



# Programme Specifications

B. Tech. Programme

Programme:  
Construction Engineering and  
Management

Department:  
Civil Engineering

Faculty of Engineering & Technology  
M.S. Ramaiah University of Applied Sciences

<p><b>14. Rationale for the Programme</b></p>	<p>Civil Engineering is primarily infrastructure development involving planning, design, construction, and operation of facilities essential to modern life, ranging from transit systems to offshore structures to space satellites. Major disciplines within civil engineering that are closely interrelated are Structural, Environmental, Geotechnical, Water Resources, Transportation, Construction and Urban Planning.</p> <p>Until recently Civil Engineering teaching was limited to Planning, Analysis, Design and Execution of different types of infrastructure like buildings, roads, bridges, dams and power plants. However, increasing technological sophistication and demand for higher living standards fueled by economic growth and concerns about environmental impact have changed the scope of Civil Engineering curriculum.</p> <p>The construction industry may be defined as comprising those organizations involved in design, production, alteration, renovation, maintenance, facility management, demolition and re - cycling of building and civil engineering works, including the supply of resources. It includes all internal and external stakeholders who in some way or another promote the industry’s policies, procedures, practices.</p> <p>Indian construction industry is one of the fastest growing industry and the second largest employer next to agriculture. In the recent times, India has stepped up its development agenda which is evident from aggressive pace of construction activities in the country. Government of India, for the first time incorporated a chapter on construction in the 10th five year plan (2002– 2007) and hence enhanced the investment in infrastructure two folds.</p> <p>New mega-project, involvement of international consultants and participation of Indian consultants/contractors in international projects has led to infusion of new materials, equipment and technologies in the construction practices in India. In its path of advancement, the industry has to overcome a number of challenges. With a lot of stress on reducing carbon emission and interdependencies between resources, a Civil Engineer needs world-class skill base coupled with flair for innovation and understanding of the interdependencies between resources and infrastructural demands.</p> <p><b>Students enrolled in the course are familiarized with the following areas</b></p> <p>Project Management, Construction Management, Contracts Management, Construction Quality, Safety and Equipment Management, Supply Chain Management of Construction Projects, Modern Construction Materials and Technologies, Computer Applications in Construction, such as ERP, MS Project, Primavera, and Building Information Modelling (BIM) for the construction industry.</p> <p>MSRUAS is offering construction engineering and management programme at the postgraduate level. The programme focuses on addressing the professional services needs of the construction industry in the following areas like Project Management, Construction Management, Contracts Management, Construction Quality, Safety and Equipment Management, Supply Chain Management of Construction Projects, Modern Construction Materials and Technologies, Computer Applications in Construction, such as ERP, MS Project, Primavera, and Building Information Modelling (BIM) for the construction industry.</p>
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**15. Programme Aim**

The aim of the programme is to produce postgraduates with advanced knowledge and understanding of Construction Engineering and Management; higher order critical, analytical, problem solving and transferable skills; ability to think rigorously and independently to meet higher level expectations of civil construction industry, academics, research or take up entrepreneurial route.

#### 16. Programme Objectives

Students will be able to apply the knowledge, understanding and skills acquired to carry out engineering design, simulation, analysis, synthesis and evaluation of construction projects. Emphasis will be placed on imaginative and creative approach to Construction Engineering and Management.

The objectives of the programme are to train and educate the students on the following :

1. Modern construction materials, methods and equipment
2. Planning and formulation of design alternatives and solutions for construction projects
3. Developing and administering project budgets and fiscal controls, contract and quality control provisions
4. Selection of materials, construction method and designing of construction process
5. Reviewing the contract strategies for construction projects and to suggest the appropriate contract forms and payment methods
6. Planning and controlling project cost including cost estimating, risk analysis, determination of contingencies, progress reporting and value engineering
7. Application of IT tools in project planning, design and management
8. Corporate and construction industry practice, process, standards and their impact on project activities giving general perspective and opportunities for a career in the construction industry
9. Teamwork, lifelong learning and continuous improvement.

#### 17. Intended Learning Outcomes of the Programme

The Intended Learning Outcomes (ILOs) are listed under four headings:

1. Knowledge and Understanding, 2. Cognitive Skills 3. Practical Skills and 4. Capability / Transferable Skills.

##### 1. Knowledge and Understanding

After undergoing this programme, a student will be able to:

KU1: Discuss structural systems, form work, construction techniques, resources, economic principles, properties of modern construction materials and equipment applied to engineering construction for sub structure, super structure, special structures, rehabilitation and strengthening techniques and demolition techniques, Intelligent Systems, significance of green and alternate building materials

KU2: Discuss the factors critical in planning and designing construction processes to achieve needed safety, quality, durability, sustainability, and economic objectives, concepts of cost effective building design

KU3: Enumerate formulation, planning, scheduling, cost and quality control, safety, construction system integration, environmental factors, services, maintenance and safety systems in construction engineering

KU4: Discuss advantages, disadvantages and limitations of various construction materials, types of special concretes and their application, construction process,

equipment, strategies, optimization techniques, inventory models, scheduling techniques, structural systems and services in construction engineering

## 2. Cognitive Skills

After undergoing this programme, a student will be able to:

**CS1:** Design and analyze various structural systems, form work, construction techniques and processes of sub systems/components of a project to meet the overall specifications of the project

**CS2:** Analyze and propose construction technique and management technique changes essential for solving a broad set of engineering problems in construction considering societal and economic impacts to achieve needed safety, quality, durability, sustainability, and economic objectives

**CS3:** Evaluate the performance of the various construction materials, special concretes, personnel, construction processes, equipment, strategies, optimization techniques, inventory models, scheduling techniques, structural systems and services in construction engineering

**CS4:** Propose and implement various safety norms in a construction project

## 3. Practical Skills

After undergoing this programme, a student will be able to:

**PS1:** Produce tender and contract documents along with the ability to carry out estimation of costs and expenditures during all project stages

**PS2:** Use appropriate software packages relevant to construction industry

**PS3:** Conduct physical tests to evaluate performance of civil construction materials

**PS4:** Perform laboratory tests on models structures to understand their behavior

## 4. Capability / Transferable Skills

After undergoing this programme, a student will be able to:

**TS1:** Manage information, develop technical reports and make presentations

**TS2:** Build, Manage and Lead a team to successfully complete a project and communicate across teams and organizations to achieve professional objectives

**TS3:** Work under various constraints to meet project targets

**TS4:** Adopt to the chosen profession by continuously upgrading his/her knowledge and understanding through Life-long Learning philosophy

**18. Programme Structure**

The Programme consists of four terms as shown below. A student is required to successfully complete the following modules and earn credits for the award of the degree.

Complete details of each of the modules such as ILO's, content, resources, teaching-learning processes and other related information are outlined in Module Specification of the respective programme.

**( Please add course and credit details accordingly : Total 42 credits : 06 core courses total 26 credits and 4 elective courses total 16 credits spread in first two semesters)**

**SEMESTER 1**

Sl.No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	19CMC501A	Advanced Concrete technology and Modern Construction Techniques	3	--	2	4	100
2	19CMC502A	Design of Form Work and Pre-Cast structures	3	1	2	5	100
3	19CMC503A	Construction Planning and Contract Management	3	1	2	5	100
4	19CME51XA	<i>Refer Elective course table</i>	4	--	0	4	100
5	19CME52XA	<i>Refer Elective course table</i>	4	--	0	4	100
6	19FET508	Research Methodology & IPR	2	--	--	2	50
7	19FET509A	Professional communication	1	--	--	--	--
<b>Total</b>			<b>20</b>	<b>02</b>	<b>06</b>	<b>24</b>	<b>550</b>
<b>Total number of contact hours per week</b>			<b>28 hours</b>				
<b>Number of credits can be registered</b>			<b>Minimum</b>	<b>18</b>	<b>Maximum</b>	<b>24</b>	

**SEMESTER 2**

Sl.No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	19CMC511A	Construction Economics and Financial Management	4	--	0	4	100
2	19CMC512A	Resource Management in Civil Construction	3	--	2	4	100
3	19CMC513A	Construction Quality and Safety Management	4	--	0	4	100
4	19CME53XA	<i>Refer Elective course table/Online course/ MOOC</i>	4	--	0	4	100
5	19CME54XA	<i>Refer Elective course table/Online course/ MOOC</i>	4	--	0	4	100
6	19FET510A	Value Education	1	--	--	0	--
<b>Total</b>			<b>20</b>	<b>0</b>	<b>02</b>	<b>20</b>	<b>500</b>
<b>Total number of contact hours per week</b>			<b>22 hours</b>				
<b>Number of credits can be registered</b>			<b>Minimum</b>	<b>16</b>	<b>Maximum</b>	<b>20</b>	

**SEMESTER 3**

Sl.No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	19CMP521A	Internship/ Other activities as specified	--	--	10	4	100
2	19CMP522A	Group Project	--	--	12	8	200
3	19CMP523A	Dissertation and Publication Phase 1					
<b>Total</b>			<b>0</b>	<b>0</b>	<b>22</b>	<b>12</b>	<b>300</b>
<b>Total number of contact hours per week</b>			<b>22 hours</b>				
<b>Number of credits can be registered</b>			<b>Minimum</b>	<b>12</b>	<b>Maximum</b>	<b>12</b>	

**SEMESTER 4**

Sl.No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	19CMP523A	Dissertation and Publication Phase 2	--	--	24	24	400
<b>Total</b>			<b>0</b>	<b>0</b>	<b>24</b>	<b>24</b>	<b>400</b>
<b>Total number of contact hours per week</b>			<b>24 hours</b>				
<b>Number of credits can be registered</b>			<b>Minimum</b>	<b>24</b>	<b>Maximum</b>	<b>24</b>	

Elective Modules List			
Stream / Specialization	S. No.	Module Code	Module Title
Stream -1	E11	19CME511A	Design of building and allied services
	E12	19CME512A	Management Information System in Construction Engineering and Management
	E13	19CME513A	Risk and Reliability in Civil Infrastructure system
	E14	19CME514A	Probability and Statistics for Civil Engineers
Stream-2	E21	19CME521A	Bridge Engineering and Road Projects
	E22	19CME522A	Entrepreneurship in Built Environment
	E23	19CME523A	Big Data analytics
	E24	19CME524A	Fire and Safety Engineering Design
Stream-3	E31	19CME531A	Green construction and Alternative building materials
	E32	19CME532A	Construction Firm and Value Engineering
	E33	19CME533A	Environmental Impact assessment of Construction Projects
	E34	19CME534A	Smart Cities and Sustainable Infrastructure
Stream-4	E41	19CME541A	Condition assessment, repair, rehabilitation and Artificial Intelligence
	E42	19CME542A	Circular Economy in Construction Industry
	E43	19CME543A	BIM and fabrication of steel structures
	E44	19CME544A	Advanced quantity surveying in civil engineering

**19. Programme Delivery Structure**

A Programme is delivered from Monday to Saturday of the week as per the Time-Table for every batch.

**20. Teaching and Learning Methods**

The module delivery comprises of a combination of few or all of the following:

1. Face to Face Lectures using Audio-Visuals
2. Workshops, Group Discussions, Debates, Presentations
3. Demonstrations
4. Guest Lectures
5. Laboratory/Field work/Workshop
6. Industry Visit
7. Seminars
8. Group Exercises
9. Project Exhibitions
10. Technical Festivals

**21. Courses**

Programme has six Professional core courses (PC1- PC6), four Professional elective courses (PE1 – PE4), two audit courses (NC), and one compulsory course (CC) followed by Group Project, Internship and Dissertation & Publication courses.

Core courses (PC1- PC6) are Programme Specialization courses which normally include both theory and laboratory sessions. Alternate activities are planned in case of laboratory sessions do not exist in a course.

Compulsory course (CM) is Research Methodology and IPR course which is mandatory.

All courses of the programmes are categorized as indicated in the **Annexure I**.

**22. Electives**

There are 4 electives (PE1 – PE4) in the programme. The electives are grouped such a way that a student can choose a set of electives to specialize in a chosen field/stream. However, if the student wishes to opt for elective course that spans multiple streams, the case may be considered subject to the affordability of academic logistics and approval by the course leader, HODs and Deans.

For every elective offered, there will be a minimum and a maximum number of registrations that is decided by the department.

There is also a provision for the students to choose PE3 and PE4 through on-line mode such as MOOC's, SWAYAM, NPTEL and other equivalent platforms. The guidelines prescribed by the University for such courses to be adhered to. The student can also earn 3 or 4 credits by participating in the international competitions like technical presentation/ conference/ publications in the journal etc and winning the award in that. In that case he/she can be exempted from one of the elective courses of the programme.

**23. Group Project**

The main objective of group project is to provide an ambiance to work in groups towards achieving a common goal. A group shall have up to 5 students. In case of Group Project work is based on interdisciplinary in nature, team can be constituted with members from across departments of the Faculty.

The students are required to develop a report for assessment and also need to demonstrate the working of the product. The IPR rights of all such work lies with the University only. The project should be approved by a committee constituted by respective HoDs before the start of the project. For further details related to the Group Project refer to Module Specification of the respective programmes

**24. Industry Internship/Other Activities**

A student can opt for an internship in an industry, a business or research organization during the module.

Alternately, can undertake a mini-project requiring self-directed study that can be perused within the affiliated Faculty.

Prior approval of the internship / mini-project by the HoD and Dean is mandatory. It is also necessary for the student to submit a report and make a presentation to the members of the panel constituted by the HoD for assessment.

For further details related to this module, please refer to Module Specification of the respective programmes.

#### **25. Dissertation and Publication**

This module has two parts – Dissertation and Publication.

Every student, has to undertake the dissertation work individually on a chosen relevant topic. The topic needs to be approved by the committee constituted by HoD.

Publication is a stage wherein dissertation work of the student is converted into a technical paper to be published in reputed conferences/journals.

For further details related to the this module refer to Module Specifications of the respective programmes

#### **26. Course Assessment**

1. Every course will be assessed for a weight of 100%
2. There are two components-Component-1 and Component-2
3. Component-1 carries a weight of 50% and Component -2 carries a weight of 50%
4. Component -1 (CE) is subdivided into Term Tests , Assignments and laboratory examinations / technical presentation  
Test carry 25 Marks  
Assignment carry 50 Marks  
Laboratory assessment/ technical presentation carry 25 Marks  
Total 100 marks will be reduced to 50 Marks.
5. Component -2 (SEE) is Written Examination for 100 Marks. It will be reduced to 50 Marks.
6. A minimum of overall 40% is required for a pass with 40% in each of the Components
7. The marks distribution for each course is given in the programme structure-section 20.  
Other flexibilities(exceptions) as per the programme regulations

#### **27. Failure in Course and Makeup Examinations**

Makeup Examinations are provided for the students who are not able to meet all pass criteria prescribed for a module during the regular term and fail in the module.

For further details related to makeup examination, please refer to M.Tech. Programme Academic Regulations document.

#### **28. Attendance**

Please refer to M.Tech. Programme Academic Regulations document for attendance requirements and condonation related details.

#### **29. Award of Grades**

As per the M.Tech. Programme Academic Regulations document.

#### **30. Student Support for Learning**

Students are provided with various facilities to support learning such as the following:

1. Module notes
2. Reference books in the library
3. Magazines and Journals
4. Internet facility
5. Computing facility
6. Laboratory facility
7. Workshop facility
8. Staff support
9. Lounges for discussions
10. Any other support that enhances their learning

#### **31. Quality Control Measures**

Following are the Quality Control Measures:

1. Review of course notes
2. Review of question papers and assignment questions



3. Student Feedback Analysis
4. Moderation of assessed work
5. Opportunities for the students to see their assessed work
6. Review by external examiners and external examiners reports
7. Staff Student Consultative Committee meetings
8. Student exit feedback analysis
9. Subject Assessment Board (SAB)
10. Programme Assessment Board (PAB)

## 32. Curriculum Map

Module Code	Intended Learning Outcomes											
	Knowledge and Understanding				Cognitive (Thinking) Skills (Critical, Analytical, Problem Solving, Innovation)				Practical Skills			
	KU1	KU2	KU3	KU4	CS1	CS2	CS3	CS4	PS1	PS2	PS3	PS4
19CMC501A	X			X	X		X			X	X	
19CMC502A	X	X	X		X	X	X		X	X		
19CMC503A		X	X	X		X	X			X		
19CME511A	X	X	X		X	X	X		X	X		
19CME512A	X	X	X		X	X	X		X	X		
19CME513A	X	X	X		X	X	X		X	X		
19CME514A	X	X	X		X	X	X		X	X		
19CME521A	X	X	X		X	X	X		X	X		
19CME522A	X	X	X		X	X	X		X	X		
19CME523A	X	X	X		X	X	X		X	X		
19CME524A	X	X	X		X	X	X		X	X		
19CME531A	X	X	X		X	X	X		X	X		
19CME532A	X	X	X		X	X	X		X	X		
19CME533A	X	X	X		X	X	X		X	X		
19CME534A	X	X	X		X	X	X		X	X		
19CME541A	X	X	X		X	X	X		X	X		
19CME542A	X	X	X		X	X	X		X	X		
19CME543A	X	X	X		X	X	X		X	X		
19CME544A	X	X	X		X	X	X		X	X		
19FET508	X	X	X	X	X	X	X	X	X			X
19CMC511A	X	X	X	X	X	X	X					
19CMC512A	X		X	X			X					
19CMC513A	X		X	X			X	X				
19FET509A	X	X	X	X	X	X	X	X	X	X	X	X
19FET510A	X	X	X	X	X	X	X	X	X	X	X	X
19CMP521A	X	X	X	X	X	X	X	X	X	X	X	X
19CMP522A	X	X	X	X					X	X	X	X
19CMP523A	X	X	X	X	X	X	X	X	X	X	X	X

**33. Capability / Transferable Skills Map**

Module Code	Group work	Self-learning	Research Skills	Written Communication Skills	Verbal Communication Skills	Presentation Skills	Behavioural Skills	Information Management	Personal management/ Leadership Skills
19CMC501A		X		X	X	X			X
19CMC502A		X		X	X	X			X
19CMC503A		X		X	X	X			X
19CME511A		X		X	X	X			X
19CME512A		X		X	X	X			X
19CME513A		X		X	X	X			X
19CME514A		X		X	X	X			X
19CME521A		X		X	X	X			X
19CME522A		X		X	X	X			X
19CME523A		X		X	X	X			X
19CME524A		X		X	X	X			X
19CME531A		X		X	X	X			X
19CME532A		X		X	X	X			X
19CME533A		X		X	X	X			X
19CME534A		X		X	X	X			X
19CME541A		X		X	X	X			X
19CME542A		X		X	X	X			X
19CME543A		X		X	X	X			X
19CME544A		X		X	X	X			X
19FET508		X		X	X	X	X	X	X
19CMC511A		X		X	X	X			X
19CMC512A		X		X	X	X			X
19CMC513A		X		X	X	X			X
19FET509A		X	X	X	X	X			
19FET510A		X	X	X	X	X			
19CMP521A	X	X		X	X	X	X	X	X
19CMP522A	X	X	X	X	X	X	X	X	X
19CMP523A		X	X	X	X	X	X	X	X

**34. Co-curricular Activities**

Students are encouraged to take part in co-curricular activities like seminars, conferences, symposium, paper writing, attending industry exhibitions, project competitions and related activities to enhance their knowledge and network.

**35. Cultural and Literary Activities**

To remind and ignite the creative endeavors, annual cultural festivals are held and the students are made to plan and organize the activities.

**36. Sports and Athletics**

Students are encouraged to develop a habit of taking part in outdoor and indoor games on regular basis.

