

# Government College of Engineering, Karad

## SCHEME OF INSTRUCTION & SYLLABI

### Programme: Civil Engineering

#### First Year M. Tech. in Civil Engineering (Construction Management – I Semester)

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs / Week	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	PC - I	CM 1101	Construction Project Management	3	-	-	3	3	15	15	10	60	100
2	PC - II	CM 1102	Construction Equipment	3	-	-	3	3	15	15	10	60	100
3	PCE - I	CM 1113	Computational Methods and Optimization Techniques	3	-	-	3	3	15	15	10	60	100
		CM1123	Human Resource Development in Construction										
4	PCE - II	CM 1114	Advanced Construction Techniques	3	-	-	3	3	15	15	10	60	100
		CM 1124	Repair and Rehabilitation of Structures										
		CM 1134	Ground Improvement Techniques										
5	MLC	RM1105	Research Methodology	2			2	2	15	15	10	60	100
6	PC Lab I	CM 1106	Construction Project Management Laboratory			2	4	2			25	25	50
7	PC Lab II	CM 1107	Construction Equipment Laboratory			2	4	2			25	25	50
8	OEC	OE 1118	Business Analytics	3			3	3	15	15	10	60	100
		OE 1128	Industrial Safety										
		OE 1138	Operations Research										
		OE 1148	Cost Management of Engineering Projects										
		OE 1158	Composite Materials										
		OE 1168	Waste to Energy										
9	Audit	CM 11*9	Audit Course I	2			2	0					
			<b>Total</b>	<b>19</b>	<b>00</b>	<b>04</b>	<b>27</b>	<b>21</b>	<b>90</b>	<b>90</b>	<b>110</b>	<b>410</b>	<b>700</b>

# Government College of Engineering, Karad

## SCHEME OF INSTRUCTION & SYLLABI

### Programme: Civil Engineering

#### First Year M. Tech. in Civil Engineering (Construction Management – II Semester)

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs / Week	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	PC III	CM 1201	Project Economics and Financing	3	-	-	3	3	15	15	10	60	100
2	PC IV	CM 1202	Construction Methods and Techniques	3	-	-	3	3	15	15	10	60	100
3	PCE III	CM 1213	Construction Contracts and Legal Aspects	3	-	-	3	3	15	15	10	60	100
		CM 1223	Advanced Construction Materials and Building Services										
4	PCE IV	CM 1214	Cost Management of Engineering Projects	3	-	-	3	3	15	15	10	60	100
		CM 1224	MIS for Construction Management										
5	PCE V	CM1215	Entrepreneurship in Construction	3			3	3	15	15	10	60	100
		CM1225	Environment Impact Assessment										
6	MP/IT	CM 1206	Mini Project/ Industrial Training	2			2	2			50	50	100
7	PC Lab III	CM 1207	Project Economics and Financing Laboratory			2	4	2			25	25	50
8	PC Lab IV	CM 1208	Construction Methods and Techniques Laboratory			2	4	2			25	25	50
9	Audit 2	CM 12*9	Audit Course II	2			2						
			<b>Total</b>	<b>19</b>	<b>00</b>	<b>04</b>	<b>27</b>	<b>21</b>	<b>75</b>	<b>75</b>	<b>150</b>	<b>400</b>	<b>700</b>

## Government College of Engineering, Karad

### SCHEME OF INSTRUCTION & SYLLABI

#### Programme: Civil Engineering

Second Year M. Tech. in Civil Engineering (Construction Management – III Semester)

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs/Wk	Credits	EXAM SCHEME				
									CT1	CT2	TA/CA	ESE	TOTAL
1	P/S/IT	CM1301	Dissertation Phase-I	-	-	14	14	07	-	-	100	100	200
2	PEC	CM1302	MOOC course (8-12 weeks)	-	-	-	-	03	-	-	-	-	-
<b>Total</b>				<b>00</b>	<b>00</b>	<b>14</b>	<b>14</b>	<b>10</b>	<b>-</b>	<b>-</b>	<b>100</b>	<b>100</b>	<b>200</b>

Note:

1. CM 1302 will be decided by respective Guide in Consultation with Program Coordinator. Course is mandatory is for student and his dissertation phase I will be considered incomplete without this Mandatory MOOC Course.
2. In Case, the course offered online are not completely relevant with the topic of dissertation then any course suggested by NASSCOM on recent technologies can be opted by candidate.

CT1- Class Test 1

CT2- Class Test 2

TA/CA- Teacher Assessment/Continuous Assessment

ESE- End Semester Examination (For Laboratory: End Semester Performance)

## Government College of Engineering, Karad

### SCHEME OF INSTRUCTION & SYLLABI

#### Programme: Civil Engineering

Second Year M. Tech. in Civil Engineering (Construction Management – IV Semester)

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs/Wk	Credits	EXAM SCHEME				
									CT1	CT2	TA/CA	ESE	TOTAL
1	P/S/IT	CM1401	Dissertation Phase-II	-	-	32	32	16	-	-	100	200	300
			Total	-	-	32	32	16	-	-	100	200	300

CT1- Class Test 1

CT2- Class Test 2

TA/CA- Teacher Assessment/Continuous Assessment

ESE- End Semester Examination (For Laboratory: End Semester Perform

# Government College of Engineering, Karad

## SCHEME OF INSTRUCTION & SYLLABI

Programme: Civil Engineering

Second Year M. Tech. in Civil Engineering (Construction Management)

### List of Electives

Program Elective I	Program Elective II	Program Elective III	Program Elective IV	Program Elective V
Semester - I	Semester - I	Semester - II	Semester - II	Semester – II
CM 1113 Computational Methods and Optimization Techniques	CM 1114 Advanced Construction Techniques	CM 1213 Construction Contracts and Legal Aspects	CM 1214 Cost Management of Engineering Projects	CM1215 Entrepreneurship in Construction
CM 1123 Human Resource Development in Construction	CM 1124 Repair and Rehabilitation of Structures	CM 1223 Advanced Construction Materials and Building Services	CM 1224 MIS for Construction Management	CM1225 Environment Impact Assessment
	CM 1134 Ground Improvement Techniques			

Open Elective	Audit Course I	Audit Course II
Semester - I	Semester – I	Semester – II
OE1118: Business Analytics	CM1119: Research Paper Writing	CM1219: Constitution of India
OE1128: Industrial Safety	CM1129: Disaster Management	CM1229: Pedagogy Studies
OE1138: Operations Research	CM1139: Sanskrit for Technical Knowledge	CM1239: Stress Management by Yoga
OE1148: Cost Management of Engineering Projects	CM1149: Value Education	CM1249: Personality Development through Life Enlightenment Skills
OE1158: Composite Materials		
OE 1168 :Waste to Energy		

Course Category	PC	PCE	MLC	MP/IT	DP I	DP II	Total
<b>Credits</b>	24	16	02	02	10	14	68

**Government College of Engineering, Karad****First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)****(PC – I) CM :1101 Construction Project Management**

<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Lectures	03 Hrs/week	CT – 1	15
Tutorials	-	CT – 2	15
Total Credits	03	TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>
<b>Course Outcomes (CO) : At the end of course students will -</b>			
1.	Identify different aspects of site organizational structures, services required on site, personnel management, safety in construction and work study.		
2.	Determine EOQ, perform ABC analysis, understand SQC charts and compute standard time.		
3.	Understand procurement procedure, Quality circles, ISO 9000 and Performance appraisal.		
4.	Appreciate different aspects of material storage, management of accidents, safety in construction and role of computers in construction field.		
	<b>Course Contents</b>		<b>Hours</b>
<b>Unit 1</b>	<b>Site Organization</b> : Organizational structures for construction field, Site layout, Services required on site.		<b>(06)</b>
<b>Unit 2</b>	<b>Material Management</b> : Functions, Inventory control, EOQ, ABC analysis, Estimating requirements, Procurement and storage of materials.		<b>(08)</b>
<b>Unit 3</b>	<b>Personnel Management</b> : Functions, Special characteristics, Manpower planning, Recruitment, Placement, Training and induction, Performance appraisal, Relevant labour laws.		<b>(06)</b>
<b>Unit 4</b>	<b>Construction Quality Management</b> : SQC charts, Sampling techniques, Quality circles, ISO 9000, Management aspects.		<b>(06)</b>
<b>Unit 5</b>	<b>Safety in Construction</b> : Safety Requirements, Safety and health codes, Occupational diseases, Economic aspects, Management of accidents, Safety department.		<b>(06)</b>
<b>Unit 6</b>	<b>Network Analysis</b> : Network compression, Resource allocation, Cost control, Monitoring of projects, PERT in construction projects.		<b>(08)</b>
<b>Text Books</b>			
1.	Principles of Management, KOONTZ AND O DONNEL.		
2.	Personal Management and Industries Relations, DALE		
3.	Critical Path Methods in Construction ANTILL and WOODHEADS		
<b>Reference Books</b>			
1.	Accounting for management, S. K. BHATTARCHARYA		
2.	Principles of Management and Personal Management, A. S. DESHPANDE		
<b>Useful Links</b>			
1.	<a href="https://swayam.gov.in/">https://swayam.gov.in/</a>		
2.	<a href="https://nptel.ac.in/">https://nptel.ac.in/</a>		
3.	<a href="https://www.youtube.com/user/nptelhrd">https://www.youtube.com/user/nptelhrd</a>		
4.	<a href="https://online.stanford.edu/">https://online.stanford.edu/</a>		
5.	<a href="https://www.mooc-list.com/tags/civil-engineering">https://www.mooc-list.com/tags/civil-engineering</a>		
6.	<a href="https://www.courses.com/civil-engineering">https://www.courses.com/civil-engineering</a>		
7.	<a href="http://www.khanacademy.org">www.khanacademy.org</a>		

**Government College of Engineering, Karad**

**First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)**

**(PC – II) CM :1102 Construction Equipment**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
Tutorials	-	CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO) : At the end of course students will be able to -**

1. Understand working of various excavating, hauling, compacting, conveying, hoisting and pile driving equipment
2. Compute cycle time of operations, rating and output of equipment.
3. Select equipment for excavation, compacting, pile driving, tunnelling and concreting.
4. Apply the knowledge of equipment management.

Course Contents		Hours
<b>Unit 1</b>	<b>Excavating Equipment</b> : Excavator, Shovels - different types – back hoe draglines- clamshell, Cycles of operations, Excavators and their use in different soil conditions. Output criteria, Rippers, Trenchers, Graders. Hauling Equipment: Tractor Dumpers, Trailers, Bulldozer, Scrapers, Operation cycles times, Matching of Excavating and hauling equipment.	<b>(10)</b>
<b>Unit 2</b>	<b>Compacting Equipment</b> : Properties of soil, Soil stabilization, Soil compaction, Different types of compacting equipment - Rollers, Sheep foot rollers, pneumatic rollers, vibratory rollers, vibrating plates/ shoes. Vibratory compaction.	<b>(06)</b>
<b>Unit 3</b>	<b>Conveying and Hoisting Equipment</b> : Different types of conveyors, Power requirement, Damages during operations, Economy of transportations, Cableways and Ropeways, Different types of hosting equipment - winch, derricks and cranes. Rating of cranes and power requirement of cranes.	<b>(08)</b>
<b>Unit 4</b>	<b>Piles and Pile driving equipment</b> : Pile Classifications and types, Pile driving and extracting equipment, Pile driving rigs, Pile driving hammers, Rating of pile hammers, Hammer accessories, Pile extractors. Concrete Mixers and Vibrators,	<b>(06)</b>
<b>Unit 5</b>	<b>Tunnelling</b> : Methods of tunnelling, Equipment for conventional tunnelling, Jumbo, Explosives, Temporary & permanent support, Lining, Mucking Equipment, Moles and use of laser beams to guide moles, Ventilations of tunnels. Use of TBM's	<b>(06)</b>
<b>Unit 6</b>	<b>Equipment Management</b> : Selection of equipment, Advantages and limitations of using machines, Planning of equipment – buying Vs hiring, Cost analysis, Economic life and Replacement, Preventative maintenance, System approach to planning. Problems of Equipment Management	<b>(08)</b>

**Text Books**

1. Construction Planning, Equipment and methods – Peurifoy-Tata McGraw Hill Publication
2. Construction Equipment Planning and Applications – Dr. Mahesh Varma
3. Construction Technology by Roy Chudley and Roger Greeno, Prentice Hall, 2005

**Reference Books**

1. Manuals, brochures, publications from construction companies, firms etc.
- 2.

**Useful Links**

1. <https://swayam.gov.in/>
2. <https://nptel.ac.in/>
3. <https://www.youtube.com/user/nptelhrd>
4. <https://online.stanford.edu/>
5. <https://www.mooc-list.com/tags/civil-engineering>
6. <https://www.courses.com/civil-engineering>
7. [www.khanacademy.org](http://www.khanacademy.org)

**Government College of Engineering, Karad**

**First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)**

**(PCE – I) CM :1113 Computational Methods and Optimization Techniques**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
Tutorials	-	CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO) : At the end of course students will able to -**

- Understand the concept of error and its propagation
- Use various methods to solve linear, nonlinear and differential equations.
- Familiar with optimisation models
- Apply linear programming and dynamic programming to solve mathematical models.

	Course Contents	Hours
<b>Unit 1</b>	<b>Error and its Propagation</b> - Solving non-linear equations, curve fitting, Linear and non-linear regression, Least squares regression, Gauss- Newton method, Interpolation, Statistical concepts, Linear correlation	<b>(08)</b>
<b>Unit 2</b>	<b>Linear &amp; Nonlinear Equations</b> - Solution of simultaneous linear and non-linear equations, direct and iterative methods	<b>(06)</b>
<b>Unit 3</b>	<b>Numerical Differentiation and Numerical Integration</b> - Numerical solutions of ordinary differential equations, systems of ODEs, Runge-kutta method.	<b>(07)</b>
<b>Unit 4</b>	<b>Optimization</b> – Types of optimization models, objective function and constraints set, Convex and Concave functions, Objectives of optimization models.	<b>(06)</b>
<b>Unit 5</b>	<b>Linear Programming</b> - Simplex Method, Duality, Sensitivity analysis, Transportation and assignment models. Nonlinear programming- Single variable and multiple variable, Quadratic Programming.	<b>(07)</b>
<b>Unit 6</b>	<b>Dynamic Programming</b> – Principle of optimality. Integer programming Cutting plane algorithm. Simulation – Monto Carlo Method.	<b>(06)</b>

**Text Books**

- Operation Research by Taha.
- Numerical Methods for engineers, Chapra and Kanale
- Quantitate Techniques - J. K. Sharma

**Reference Books**

- Optimisation – S. S. Rao.
- Numerical Methods – E Balaguruswamy.
- Topics in Management Science - Markland

**Useful Links**

- <https://swayam.gov.in/>
- <https://nptel.ac.in/>
- <https://www.youtube.com/user/nptelhrd>
- <https://online.stanford.edu/>
- <https://www.mooc-list.com/tags/civil-engineering>
- <https://www.courses.com/civil-engineering>
- [www.khanacademy.org](http://www.khanacademy.org)

**Government College of Engineering, Karad**

**First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)**

**(PCE – I) CM :1123 Human Resource Development in Construction**

<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Lectures	03 Hrs/week	CT – 1	15
Tutorials	-	CT – 2	15
Total Credits	03	TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>
<b>Course Outcomes (CO) : At the end of course students will able to -</b>			
1. Identify the history of HRD in construction industry.			
2. Able to develop human resource plans, forecast personnel needs and understand recruitment process			
3. Evaluate methods recruitment, training process, and Prepare evaluation and employee benefit system.			
4. Familiars with various acts governing employee management relations			
<b>Course Contents</b>			<b>Hours</b>
<b>Unit 1</b>	<b>Introduction:</b> Definition, history of human resource management, Objectives, HRD in construction industry, Status of construction labour in India.		<b>(07)</b>
<b>Unit 2</b>	<b>Human Resource Planning:</b> Formulating human resource plans - various methods, Job analysis, job specifications, and job design in construction projects, Forecasting personal needs and supply in construction sector.		<b>(07)</b>
<b>Unit 3</b>	<b>Recruitment and Selection:</b> Selection of project manager and project team, External and internal recruitment, Data gathering methods, Skill requirements of construction personnel.		<b>(06)</b>
<b>Unit 4</b>	<b>Training and Development:</b> Training process, Individual and organizational development, Performance appraisal and use of performance appraisal information, Establishing the evaluation system.		<b>(07)</b>
<b>Unit 5</b>	<b>Employee Benefits:</b> Employee health and safety, Wage and salary administration, Incentive system, Wages in construction industry, Retirement and pensions.		<b>(07)</b>
<b>Unit 6</b>	<b>Employee Management Relations:</b> Collective bargaining, Trade unions connected with construction industry, Trade unions act, Labour welfare act, Payment of wages act, Worker's compensation act, Contract labour act, Management of conflict.		<b>(06)</b>
<b>Text Books</b>			
1.	Personnel and Human Resources Management, Terry L. Deep, Mical D Crino, MacMillan Pub. Company.		
2.	Personnel Management, Edwin B. Flippo, McGraw Hill Book Company		
3.	Human Behavior at Work, Keith Davis, Tata McGraw Hill Pub. Company		
<b>Reference Books</b>			
1.	Construction Planning and Management P.S. Gahlot		
2.	Personnel Management Managing Human Resources, Paul S., Greenlaw, John P. Kohl harper and Row Pub		

**Government College of Engineering, Karad**

**First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)**

**(PCE – II) CM :1114 : : Advanced Construction Techniques**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
Tutorials		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO) : At the end of course students will able to -**

- Understand various composite construction process and design formwork.**
- Use new construction material and familiar with land reclamation techniques as well as slip formwork.**
- Familiar with construction techniques of power plants, retaining structures, concrete pavements and rehabilitation of bridges**
- Possess knowledge advanced techniques like compacted concrete reinforced earth construction etc.**

Course Contents		Hours
<b>Unit 1</b>	<b>Composite Construction:</b> Composite Vs Non composite action, Composite steel - concrete construction. <b>Formwork:</b> Materials for formwork, special types of formwork, design of formwork.	<b>(07)</b>
<b>Unit 2</b>	<b>New Materials for construction:</b> such as Geosynthetics, Epoxy resins, Adhesives, MDF(Medium Density Fibre), FRC (Fibre Reinforced Concrete) FRP (Fibre Reinforced Polymer) , Polymer based composites <b>Land Reclamation:</b> Technical progress, drainage for land reclamation, Structural Improvement	<b>(07)</b>
<b>Unit 3</b>	<b>Construction of Power Plant:</b> Generation, structures, Atomic Power Stations, Thermal Power Stations, Wind- Mills	<b>(06)</b>
<b>Unit 4</b>	<b>Rehabilitation of Bridges:</b> Necessity and methods of strengthening, Preservation of Bridges. <b>Retaining Structures :</b> Diaphragm walls, Advanced methods of construction.	<b>(06)</b>
<b>Unit 5</b>	<b>Advanced Techniques:</b> Compacted concrete, Vacuum, Ready Mix, Concrete dewatering in concrete slab construction, Reinforced earth construction, Foundation strengthening.	<b>(07)</b>
<b>Unit 6</b>	<b>Construction of Concrete Pavement :</b> Vacuum processing, Revibrated concrete, Roller – compacted concrete. <b>Slip Formwork:</b> Slip form paving in pavement construction using wet mix macadam in road construction.	<b>(07)</b>

**Text Books**

- Formwork design and construction – Wynn.
- Formwork construction and practices – John. G. Richardson.
- Technical progress in land reclamation by B. G. Shtepa.

**Reference Books**

- Water Power Engineering by Dandekar, Sharma.
- Bridge Engineering by Ponnuswamy,
- Monthly: Civil Engineering & Construction Review
- Handbook of composite construction Engineering by G. M. Subnis.
- Water Power Engineering by Dandekar, Sharma.

**Government College of Engineering, Karad**

**First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)**

**(PCE – II) CM :1124 : : Repair and Rehabilitation of Structures**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
Tutorials	-	CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO) : At the end of course students will able to -**

- Follow various techniques of serviceability and durability of structures.**
- Use maintenance and repair strategies and identify materials for repair.**
- Suggest techniques of repairs for deflection, cracking, etc.**
- Possess knowledge of corrosion protection, grouting, gunting and shotcreting.**

Course Contents		Hours
<b>Unit 1</b>	<b>Serviceability and Durability of Concrete Structures:</b> Quality assurance for concrete construction as built environment, Concrete properties viz strength, permeability, thermal properties and cracking. Effects due to climate, temperature, chemicals, wear and erosion on, Design and construction errors, Corrosion mechanism, Effects of cover thickness and cracking, Methods of corrosion protection, Corrosion inhibitors, Corrosion resistant steels, Coatings, Cathode protection.	<b>(07)</b>
<b>Unit 2</b>	<b>Maintenance and Repair Strategies:</b> Definitions - maintenance, repair and rehabilitation, Factors of maintenance, Importance of maintenance, Preventive measures on various aspects, Inspection, Assessment procedure for evaluating a damaged structure, Causes of deterioration, Testing techniques.	<b>(07)</b>
<b>Unit 3</b>	<b>Materials for Repair:</b> Special concretes and mortar, Concrete chemicals, Special elements for accelerated strength gain , Expansive cement, Polymer concrete, Sulphur infiltrated concrete, Ferro cement, Fibre reinforced concrete.	<b>(06)</b>
<b>Unit 4</b>	<b>Techniques for Repair:</b> Rust eliminators and polymers coating for rebars during repair, Foamed concrete, Mortar and dry pack, Vacuum concrete.	<b>(06)</b>
<b>Unit 5</b>	<b>Grout, Gunitite and Shotcrete:</b> Epoxy injection, Mortar repairfor cracks, Shoring and underpinning. Maintenance and rehabilitation of bridges, dams and offshore structures.	<b>(07)</b>
<b>Unit 6</b>	<b>Examples of Repair to Structures:</b> Repairs to overcome low member strength, Deflection, Cracking, Chemical disruption, Weathering, Wear, Fire, Leakage, Marine exposure. Engineered demolition techniques for dilapidated structures, Case studies.	<b>(07)</b>

**Text Books**

- Concrete Structures Denison Campbell
- Training Course notes on Damage Assessment and repair in Low Cost Ho using Santhakumar
- Repair of Concrete Structures R.T.Allen and S.CEdwards Blakie and Sons

**Government College of Engineering, Karad**

**First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)**

**(PCE – II) CM :1134 Ground Improvement Techniques**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
Tutorials	-	CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO) : At the end of course students will able to -**

- 1. Follow the importance of ground improvement.**
- 2. Familiar with different ground improvement techniques.**
- 3. Understand the theoretical background for different ground improvement techniques**
- 4. Design and apply ground improvement techniques.**

	Course Contents	Hours
<b>Unit 1</b>	<b>Ground Improvement:</b> Befinition, objectives, classification. Suitability of different techniques, Preloading - need, preloading without vertical drain, preloading with vertical drain, Dynamic consolidation.	<b>(07)</b>
<b>Unit 2</b>	<b>Stone Column:</b> Design of stone column: unit cell concept ,area replacement ratio, spacing and diameter, depth, stress ratio, Load bearing capacity of individual stone column, Settlement of stone column, Failure mechanism	<b>(06)</b>
<b>Unit 3</b>	<b>Ground Anchors:</b> components, load transfer mechanism, rock anchors, anchors in granular soil, anchors in cohesive soil, Rock bolt, types, action of rock bolt, Soil nailing, analysis of nailed soil.	<b>(07)</b>
<b>Unit 4</b>	<b>Soil Stabilization:</b> Cement, lime, fly ash, Factors affecting. Grouting - classification, types of grouts, Equipment, design and layout, applications, case histories.	<b>(06)</b>
<b>Unit 5</b>	<b>Earth Reinforcement :</b> Mechanism and concept, Stress strain relationship of reinforced soil, Design theories, Stability analysis of retaining wall - tie back analysis, coherent gravity analysis, Application areas of earth reinforcement.	<b>(07)</b>
<b>Unit 6</b>	<b>Geo Synthetics :</b> Types, functions, Application of geo synthetics: reinforcement, separator, filter, drainage, Selection of geo synthetics; damage and durability of geo synthetics.	<b>(08)</b>

**Text Books**

- Ground improvement techniques by Dr. P Purushothma Raj
- An introduction to ground improvement engineering by SatyendraMittal
- Ground improvement techniques by Nihar Ranjan Patra

**Reference Books**

- Earth reinforcement and soil structures by Colin JFPJones
- An introduction to soil reinforcement and geosynthetics by G. L.SivakumarBabu Geotechnical engineering by Shashi K Gulhati andManojDatta

**Government College of Engineering, Karad**

**First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)**

**(MLC) RM :1105 Research Methodology**

Teaching Scheme		Examination Scheme	
Lectures	02 Hrs/week	CT – 1	15
Tutorials	-	CT – 2	15
Total Credits	2	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO) : At the end of course students will able to -**

1.	Understand basic concept of research and its methodologies
2.	Identify appropriate research topic.
3.	Select and prepare appropriate research problem and parameters
4.	Write a research report

	Course Contents	Hours
Unit 1	<b>Introduction to Research:</b> Meaning of research ,types of research, process of research, Sources of research problem, Criteria / Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem, formulation of research hypotheses. Search for causation.	(08)
Unit 2	<b>Literature survey:</b> Definition of literature and literature survey,needof literature survey, sources of literature, elements and objectives of literature survey, styles of literature survey, and strategies of literature survey.	(06)
Unit 3	<b>Data collection:</b> Measuring, Sampling and Scaling—Classification of data, benefits and drawbacks of data, evaluation of data, qualititative methods of data collection, methods of qualitative research, Sampling, sample size, sampling strategy, attitude measurement and scaling, types of measurements, criteria of good measurements, classification of scales.	(08)

**Text Books**

1.	Applied Statistics and Probability for Engineers
2.	Probability and Statistics for Engineers –Miller, Freund
3.	Applied Mathematics for Engineers and Physiscists

**Reference Books**

1.	Research Methodology: concepts and cases—Deepak Chawla and Neena Sondhi
2.	Research Methods forBusiness—Sekaran—Wiley
3.	Research Methodology: Methods and Trends’
4.	Research Methods in Education---Louis Cohen
5.	Principles of Engineering Economy by Grant Ireson/Leavenworth.

**Useful Links**

1.	<a href="http://nptel.ac.in">nptel.ac.in</a>
2.	<a href="http://freevideolectures.com">freevideolectures.com</a>
3.	<a href="http://www.youtube.com">www.youtube.com</a>

**Government College of Engineering, Karad**

**First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)**

**(PC Lab – I) CM :1106 Construction Project Management Laboratory**

<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Practical	04 Hrs/week	CT – 1	-
Tutorials	-	CT – 2	-
Total Credits	02	TA	25
		ESE	25
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>

**Course Outcomes (CO) : At the end of course students will able to -**

1.	Formulate project report.
2.	Apply theoretical concepts of project management to a case study .

<b>Course Contents</b>		<b>Hours</b>
	Student will visit one or more construction projects and prepare a visit reports covering following aspects of projects. i. Site Organisation ii. Materials Management iii. Personnel Management iv. Quality Management v. Safety Measures	<b>(40)</b>

**Government College of Engineering, Karad**

**First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)**

**(PC Lab – II) CM :1107 Construction Equipment Laboratory**

<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Practical	04 Hrs/week	CT – 1	-
Tutorials	-	CT – 2	-
Total Credits	02	TA	25
		ESE	25
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>

**Course Outcomes (CO) : At the end of course students will able to -**

1.	Formulate project report.
2.	Apply theoretical concepts of equipment management to a case study .

	<b>Course Contents</b>	<b>Hours</b>
	Student will visit one or more construction projects and prepare a visit reports covering following aspects of equipment used on projects. i. Detail Specification of Equipment ii. Cycle Time Calculation iii. Calculation of Output iv. Determination of Economic Life v. Justification for Purchase of Equipment	<b>(40)</b>

**Government College of Engineering, Karad****First Year (Sem – II) M. Tech. Civil Engineering (Construction Management)****(OEC- III) CM :1138 Operations Research**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
Tutorials		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO) : At the end of course students will able to**

1.	Apply the dynamic programming to solve problems of discreet and continuous variables.
2.	Apply the concept of non-linear programming
3.	Carry out sensitivity analysis
4.	Student should able to model the real world problem and simulate it.

Course Contents		Hours
<b>Unit 1</b>	Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex Techniques, Sensitivity Analysis, Inventory Control Models	(10)
<b>Unit 2</b>	Formulation of a LPP - Graphical solution revised simplex method - duality theory -dual simplex method - sensitivity analysis - parametric programming	(08)
<b>Unit 3</b>	Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem - max flow problem - CPM/PERT	(08)
<b>Unit 4</b>	Scheduling and sequencing - single server and multiple server models - deterministic inventor models - Probabilistic inventory control models - Geometric Programming.	(08)
<b>Unit 5</b>	Competitive Models, Single and Multi-channel Problems, Sequencing Models, Dynamic Programming, Flow in Networks, Elementary Graph Theory, Game Theory Simulation	(08)

**Text Books**

1.	H.A. Taha, Operations Research, An Introduction, PHI, 2008
2.	H.M. Wagner, Principles of Operations Research, PHI, Delhi, 1982.
3.	J.C. Pant, Introduction to Optimisation: Operations Research, Jain Brothers, Delhi, 2008

**Reference Books**

1.	Hitler Libermann Operations Research: McGraw Hill Pub. 2009
2.	Pannerselvam, Operations Research: Prentice Hall of India 2010
3.	Harvey M Wagner, Principles of Operations Research: Prentice Hall of India 2010

**Useful Links**

1.	<a href="https://swayam.gov.in/">https://swayam.gov.in/</a>
2.	<a href="https://nptel.ac.in/">https://nptel.ac.in/</a>
3.	<a href="https://www.youtube.com/user/nptelhrd">https://www.youtube.com/user/nptelhrd</a>
4.	<a href="https://online.stanford.edu/">https://online.stanford.edu/</a>
5.	<a href="https://www.mooc-list.com/tags/civil-engineering">https://www.mooc-list.com/tags/civil-engineering</a>
6.	<a href="https://www.courses.com/civil-engineering">https://www.courses.com/civil-engineering</a>
7.	<a href="http://www.khanacademy.org">www.khanacademy.org</a>

**Government College of Engineering, Karad****First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)****(Open Elective-VI) OE :1168 Waste to Energy**

<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Lectures	03 Hrs/week	CT – 1	15
Tutorials	-	CT – 2	15
Total Credits	03	TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>2 Hrs 30 Min</b>
<b>Course Outcomes (CO)</b>			
Students will be able to:			
1.			
2.			
3.			
	<b>Course Contents</b>		<b>Hours</b>
<b>Unit 1</b>	Introduction to Energy from Waste: Classification of waste as fuel – Agro based, Forest residue, Industrial waste - MSW – Conversion devices – Incinerators, gasifiers, digestors		<b>(07)</b>
<b>Unit 2</b>	Biomass Pyrolysis: Pyrolysis – Types, slow fast – Manufacture of charcoal – Methods - Yields and application – Manufacture of pyrolytic oils and gases, yields and applications.		<b>(06)</b>
<b>Unit 3</b>	Biomass Gasification: Gasifiers – Fixed bed system – Downdraft and updraft gasifiers – Fluidized bed gasifiers – Design, construction and operation – Gasifier burner arrangement for thermal heating – Gasifier engine arrangement and electrical power – Equilibrium and kinetic consideration in gasifier operation.		<b>(07)</b>
<b>Unit 4</b>	Biomass Combustion: Biomass stoves – Improved chullahs, types, some exotic designs, Fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design, construction and operation - Operation of all the above biomass combustors.		<b>(06)</b>
<b>Unit 5</b>	Biogas: Properties of biogas (Calorific value and composition) - Biogas plant technology and status - Bio energy system - Design and constructional features - Biomass resources and their classification		<b>(07)</b>
<b>Unit 6</b>	Biomass conversion processes - Thermo chemical conversion - Direct combustion - biomass gasification - pyrolysis and liquefaction - biochemical conversion - anaerobic digestion - Types of biogas Plants – Applications - Alcohol production from biomass - Bio diesel production - Urban waste to energy conversion - Biomass energy programme in India.		<b>(08)</b>
<b>Text Books</b>			
1.	Non Conventional Energy, Desai, Ashok V., Wiley Eastern Ltd., 1990		
2.	Biogas Technology - A Practical Hand Book - Khandelwal, K. C. and Mahdi, S. S., Vol. I & II, Tata McGraw Hill Publishing Co. Ltd., 1983.		
3.	Food, Feed and Fuel from Biomass, Challal, D. S., IBH Publishing Co. Pvt. Ltd., 1991.		
<b>Reference Books</b>			
1.	Biomass Conversion and Technology, C. Y. WereKo-Brobby and E. B. Hagan, John Wiley & Sons, 1996.		
<b>Useful Links</b>			
1.	Moocs/ Swayam Courses on Waste to Energy		

**Government College of Engineering, Karad****First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)****(Audit I) CM 1119: Research Paper Writing**

<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Lectures	02 Hrs/week	CT – 1	15
Tutorials	-	CT – 2	15
Total Credits	00	TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>2 Hrs 30 Min</b>
<b>Course Outcomes (CO)</b>			
Students will be able to:			
1.	Understand that how to improve your writing skills and level of readability		
2.	Learn about what to write in each section		
3.	Understand the skills needed when writing a Title		
	<b>Course Contents</b>		<b>Hours</b>
<b>Unit 1</b>	Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness		<b>(07)</b>
<b>Unit 2</b>	Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction		<b>(06)</b>
<b>Unit 3</b>	Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.		<b>(07)</b>
<b>Unit 4</b>	Key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature,		<b>(06)</b>
<b>Unit 5</b>	Skills needed when writing the Methods, skills needed when writing the Results, skills needed when writing the Discussion, skills needed when writing the Conclusions		<b>(07)</b>
<b>Unit 6</b>	useful phrases, how to ensure paper is as good as it could possibly be the first- time submission		<b>(08)</b>
<b>Text Books</b>			
1.	Goldbort R (2006) Writing for Science, Yale University Press		
2.	Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press		
3.	Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book		
<b>Reference Books</b>			
1.	Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011		
<b>Useful Links</b>			
1.	Moocs/ Swayam Courses on Technical English and Research paper writing.		

**Government College of Engineering, Karad**

**First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)**

**(Audit I) CM :1129 Disaster Management**

Teaching Scheme		Examination Scheme	
Lectures	02 Hrs/week	CT – 1	15
Tutorials		CT – 2	15
Total Credits	00	TA	10
		ESE	60
		Duration of ESE	2 Hrs 30 Min

**Course Outcomes (CO)**

Students will be able to:

- learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
- critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives
- develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations

**Course Contents**

		Hours
<b>Unit 1</b>	<b>Introduction :</b> Disaster: Definition, Factors And Significance; Difference Between Hazard And Disaster; Natural And Manmade Disasters: Difference, Nature, Types And Magnitude.	<b>(07)</b>
<b>Unit 2</b>	<b>Repercussions of Disasters And Hazards:</b> Economic Damage, Loss Of Human And Animal Life, Destruction Of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks Of Disease And Epidemics, War And Conflicts.	<b>(06)</b>
<b>Unit 3</b>	<b>Disaster Prone Areas in India :</b> Study Of Seismic Zones; Areas Prone To Floods And Droughts, Landslides And Avalanches; Areas Prone To Cyclonic And Coastal Hazards With Special Reference To Tsunami; Post-Disaster Diseases And Epidemics	<b>(07)</b>
<b>Unit 4</b>	<b>Disaster Preparedness and Management :</b> Preparedness: Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.	<b>(06)</b>
<b>Unit 5</b>	<b>Risk Assessment :</b> Disaster Risk: Concept And Elements, Disaster Risk Reduction, Global And National Disaster Risk Situation. Techniques Of Risk Assessment, Global Co-Operation In Risk Assessment And Warning, People’s Participation In Risk Assessment. Strategies for Survival.	<b>(07)</b>
<b>Unit 6</b>	<b>Disaster Mitigation :</b> Meaning, Concept And Strategies Of Disaster Mitigation, Emerging Trends In Mitigation. Structural Mitigation And Non-Structural Mitigation, Programs Of Disaster Mitigation In India.	<b>(08)</b>

**Text Books**

- R. Nishith, Singh AK, “Disaster Management in India: Perspectives, issues and strategies “New Royal book Company
- Sahni, PardeepEt.Al. (Eds.),” Disaster Mitigation Experiences And Reflections”, Prentice Hall Of India, New Delhi.

**Reference Books**

- Goel S. L. , Disaster Administration And Management Text And Case Studies” ,Deep &Deep Publication Pvt. Ltd., New Delhi.

**Useful Links**

- NPTEL/ Swayam/ Moocs on Disaster Managements.

**Government College of Engineering, Karad**

**First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)**

**(Audit I) CM :1139 Sanskrit for Technical Knowledge**

<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Lectures	02 Hrs/week	CT – 1	15
Tutorials		CT – 2	15
Total Credits	00	TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>2 Hrs 30 Min</b>
<b>Course Outcomes (CO)</b>			
Students will be able to:			
1.	Introduction to Vedic language		
2.	Technical information about Sanskrit Literature		
3.	Vedic mathematics		
	<b>Course Contents</b>		<b>Hours</b>
<b>Unit 1</b>	Alphabets in Sanskrit, Past/Present/Future Tense, Simple Sentences		<b>8</b>
<b>Unit 2</b>	Order Introduction of roots Technical information about Sanskrit Literature		8
<b>Unit 3</b>	Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics		8
<b>Text Books</b>			
1.	“Abhyaspustakam” – Dr. Vishwas, Samskrita-Bharti Publication, New Delhi		
2.	“Teach Yourself Sanskrit” Prathama Deeksha-VempatiKutumbshastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication		
<b>Reference Books</b>			
1.	“India’s Glorious Scientific Tradition” Suresh Soni, Ocean books (P) Ltd., New Delhi.		
<b>Useful Links</b>			
1.	Swayam/ NPTEL Courses		

**Government College of Engineering, Karad****First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)****(Audit I) CM :1149 Value Education**

Teaching Scheme		Examination Scheme	
Lectures	02 Hrs/week	CT – 1	15
Tutorials	-	CT – 2	15
Total Credits	00	TA	10
		ESE	60
		Duration of ESE	2 Hrs 30 Min.

**Course Outcomes (CO)**

Students will be able to

1. Knowledge of self-development
2. Learn the importance of Human values
3. Developing the overall personality

	Course Contents	Hours
<b>Unit 1</b>	Values and self-development –Social values and individual attitudes. Work ethics, Indian vision of humanism. Moral and non- moral valuation. Standards and principles. Value judgements	07
<b>Unit 2</b>	Importance of cultivation of values. Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness. Honesty, Humanity. Power of faith, National Unity. Patriotism.Love for nature ,Discipline	07
<b>Unit 3</b>	Personality and Behavior Development - Soul and Scientific attitude. Positive Thinking. Integrity and discipline. Punctuality, Love and Kindness. Avoid fault Thinking.	07
<b>Unit 4</b>	Free from anger, Dignity of labour. Universal brotherhood and religious tolerance. True friendship. Happiness Vs suffering, love for truth. Aware of self-destructive habits.	08
<b>Unit 5</b>	Association and Cooperation. Doing best for saving nature Character and Competence –Holy books vs Blind faith. Self-management and Good health. Science of reincarnation.	07
<b>Unit 6</b>	Equality, Nonviolence ,Humility, Role of Women. All religions and same message. Mind your Mind, Self-control. Honesty, Studying effectively	06

**Text Books**

1. Chakroborty, S.K. “Values and Ethics for organizations Theory and practice”, Oxford University Press, New Delhi

**Useful Links**

1. NPTEL/ Swayam Courses dedicated to value Education.

**Government College of Engineering, Karad****First Year (Sem –II) M. Tech. Civil Engineering (Construction Management)****(PC – III) CM :1201 Project Economics and Financing**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
Tutorials	-	CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO) : At the end of course students will able to -**

1.	understand concepts of project economics, risk management and PPP in projects.
2.	use appraisal methods for financial feasibility studies, risk estimation techniques and financing methods of projects.
3.	Apply knowledge of finance and accounting in management of projects
4.	Possesses knowledge of PPP in infrastructure projects

Course Contents		Hours
<b>Unit 1</b>	<b>Economics of Engineering Projects</b> - Nominal and effective rate of interest, Discrete and continuous compounding, Inflation and real rate of interest, Capitalized cost. Economic factors, Equivalence and use of multiple factors.	<b>(08)</b>
<b>Unit 2</b>	<b>Financial Appraisal Criteria</b> - Discounting and non- discounting criteria (Payback period, NPV, AW, ROR, IRR, Benefit- cost ration, Break even analysis). MARR & it's estimation	<b>(06)</b>
<b>Unit 3</b>	<b>Risks in Construction Projects</b> - Types of risk, Measures of project risk, Risk estimation, Risk analysis and Risk management. Sensitivity analysis, Simulation, Decision tree analysis, Selection of projects, Fuzzy Systems applications.	<b>(08)</b>
<b>Unit 4</b>	<b>Financing Projects</b> - Sources of finance, equity, debit, securities, borrowings, debentures, Working capital requirement, Financial institutes, Direct and indirect financial assistance.	<b>(06)</b>
<b>Unit 5</b>	<b>Accounting</b> - Site Accounts - preparation, reporting, Accounting records, Depreciations, Classification of construction costs, Standard budgeting and control.	<b>(06)</b>
<b>Unit 6</b>	<b>Public Private Participation in Projects-</b> PPP Models, BOOT, BOT, Joint Ventures, Annuity, DBFO, External Commercial Borrowings, International Finance.	<b>(06)</b>

**Text Books**

1.	Engineering Economy By E. Paul Degarmo, William G. Sullivan
2.	Project preparation Appraisal Implementation by Prasanna Chandra.
3.	Principles of Construction Management by Roy Pilcher.

**Reference Books**

1.	Construction Project Management By Chitkara
2.	Engineering economics by Riggs
3.	Corporate finance by Kuchal S.C.
4.	Principles of Corporate Finance by Brealey R.A.
5.	Principles of Engineering Economy by Grant Ireson/Leavenworth.

**Useful Links**

1.	<a href="http://nptel.ac.in">nptel.ac.in</a>
2.	<a href="http://freevideolectures.com">freevideolectures.com</a>
3.	<a href="http://www.youtube.com">www.youtube.com</a>

**Government College of Engineering, Karad**

**First Year (Sem – II) M. Tech. Civil Engineering (Construction Management)**

**(PC – IV) CM :1202 Construction Methods and Techniques**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
Tutorials	-	CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO) : At the end of course students will able to**

1.	Understand underground, underwater and steel construction methods.
2.	Use cofferdams, caissons and piles for foundation construction.
3.	Follow and apply prefabrication construction method.
4.	Familiarise with vibration controlled foundation, formworks and retaining walls

Course Contents		Hours
<b>Unit 1</b>	<b>Underground and Underwater Construction :</b> Shaft sinking, Tunnel driving in hard and soft strata, Surge chambers - Design criteria, loads, assumptions, Types of surge chambers. Underground power stations - Principal types. Underground railway stations - Construction and Maintenance, Parking places. Bedding of conduits. Underwater Construction - Problems encountered, Underwater drilling, blasting, concreting and welding, Underwater structural concrete walls. Protection of structures against attack by ground.	<b>(08)</b>
<b>Unit 2</b>	<b>Steel Construction:</b> Launching of steel, Pre-stressed, Precast bridges. Site erection methods: Side showing method for road railway bridges. End launching Using cranes and gantries, Cantilever method, Floatation method, Incremental launching for concrete girders. Case studies of steel cantilevers. Arches, Simply supported beams, Suspension, Cable stayed bridge launching. Moving formwork, staging, shuttering, centring. Dismantling for maintenance, repairs and inspection of bridges. Testing of bridges.	<b>(06)</b>
<b>Unit 3</b>	<b>Coffer Dams and Caissons:</b> Land cofferdams, Soldier beam and horizontal sheeting techniques, Design considerations, Sinking rate, Open caissons, Pneumatic caissons. Machine bored caissons. Drop caissons. Details of design and construction, Case Studies. Pilling – behaviour of single pile and a group of piles during driving, Under loads- ultimate loads on driven and cast in situ piles, Construction details of precast piles, Pre-stressed piles, Steel piles, Friction piles. Driven piles, Bored piles, Large diameter bored piles, Negative and positive friction.	<b>(06)</b>
<b>Unit 4</b>	<b>Pre-fabricated Construction:</b> Types, Standardization of components, Size and economy, Fabrication techniques, Transportation, Erection, Jointing, Fabrication techniques.	<b>(06)</b>
<b>Unit 5</b>	<b>Vibration Controlled Foundation:</b> Free and forced vibration, Damping, Vibrating machine, Weight of foundation, Natural frequency of machine foundation and soil system, Design procedure, Causes and effects of vibration transmitted through soil.	<b>(06)</b>
<b>Unit 6</b>	<b>Formwork:</b> Types, components and design of formwork, Special types of formwork such as slip form : Removal of formwork, Cost aspect of formwork. <b>Retaining Walls:</b> Types, Construction techniques.	<b>(08)</b>

**Text Books**

1.	Wells and Caissons – Vijaya Singh, New Chand & Bros,Roorkee
2.	Modem Foundations- N-P-Kurion, Tata McGraw, Hill pub, co.Ltd.
3.	Foundation Engineering- G. A. Leonards Mcgraw Hills Co.Ltd.

**Reference Books**

1.	Construction Planning Equipments and Methods Peurifey RI
2.	Hand Book of Civil Engineering-stubb
3.	Formwork Design and Construction-Wynn 10 Foundation Engineering-Tomlinson
4.	Cofferdams- While and prentice- Columbia University Press New-York
5.	Construction Planning Equipments and Methods Peurifey RI

**Government College of Engineering, Karad**

**First Year (Sem – II) M. Tech. Civil Engineering (Construction Management)**

**(PCE – III) CM :1213 Construction Contracts and Legal Aspects**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
Tutorials	-	CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO) : At the end of course students will able to**

1.	Identify salient features of Indian contract act, Arbitration act and process of contract administration
2.	Possess knowledge about bailment and FIDIC
3.	Asses provisions of labour laws and relevant acts
4.	Apply knowledge of safety engineering.

Course Contents		Hours
<b>Unit 1</b>	<b>Professional Practice and Administration Contracts:</b> The standard form of building contracts. The right of building owner, Third parties, Indian contract Act, Sale of Goods Act, Professional Ethics. RERA.	<b>(10)</b>
<b>Unit 2</b>	<b>Arbitration and Award :</b> Indian Arbitration Act, Arbitration Agreement, Conduct of Arbitration, Power and Duties of Arbitration, Rules of Evidence, E- Tendering, Preparation and publication of award, Methods of Enforcement impending and Awards.	<b>(06)</b>
<b>Unit 3</b>	<b>Bailment:</b> Nature of Transactions, Delivery of Bailee, care to be taken, Bailee’s Responsibility, Termination, Bailment of pledges. International Contracting : Meaning Scope, Nature, Distinctive Features of FIDIC.	<b>(08)</b>
<b>Unit 4</b>	<b>Injunction:</b> Types Temporary, Perpetual, Mandatory when referred .Indemnity and Guarantee :Difference between the two, The Contract of Guarantee and Indemnity, Consideration of Guarantee, Surety’s Liability, Discharge of Surety.	<b>(06)</b>
<b>Unit 5</b>	<b>Industrial Act and Labour Laws:</b> Industrial Dispute Act, Payment of Wages Act.	<b>(06)</b>
<b>Unit 6</b>	<b>Safety Engineering:</b> Sources, Classification, Cost of Accident and Injury Workmen’s Compensation Act, Safety Programme, Safety Organization. Employers Liability Act, Employers Insurance Act, Safety and Health Standards Occupations Hazards, personal Protective equipments, preventive measures Factory Act, Fatal accidents.	<b>(08)</b>

**Text Books**

1.	Indian arbitration Act by B. S.Patil
2.	Legal Aspects of building and Engineering Contracts by B. S.Patil
3.	Indian contract Act Avatarsingh

**Reference Books**

1.	Indian Contract Act.
2.	Safety Engineering, Govt. of India Publicaiton
3.	Professional Practice,Roshan Namavati.
4.	Indian contract Act Avatarsingh
5.	Indian contract Act Jhamb

**Government College of Engineering, Karad**

**First Year (Sem – II) M. Tech. Civil Engineering (Construction Management)**

**(PCE –III) CM :1223 Advanced Construction Materials & Building Services**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
Tutorials		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>

**Course Outcomes (CO) : At the end of course students will able to**

1. Understand characteristics of modern construction materials
2. Familiarise with new construction techniques & understand concept of high-rise buildings.
3. Identify components of water supply, sanitation arrangements in a building , ventilation, air conditioning and fire safety installations in a building
4. Follow the concepts of intelligent building

Course Contents		Hours
<b>Unit 1</b>	<b>Modern Materials:</b> Glass Ceramics, Sealants for joints, Fibre glass reinforced plastic, Clay products , Refractories , Composite materials. Types Applications of laminar composites, Fibre textiles, Geosynthetics for Civil engineering applications. Timber And Other Materials Timber Market forms Industrial timber, Plywood, Veneer, Thermocole Panels of laminates Steel, Aluminium and Other Metallic Materials Composition uses Market forms Mechanical treatment.	<b>(10)</b>
<b>Unit 2</b>	<b>Concrete:</b> Concrete ingredients, Manufacture, Batching plants, RMC. Properties of fresh concrete, Slump, Flow and compaction. Principles of hardened Concrete. Compressive, Tensile and shear strength. Modulus of rupture, Tests Mix specification, Mix proportioning – IS method – High Strength Concrete and HPC Other types of Concrete – Code Practices	<b>(08)</b>
<b>Unit 3</b>	<b>High rise buildings</b> – Construction methods and techniques using in-situ concrete, Precast Concrete & Structural Steel, finished concrete, tunnel form, fire Fighting, Safety. Innovative methods of construction – Slip form technology, Jump form technology, Dry wall technology, Plastering Machines.	<b>(08)</b>
<b>Unit 4</b>	<b>Water Supply Systems:</b> Water quality, Purification and treatment- water Supply systems- distribution systems in small towns –types of pipes used- laying jointing ,testing-testing for water tightness plumbing system for building-internal supply in buildings- municipal bye laws and regulations - Rain Water Harvesting- Sanitation in buildings-arrangement of sewerage systems in housing -pipe systems- storm water drainage from buildings - septic and sewage treatment plant – collection, conveyance and disposal of town refuse systems	<b>(08)</b>
<b>Unit 5</b>	<b>Ventilation</b> and Its Importance Ventilation and its importance-natural and artificial systems-Window type and packaged air-conditioners-chilled water plant –fan coil systems-water piping– cooling load –air conditioning systems for different types of buildings –protection against fire to be caused by A.C.Systems..	<b>(08)</b>
<b>Unit 6</b>	<b>Intelligent Buildings</b> 6 Intelligent buildings-Building automation-Smart buildings- Building services in high rise buildings-Green buildings-Energy efficient buildings for various zones- Case studies of residence, office buildings and other buildings in each zones.	<b>(08)</b>

**Text Books**

1. R. K. Rajput, Engineering Materials, S. Chand & Company Ltd., 2000
2. Construction Technology by Roy Chudley and Roger Greeno, Prentice Hall, 2005.
3. Air conditioning and refrigeration, William H.Severns and Julian R.Fellows, John Wily and sons, London, 2008.

**Reference Books**

1. Reports of actual works executed
2. NICMAR Publications on Construction Engineering
3. Fair G.M., Geyer J.C. and Okun .D, “Water and waste Engineering“, Vol. II, John Wiley & sons, Inc., New York.

**Government College of Engineering, Karad**

**First Year (Sem – II) M. Tech. Civil Engineering (Construction Management)**

**(PCE –IV) CM :1214 Cost Management of Engineering Projects**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
Tutorials		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>

**Course Outcomes (CO) : At the end of course students will able to**

<b>1.</b>	Understanding of cost management process
<b>2.</b>	Applications of project management in context with cost
<b>3.</b>	Quantitative techniques for cost management

	Course Contents	Hours
<b>Unit 1</b>	Introduction and Overview of the Strategic Cost Management Process	<b>(10)</b>
<b>Unit 2</b>	Cost concepts in decision-making; Relevant cost, Differential cost, Incremental cost and Opportunity cost. Objectives of a Costing System; Inventory valuation; Creation of a Database for operational control; Provision of data for Decision-Making.	<b>(08)</b>
<b>Unit 3</b>	Project: meaning, Different types, why to manage, cost overruns centres, various stages of project execution: conception to commissioning. Project execution as conglomeration of technical and non- technical activities. Detailed Engineering activities. Pre project execution main clearances and documents Project team: Role of each member. Importance Project site: Data required with significance. Project contracts. Types and contents. Project execution Project cost control. Bar charts and Network diagram. Project commissioning: mechanical and process	<b>(08)</b>
<b>Unit 4</b>	Cost Behavior and Profit Planning Marginal Costing; Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis. Various decision-making problems. Standard Costing and Variance Analysis. Pricing strategies: Pareto Analysis. Target costing, Life Cycle Costing.	<b>(08)</b>
<b>Unit 5</b>	Costing of service sector. Just-in-time approach, Material Requirement Planning, Enterprise Resource Planning, Total Quality Management and Theory of constraints. Activity-Based Cost Management, Bench Marking; Balanced Score Card and Value-Chain Analysis. Budgetary Control;	<b>(08)</b>
<b>Unit 6</b>	Flexible Budgets; Performance budgets; Zero-based budgets. Measurement of Divisional profitability pricing decisions including transfer pricing. Quantitative techniques for cost management, PERT/CPM, Linear Programming, Transportation problems, Assignment problems, Simulation, Learning Curve Theory.	<b>(08)</b>

**Text Books**

<b>1.</b>	Cost Accounting A Managerial Emphasis, Prentice Hall of India, NewDelhi
<b>2.</b>	Charles T. Horngren and George Foster, Advanced Management Accounting
<b>3.</b>	Robert S Kaplan Anthony A. Alkinson, Management & Cost Accounting

**Reference Books**

<b>1.</b>	Ashish K. Bhattacharya, Principles & Practices of Cost Accounting A. H. Wheeler publisher
<b>2.</b>	N.D. Vohra, Quantitative Techniques in Management, Tata McGraw Hill Book Co. Ltd.

**Government College of Engineering, Karad****First Year (Sem – II) M. Tech. Civil Engineering (Construction Management)****(PCE –IV) CM :1224 Management Information Systems for Construction Management**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
Tutorials		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO) : At the end of course students will able to**

1.	To study fundamentals of engineering economics
2.	To understand the concepts of economic appraisal of projects and get expertise in using appraisal techniques
3.	To understand the importance of risk and study fundamentals of risk management.
4.	To aware about various options available for financing projects

Course Contents		Hours
<b>Unit 1</b>	<b>Introduction</b> - Definition Role, Impact, Evolution, Structure of MIS in organization..	<b>(10)</b>
<b>Unit 2</b>	<b>Decision Making</b> - Programmed and Non programmed decisions, Stages in decision making, Concepts of Information, Systems Theory, Decision Support System	<b>(08)</b>
<b>Unit 3</b>	<b>Computers in MIS</b> - Hard ware, Software, Communication networks Office automation	<b>(08)</b>
<b>Unit 4</b>	<b>Data Management</b> - Collection and analysis of data, Database Management system.	<b>(08)</b>
<b>Unit 5</b>	<b>Applications of MIS</b> - Materials, Finance, HRD, Marketing and Service sector	<b>(08)</b>
<b>Unit 6</b>	<b>Implementation and Maintenance of MIS</b> - Socio-technical approach, Factors of success and failure, Quality assurance of MIS.	<b>(08)</b>

**Text Books**

1.	Management Information System, Jawadekar W. S. (Tata McGraw Hill)
2.	Information System For Modern Management, Robert G. Murdick. Joel E Ross, Janes R. Claggeett.
3.	Management Information System, Jerome Kanter.
4.	The Management Information System Gary W. Dickson Janes C. Weatherbe, McGraw Hill Book company.

**Government College of Engineering, Karad**

**First Year (Sem – II) M. Tech. Civil Engineering (Construction Management)**

**(PCE – V) CM :1215 Entrepreneurship in Construction**

<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Lectures	03 Hrs/week	CT – 1	15
Tutorials	-	CT – 2	15
Total Credits	03	TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>

**Course Outcomes (CO) : At the end of course students will able to -**

- 1. Understand importance of entrepreneurship in construction industry.**
- 2. Follow concept of project appraisal, financial analysis, problems in construction industry.**
- 3. Student will be aware of different aspect of civil engineering entrepreneurship for small and large scale areas.**

<b>Course Contents</b>		<b>Hours</b>
<b>Unit 1</b>	<b>General:</b> Meaning and importance of entrepreneurship. Definition and objectives of industrial estates, Awareness and requirements of an entrepreneur, Organization dealing with entrepreneurship Govt. and private. Socio-economic bases - Occupation impact on line of manufacture, the impact of education.	<b>(08)</b>
<b>Unit 2</b>	<b>Project:</b> Selection by identification, Size, Appropriate technology, Cost and time scheduling. Project reports - Backing market survey, demand and supply relation, equipment cost, space and merit analysis recommendations.	<b>(06)</b>
<b>Unit 3</b>	<b>Project Appraisal:</b> Technical feasibility, Commercial soundness, Financial capability, Economic viability, Managerial aspects.	<b>(06)</b>
<b>Unit 4</b>	<b>Financial Analysis:</b> Resources - loans, terms and conditions, Working capital, Repayment, Security, Financial institutes.	<b>(07)</b>
<b>Unit 5</b>	<b>Problems Faced by Enterprise:</b> Marketing, Finance and taxes, Raw and finished materials. Government policies.	<b>(07)</b>
<b>Unit 6</b>	<b>Civil Engineering Entrepreneurship:</b> Small scale, Large scale, Optimum size, Typical areas and preparation of specialized aspects.	<b>(06)</b>

**Text Books**

1. Entrepreneurship & Growth Of Enterprise In Industrial Estates, Dr. N. Gangadhar Rao (Deep & deep Publ.)
2. A Complete Guide To Successful Entrepreneurship, G.N. Pandey (Vikas Publ. House)

**Reference Books**

1. Project Appraisal Prasanna Chandra.
2. Entrepreneurship, Government of India Publication.

**Government College of Engineering, Karad**

**First Year (Sem – II) M. Tech. Civil Engineering (Construction Management)**

**(PCE –V) CM :1225 Environment Impact Assessment**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
Tutorials		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO) : At the end of course students will able to**

1. Understand the fundamental concepts of EM and EIA
2. Trace the evolution of EIA and use it as EM tool
3. Apply environment impact assessment process for construction projects
4. Prepare project report which is comply with environmental clearance procedure

Course Contents		Hours
<b>Unit 1</b>	<b>Introduction:</b> Environmental Management, Definition, Scope, Goals and need. International Environmental Movement, Environmental concerns in India.	<b>(10)</b>
<b>Unit 2</b>	<b>Policies &amp; Programmes:</b> Environmental Policies and Programmes in India, Environmental laws and Legislations, Evolution of Indian Legislations, Constitution of India.	<b>(06)</b>
<b>Unit 3</b>	<b>Environmental Impact Assessment:</b> Introduction, Purpose, Evolution, Forecasting environmental changes, Environment Impact Statement(EIS), Strategic Environmental Assessment (SEA). Screening and Scoping.	<b>(08)</b>
<b>Unit 4</b>	<b>EIA Documentation and Processes:</b> Preliminary Stages of EIA, Impact Prediction, Evaluation and Mitigation, Impact on Decisions, Cost Benefit Analysis of EIA of Construction Projects.	<b>(06)</b>
<b>Unit 5</b>	<b>Environmental Auditing:</b> Audit Methodology, Life Cycle Assessment (LCA) – Purpose, Evolution and Stages. Environment Impact Statement (EIS), Requisites of good EIS.	<b>(06)</b>
<b>Unit 6</b>	<b>Environment Management System:</b> EMS Standards: IS14000, Benefits of Implementing ISO 14001.	<b>(08)</b>

**Text Books**

1. Canter L (1996) Environmental Impact Assessment (Second Edition). McGrawHill Publishing Company, NewYork.
2. Environmental Management – Web course <http://NPTEL.iitm.ac.in>, Prof.T. V. Ramchandra
3. UNDP (1992) Handbook and Guidelines for Environmental Management and Sustainable Development. Environment and Natural Resources Group, UNDP,New York.

**Reference Books**

1. World Bank (1997) Environmental Performance Monitoring and Supervision.Update. Environmental Assessment Sourcebook. World Bank, Washington,DC.
2. Lohani, B., J.W. Evans, H. Ludwig, R.R. Everitt, Richard A. Carpenter, and S.L.Tu. 1997. Environmental Impact Assessment for Developing Countries in Asia.Volume 1, Asian DevelopmentBank.
3. EIA Notification Published in the Gazette of India, Extraordinary, Part-II, andSection 3, Sub-section (ii) by MINISTRY OF ENVIRONMENT AND FORESTS New Delhi 14th September,2006

**Government College of Engineering, Karad**

**First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)**

**(MP/IT) CM :1206 Mini Project/Industrial Training**

<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Lectures	02 Hrs/week	CT – 1	-
Tutorials	-	CT – 2	-
Total Credits	02	TA	50
		ESE	50
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>

**Course Outcomes (CO) : At the end of course students will able to -**

- 1.** Students will get an opportunity to work in actual project environment if they opt for internship.
- 2.** In case of mini project, they will solve a live problem using software/analytical/computational tools.
- 3.** Students will learn to write technical reports.
- 4.** Students will develop skills to present and defend their work in front of technically qualified audience.

	<b>Mini Project</b>	<b>Hours</b>
	As a part of mini project student shall visit a infrastructure project which is under construction (like, Housing development, Industrial unit, Power plant, Dam, Bridge, Highway, Tunnel etc), The project student choose to visit should be started not later than two years prior to his visit. Based on data collected during visit student prepare detailed Project Report (DPR) and submit. Submission of DPR & Case study report.	<b>(40)</b>
	<b>Industrial Training</b>	
	The students are required to undergo training in any area related to Construction Management as mentioned in the syllabus for 25 working days beyond the academic schedule during second semester (after the completion of I semester and before end of II Semester ). Students shall submit the report of the Industrial Training taken and necessary certificate from the organization where such training is undertaken. Assessment will be done at the end of II <sup>nd</sup> Semester by course coordinator along with Assessment Committee appointed by Programme Head.	

**Government College of Engineering, Karad**

**First Year (Sem – II) M. Tech. Civil Engineering (Construction Management)**

**(PC Lab – III) CM :1207 Project Economics and Financing Laboratory**

<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Lectures	04 Hrs/week	CT – 1	-
Tutorials	-	CT – 2	-
Total Credits	02	TA	25
		ESE	25
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO) : At the end of course students will able to -**

- |    |  |
|----|--|
| 1. | Write detail project report.   |
| 2. | Apply theoretical concepts of equipment management to a case study . |
|    |  |
|    |  |
|    |  |

	<b>Course Contents</b>	<b>Hours</b>
	Student will visit one or more construction projects and prepare a detail project report based on data collected from visit to projects which will cover i. Financial feasibility of project ii. Method of collecting finance iii. Estimation of working capital iv. Possibility of private financing v. Scope for International financing	<b>(40)</b>

**Government College of Engineering, Karad**

**First Year (Sem – II) M. Tech. Civil Engineering (Construction Management)**

**(PC Lab – IV) CM :1208 Construction Methods and Techniques Laboratory**

<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Lectures	04 Hrs/week	CT – 1	-
Tutorials	-	CT – 2	-
Total Credits	02	TA	25
		ESE	25
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO) : At the end of course students will able to -**

1.	Write detail project report.
2.	Apply theoretical concepts of equipment management to a case study .

	<b>Course Contents</b>	<b>Hours</b>
	Student will visit one or more construction projects where advanced construction techniques are used and prepare a detail report covering all aspects of technique used for project	<b>(40)</b>

**Government College of Engineering, Karad**

**First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)**

**(Audit II) CM :1219 Constitution of India**

Teaching Scheme		Examination Scheme	
Lectures	02 Hrs/week	CT – 1	15
Tutorials		CT – 2	15
Total Credits	00	TA	10
		ESE	60
		Duration of ESE	2 Hrs 30 min.

**Course Outcomes (CO) At the end of course students will able to -**

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals’ constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism
- To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

	Course Contents	Hours
<b>Unit 1</b>	<ul style="list-style-type: none"> <li>• <b>History of Making of the Indian Constitution:</b></li> <li>History</li> <li>Drafting Committee, ( Composition &amp; Working)</li> </ul>	<b>(07)</b>
<b>Unit 2</b>	<ul style="list-style-type: none"> <li>• <b>Philosophy of the Indian Constitution:</b></li> <li>Preamble Salient Features</li> </ul>	<b>(06)</b>
<b>Unit 3</b>	<ul style="list-style-type: none"> <li>• <b>Contours of Constitutional Rights &amp; Duties:</b></li> <li>• Fundamental Rights</li> <li>• Right to Equality</li> <li>• Right to Freedom</li> <li>• Right against Exploitation</li> <li>• Right to Freedom of Religion</li> <li>• Cultural and Educational Rights</li> <li>• Right to Constitutional Remedies</li> <li>• Directive Principles of State Policy</li> <li>• Fundamental Duties.</li> </ul>	<b>(07)</b>
<b>Unit 4</b>	<ul style="list-style-type: none"> <li>• <b>Organs of Governance:</b></li> <li>• Parliament</li> <li>• Composition</li> <li>• Qualifications and Disqualifications</li> <li>• Powers and Functions                             <ul style="list-style-type: none"> <li>• Executive</li> </ul> </li> <li>• President</li> <li>• Governor</li> <li>• Council of Ministers</li> <li>• Judiciary, Appointment and Transfer of Judges, Qualifications</li> <li>• Powers and Functions</li> </ul>	<b>(06)</b>
<b>Unit 5</b>	<ul style="list-style-type: none"> <li>• <b>Local Administration:</b></li> <li>• District’s Administration head: Role and Importance,</li> <li>• Municipalities: Introduction, Mayor and role of Elected Representative, CEO o Municipal</li> </ul>	<b>(07)</b>

	<p>Corporation.</p> <ul style="list-style-type: none"> <li>• Pachayati raj: Introduction, PRI: ZilaPachayat.</li> <li>• Elected officials and their roles, CEO ZilaPachayat: Position and role.</li> <li>• Block level: Organizational Hierarchy (Different departments),</li> <li>• Village level: Role of Elected and Appointed officials,</li> <li>• Importance of grass root democracy</li> </ul>	
<b>Unit 6</b>	<ul style="list-style-type: none"> <li>• <b>Election Commission:</b></li> <li>• Election Commission: Role and Functioning.</li> <li>• Chief Election Commissioner and Election Commissioners.</li> <li>• State Election Commission: Role and Functioning.</li> </ul> <p>Institute and Bodies for the welfare of SC/ST/OBC and women.</p>	<b>(08)</b>
<b>Text Books</b>		
1.	The Constitution of India, 1950 (Bare Act), Government Publication	
2.	Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.	
3.	M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.	
<b>Reference Books</b>		
1.	D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.	
<b>Useful Links</b>		
1.	NPTEL/ Swayam Courses	

**Government College of Engineering, Karad**

**First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)**

**(Audit II) CM :1229 Pedagogy Studies**

Teaching Scheme		Examination Scheme	
Lectures	02 Hrs/week	CT – 1	15
Tutorials		CT – 2	15
Total Credits	00	TA	10
		ESE	60
		Duration of ESE	2 Hrs 30 min

**Course Outcomes (CO) Students will be able to:**

- Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.
- Identify critical evidence gaps to guide the development.

Course Contents		Hours
<b>Unit 1</b>	<ul style="list-style-type: none"> <li><b>Introduction and Methodology:</b></li> <li>Aims and rationale, Policy background, Conceptual framework and terminology</li> <li>Theories of learning, Curriculum, Teacher education.</li> <li>Conceptual framework, Research questions.</li> <li>Overview of methodology and Searching.</li> </ul>	<b>(07)</b>
<b>Unit 2</b>	<ul style="list-style-type: none"> <li>Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries.</li> <li>Curriculum, Teacher education.</li> </ul>	<b>(06)</b>
<b>Unit 3</b>	<ul style="list-style-type: none"> <li>Evidence on the effectiveness of pedagogical practices</li> <li>Methodology for the in depth stage: quality assessment of included studies.</li> <li>How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?</li> <li>Theory of change.</li> <li>Strength and nature of the body of evidence for effective pedagogical practices.</li> <li>Pedagogic theory and pedagogical approaches.</li> <li>Teachers’ attitudes and beliefs and Pedagogic strategies.</li> </ul>	<b>(07)</b>
<b>Unit 4</b>	<ul style="list-style-type: none"> <li>Professional development: alignment with classroom practices and follow- up support</li> <li>Peer support</li> <li>Support from the head teacher and the community.</li> <li>Curriculum and assessment</li> <li>Barriers to learning: limited resources and large class sizes</li> </ul>	<b>(06)</b>
<b>Unit 5</b>	<ul style="list-style-type: none"> <li><b>Research gaps and future directions</b></li> <li>Research design</li> <li>Contexts</li> <li>Pedagogy</li> <li>.</li> </ul>	<b>(07)</b>
<b>Unit 6</b>	<ul style="list-style-type: none"> <li>Teacher education</li> <li>Curriculum and assessment</li> <li>Dissemination and research impact.</li> </ul>	<b>(08)</b>

**Text Books**

- Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.

2.	Agrawal M (2004) Curricular reform in schools: The importance of evaluation, <i>Journal of Curriculum Studies</i> , 36 (3): 361-379.
3.	Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.
<b>Reference Books</b>	
1.	Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? <i>International Journal Educational Development</i> , 33 (3): 272–282
2.	Alexander RJ (2001) <i>Culture and pedagogy: International comparisons in primary education</i> . Oxford and Boston: Blackwell.
3.	Chavan M (2003) <i>Read India: A mass scale, rapid, 'learning to read' campaign</i>
<b>Useful Links</b>	
1.	<a href="http://www.pratham.org/images/resource%20working%20paper%202.pdf">www.pratham.org/images/resource%20working%20paper%202.pdf</a> .

**Government College of Engineering, Karad****First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)****(Audit II) CM :1239 Stress Management by Yoga**

<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Lectures	02 Hrs/week	CT – 1	15
Tutorials		CT – 2	15
Total Credits	00	TA	10
		ESE	60
		Duration of ESE	2 Hrs 30 Min
<b>Course Outcomes (CO)</b>			
Students will be able to:			
1.	Develop healthy mind in a healthy body thus improving social health also		
2.	Improve efficiency		
<b>Course Contents</b>			<b>Hours</b>
<b>Unit 1</b>	• Definitions of Eight parts of yoga. ( Ashtanga )		<b>10</b>
<b>Unit 2</b>	• Yam and Niyam. Do`s and Don`t`s in life. i) Ahinsa, satya, astheya, bramhacharya and aparigraha ii) Shaucha, santosh, tapa, swadhyay, ishwarpranidhan		10
<b>Unit 3</b>	• Asan and Pranayam i) Various yog poses and their benefits for mind & body ii)Regularization of breathing techniques and its effects-Types of pranayam		10
<b>Text Books</b>			
1.	‘Yogic Asanas for Group Tarining-Part-I’ : Janardan Swami Yogabhyasi Mandal, Nagpur		
2.	“Rajayoga or conquering the Internal Nature” by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata		

**Government College of Engineering, Karad****First Year (Sem – I) M. Tech. Civil Engineering (Construction Management)****(Audit II) CM :1249 Personality Development through Life Enlightenment Skills.**

<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Lectures	02 Hrs/week	CT – 1	15
Tutorials		CT – 2	15
Total Credits	00	TA	10
		ESE	60
		Duration of ESE	2 Hrs 30 min
<b>Course Outcomes (CO)</b>			
Students will be able to			
1.	Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life		
2.	The person who has studied Geeta will lead the nation and mankind to peace and prosperity		
3.	Study of Neetishatakam will help in developing versatile personality of students.		
	<b>Course Contents</b>		<b>Hours</b>
<b>Unit 1</b>	Neetisatakam-Holistic development of personality <ul style="list-style-type: none"><li>• Verses- 19,20,21,22 (wisdom)</li><li>• Verses- 29,31,32 (pride &amp; heroism)</li><li>• Verses- 26,28,63,65 (virtue)</li><li>• Verses- 52,53,59 (dont's)</li><li>• Verses- 71,73,75,78 (do's)</li></ul>		<b>10</b>
<b>Unit 2</b>	<ul style="list-style-type: none"><li>• Approach to day to day work and duties.</li><li>• Shrimad BhagwadGeeta: Chapter 2-Verses 41, 47,48,</li><li>• Chapter 3-Verses 13, 21, 27, 35, Chapter 6-Verses 5,13,17, 23, 35,</li><li>• Chapter 18-Verses 45, 46, 48.</li></ul>		10
<b>Unit 3</b>	<ul style="list-style-type: none"><li>• Statements of basic knowledge.</li><li>• Shrimad BhagwadGeeta: Chapter2-Verses 56, 62, 68</li><li>• Chapter 12 -Verses 13, 14, 15, 16,17, 18</li><li>• Personality of Role model. Shrimad BhagwadGeeta: Chapter2-Verses 17, Chapter 3-Verses 36,37,42,</li><li>• Chapter 4-Verses 18, 38,39</li><li>• Chapter18 – Verses 37,38,63</li></ul>		10
<b>Text Books</b>			
1.	“Srimad Bhagavad Gita” by Swami Swarupananda Advaita Ashram (Publication Department), Kolkata		
2.	Bhartrihari's Three Satakam (Niti-sringar-vairagya) by P.Gopinath, Rashtriya Sanskrit Sansthanam, New Delhi.		

**Government College of Engineering, Karad**

**Second Year (Sem –III) M. Tech. Civil Engineering (Construction Management)**

**(DP I) CM :1301 Dissertation Phase I**

Teaching Scheme		Examination Scheme	
Lectures	14 Hrs/week	CT – 1	-
Tutorials		CT – 2	-
Total Credits	07	TA	100
		ESE	100
		Duration of ESE	

**Course Outcomes (CO)**

After completion of course, students would be able to:

1. Identify self-learning topics.
2. Explore the survey literature and contact resource persons for the selected topic of research.
3. Develop oral and written communication skills to present and defend their work in front of technically qualified audience.

**Course Guidelines**

**Hours**

The Project Work should preferably be a problem with research potential and should involve scientific research, design, generation/collection and analysis of data, determining solution and must preferably bring out the individual contribution. It should be based on the area in which the candidate has undertaken the dissertation work as per the common instructions for all branches of M. Tech. The examination shall consist of the preparation of report consisting of a detailed problem statement and a literature review. The preliminary results (if available) of the problem may also be discussed in the report. The work has to be presented in front of the examiners panel set by Head and PG coordinator. The candidate has to be in regular contact with his guide and the topic of dissertation must be mutually decided by the guide and student.

**Syllabus Contents:**

The dissertation / project topic should be selected / chosen to ensure the satisfaction of the urgent need to establish a direct link between education, national development and productivity and thus reduce the gap between the world of work and the world of study. The dissertation should have the following:

- Relevance to social needs of society
- Relevance to value addition to existing facilities in the institute
- Relevance to industry need
- Problems of national importance
- Research and development in various domain

**The student should complete the following:**

- Literature survey Problem Definition
- Motivation for study and Objectives
- Preliminary design / feasibility / modular approaches
- Report and presentation

**Guidelines for Dissertation Phase – I:**

- As per the AICTE directives, the dissertation is a yearlong activity, to be carried out and evaluated in two phases i.e. Phase – I: July to December and Phase – II: January to

June.

- The dissertation may be carried out preferably in-house i.e. department's laboratories and centers OR in industry allotted through department's T & P coordinator.
- After multiple interactions with guide and based on comprehensive literature survey, the student shall identify the domain and define dissertation objectives. The referred literature should preferably include Springer/Science Direct. In case of Industry sponsored projects, the relevant application notes, white papers, product catalogues should be referred and reported.
- Student is expected to detail out specifications, methodology, resources required, critical issues involved in design and implementation and phase wise work distribution, and submit the proposal within a month from the date of registration.
- Phase – I deliverables: A document report comprising of summary of literature survey, detailed objectives, project specifications, paper, part results, a record of continuous progress.

Phase – I evaluation: A committee comprising of guides of respective specialization shall assess the progress/performance of the student based on report, presentation and Q & A. In case of unsatisfactory performance, committee may recommend repeating the phase-I work.

**List of Submission:** Dissertation report should be prepared using Latex.

**Government College of Engineering, Karad**

**Second Year (Sem –IV) M. Tech. Civil Engineering (Construction Management)**

**(DP II) CM :1401 Dissertation Phase II**

<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Lectures	32 Hrs/week	CT – 1	-
Tutorials		CT – 2	-
Total Credits	16	TA	100
		ESE	100
		<b>Duration of ESE</b>	

**Course Outcomes (CO)**

After completion of course, students would be able to:

1. Identify self-learning topics.
2. Explore the survey literature and contact resource persons for the selected topic of research.
3. Develop oral and written communication skills to present and defend their work in front of technically qualified audience.

**Course Guidelines**

**Hours**

It is a continuation of Project work started in semester III. He/She has to submit the report in prescribed format and also present a seminar. The dissertation should be presented in standard format as provided by the department. The candidate has to prepare a detailed project report consisting of introduction of the problem, problem statement, literature review, objectives of the work, methodology (experimental set up or numerical details as the case may be) of solution and results and discussion. The report must bring out the conclusions of the work and future scope for the study. . The work has to be presented in front of the examiners panel consisting of an approved external examiner, an internal examiner and a guide, co-guide etc. as decided by the Head and PG coordinator. The candidate has to be in regular contact with his guide.