNIT –III: CONTRACTUAL OBLIGATIONS		9 Hrs
Contractual obligations - Safety in Construction Contracts – Substance Abuse – Safety Record Keeping.		
UNIT –IV: DESIGNING FOR SAFETY		9 Hrs
Safety Culture – Safe Workers – Safety and First Line Supervisors – Safety and Middle Managers – Top Management Practices, Company Activities and Safety – Safety Personnel – Sub contractual Obligation – Project Coordination and Safety Procedures –Workers Compensation.		
UNIT –V: OWNERS’ AND DESIGNERS’ OUTLOOK		9 Hrs
Owner’s responsibility for safety – Owner preparedness – Role of designer in ensuring safety – Safety clause in design document.		
		Total: 45 hrs.
REFERENCE BOOKS:		
1. Richard J. Coble, Jimmie Hinze and Theo C. Haupt, Construction Safety and Health Management, Prentice Hall Inc., 2001. 2. TamilNadu Factory Act, Department of Inspectorate of factories, Tamil Nadu. Health Management, Prentice Hall Inc., 2001. 3. Jimmy W. Hinze, Construction Safety, Prentice Hall Inc., 1997.		

P19CEM511	Construction Equipment and Management	L T P C 3 0 0 3
<i>COURSE OUTCOMES</i>		
At the end of the course, the student will be able to: CO1 know about the management of equipments and their utilization. CO2 recognize principles of effective utilization of earthwork equipments. CO3 understand the basic of construction equipments. CO4 know about the materials handling in construction site. CO5 recognize the productivity of equipment management.		
UNIT-I: EQUIPMENT MANAGEMENT		9 Hrs
Identification –Planning - Equipment Management in Projects - Maintenance Management – Replacement - Cost Control of Equipment – Depreciation Analysis, Methods of calculation of depreciation- Safety Management.		
UNIT –II: EARTHWORK EQUIPMENT		9 Hrs
Fundamentals of Earth Work Operations - Earth Moving operations-Types of Earthwork Equipment - Tractors, Motor Graders, Scrapers, Front end Loaders, Earth Movers – capacity calculations.		
UNIT –III: OTHER CONSTRUCTION EQUIPMENTS		9 Hrs
Equipment for Dredging, Trenching, Tunneling, Drilling and Blasting. Equipment for compaction - Types of pumps used in Construction - Equipment for Grouting - Pile Driving Equipment- Equipment of Erection and demolition.		
UNIT –IV: MATERIALS HANDLING EQUIPMENT		9 Hrs
Forklifts and related equipment - Portable Material Bins - Conveyors - equipment used in demolition – Chain Pulley Blocks.		
UNIT –V: EQUIPMENT FOR PRODUCTION OF AGGREGATE AND CONCRETING		9 Hrs
Crushers – Feeders - Screening Equipment - Batching and Mixing Equipment – Hauling equipment - Pouring and Pumping Equipment – Ready mixed concrete carriers.		
		Total: 45 hrs.
REFERENCE BOOKS:		
<ol style="list-style-type: none"> 1. Peurifoy, R.L., Ledbetter, W.B. and Schexnayder.C, “Construction Planning Equipment and Methods”, McGraw Hill. Singapore 2005. 2. Sharma S.C. “Construction Equipment and Management”, Khanna Publishers, Delhi, 2008. 3. Deodhar, S.V. “Construction Equipment and Job Planning”, Khanna Publishers Delhi, 2008. 4. Mahesh Varma .Dr. “Construction Equipment and its planning and application”, Metropolitan Book Company, New Delhi, 2003. 		

Course Outcomes:

At the end of completion of this course, students will be able to

1. Develop physical and mental health thus improving social health
2. Increase immunity power of the body and prevent diseases
3. Accelerate memory power
4. Achieve the set goal with confidence and determination
5. Improve stability of mind, pleasing personality and work with awakened wisdom

UNIT – I**6**

Yoga-Introduction - Astanga Yoga- 8 parts-Yam and Niyam etc.- Do's and Don'ts in life-Benefits of Yoga and Asana- Yoga Exercise- and benefits- Pranayam Yoga- Nadisuthi, Practice and Spinal Clearance Practice-Regularization of breathing techniques and its effects-Practice and kapalapathy practice.

UNIT – II**6**

Neuromuscular breathing exercise and Practice- Magarasa Yoga, 14 points Acupressure techniques and practice- Body relaxation practice and its benefits- Raja Yoga- 1.Agna –explanation and practice- Activation of Pituitary- Raja Yoga-2. Santhi Yoga-Practice-Balancing of physical and mental power.

UNIT – III**6**

Raja Yoga-3.Sagasrathara yoga –practice- Activation of dormant brain cells-Kayakalpa-theory- Kayakalpa –practice-Yogic exercise to improve physical and mental health and practice-Asanas –explanation-Practice-benefits

UNIT –IV**6**

Sun namaskar- 12 poses-explanation and practice-Yoga –Asana-Padmasana, vajrasana,chakrasana, viruchasanaetc-Stress management with Yoga-Role of women and Yoga Equality, nonviolence, Humanity,Self- control- Food and yoga Aware of self-destructive habits Avoid fault thinking (thought analysis-Practice)-Yoga Free from ANGER (Neutralization of anger)& practice

UNIT – V**6**

Moralisation of Desire & practice- Punctuality-Love-Kindness-CompassionEradication ofworries-Practice - Personality development, positive thinking-Good characters to lead a moral life How to clear the polluted mind- Benefits of blessing- Five- fold culture –explanation- Karma Yoga Practice In Geetha- Sense of duty-Devotion, self- reliance, confidence, concentration, truthfulness, cleanliness.

Total : 30 hours**Reference Books**

1. 'Yogic Asanas for Group Training-Part-I' Janardan Swami YogabhyasiMandal, Nagpur
2. "Rajayoga or conquering the Internal Nature" by Swami Vivekananda, AdvaitaAshrama (Publication Department), Kolkata

OPEN ELECTIVE

Civil

P19CEM601	DISASTER MITIGATION AND MANAGEMENT	3 0 0 3
COURSE OUTCOMES		
<i>Upon completion of this course, the student will be able to...</i> <ul style="list-style-type: none">• CO1 Identify the types of hazards, vulnerability and micro zonation• CO2 Explain the causes and effects of disasters• CO3. Discuss the preparedness and forecasting the disasters• CO4 Explain various post disaster activities• CO5 Discuss the disaster management solutions from case studies		
Unit 1 INTRODUCTION		9 Hrs.
.Meaning and types of hazards, disasters and catastrophes – Disaster Management; Earthquakes: causes and effects – measurements - earthquake zones India – vulnerability and micro zonation;- volcanic hazards		
Unit –II CAUSES AND EFFECTS		9 Hrs.
Landslides : Causes and effects – landslide prone zones in India –Cyclone: Origin and types - effects on land and sea – damage assessment; Flooding: Tsunami –Soil Erosion-Drought :Characteristics- Occurrence – Preventive measures		
Unit –III PREPAREDNESS AND FORECASTING		9 Hrs.
Emerging approaches in Disaster Management- Pre- disaster stage (preparedness) - Preparing hazard zonation maps, Predictability/forecasting& warning- Preparing disaster preparedness plan- Land use zoning- Disaster resistant house construction- Population reduction in vulnerable areas- Awareness		
Unit –IV POST DISASTER ACTIVITIES		9 Hrs.
Emergency Stage - Rescue training for search & operation at national & regional level-Immediate relief-Assessment surveys- Post Disaster stage-Rehabilitation- Political Administrative Aspect- Social Aspect-Economic Aspect- Environmental Aspect- Mitigation - Role of Media - Monitoring Management- Preventive Measures- A regional survey of Land Subsidence, Coastal Disaster, Cyclonic Disaster& Disaster in Hills with particular reference to India -Ecological planning for sustainability & sustainable development in India-Sustainable rural development		
Unit –V CASE STUDIES		9 Hrs.
Soft Solutions for Disaster Management - Case studies - Earthquake, volcano and landslide - Flood prone area analysis and management – risk assessment – cyclones and floods - Drought and desertification		
		Total: 45 hrs.
Reference Books:		
1. National Disaster Management Division (2004) Disaster Management in India - A Status Report, Ministry of Home Affairs, Government of India, New Delhi. 2. UNDRO (1995) Guidelines for Hazard Evaluation Procedures, United Nations Disasters Relief Organization, Vienna. 3. Nagarajan, R., (2004) Landslide Disaster Assessment and Monitoring, Anmol Publications, New Delhi. 4. Ramkumar, Mu, (2009) Geological Hazards: Causes, Consequences and Methods of Containment, New India Publishing Agency, New Delhi.		

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for ME IV Semester under Regulations 2019
Civil Engineering

Branch: Construction Engineering and Management

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Practical						
1	P19CEM401	Project Phase – II	0	0	28	14
Total Credits						14

Approved by

Chairperson, Civil Engineering BOS

Dr.R.Malathy

Member Secretary, Academic Council

Dr.R.Shivakumar

Chairperson, Academic Council & Principal

Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/Civil, Fourth Semester ME CEM Students and Staff, COE