



# VIMAL JYOTHI ENGINEERING COLLEGE

Autonomous

## **CURRICULUM- 2024**

### **MASTER OF TECHNOLOGY**

Discipline: Civil Engineering  
Stream: SECM (Structural Engineering and  
Construction Management)

Department of Civil Engineering  
Vimal Jyothi Engineering College (Autonomous)  
Jyothi Nagar, Chemperi, Kannur, Kerala 670632

Affiliated to

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

M Tech COURSE STRUCTURE			
Sem	Course work content	Total credits allotted	Credits allotted semester wise
I	Core courses: 3 nos	$3 \times 3 = 9$	18
	Programme electives: 2 nos	$2 \times 3 = 6$	
	Laboratory: 1 no	$1 \times 1 = 1$	
	Research Methodology & IPR: 1 no	$1 \times 2 = 2$	
II	Core courses: 2 nos	$2 \times 3 = 6$	18
	Programme electives: 3 nos	$3 \times 3 = 9$	
	Laboratory: 1 no	$1 \times 1 = 1$	
	Min project: 1 no	$1 \times 2 = 2$	
III	MOOC: 1 nos	$1 \times 2 = 2$	16
	Internship: 1 no	$1 \times 3 = 3$	
	Audit course: 1 nos	No Credit	
	Phase 1: Dissertation/Research Project: 1 no	$1 \times 11 = 11$	
IV	Phase 2: Dissertation/Research Project: 1 no	$1 \times 16 = 16$	16
	<b>TOTAL</b>		<b>68</b>

Semester 1								
Slot	Course Code	Course name	Marks		Total	L-T-P	Hours	Credit
			CIE	End				
A	241TCE100	Probability, Statistics and Numerical Methods	40	60	100	3- 0-0	3	3
B	241TCE001	Advanced Design of Structures	40	60	100	3- 0- 0	3	3
C	241TCE002	Construction Planning, Scheduling and control	40	60	100	3- 0- 0	3	3
D	241ECEXXX	Program Elective 1	40	60	100	3- 0- 0	3	3
E	241ECEXXX	Program Elective 2	40	60	100	3- 0- 0	3	3
F	241RGE100	Research Methodology and IPR	40	60	100	2- 0- 0	2	2
S	241LCE003	Advanced Structural Engineering Lab	100	—	100	2- 0- 0	2	1
		<b>Total</b>			<b>700</b>		<b>19</b>	<b>18</b>

PROGRAM ELECTIVES- S1								
Slot	Course Code	Course name	Marks		Total	L-T-P	Hours	Credit
			CIE	End				
D/E	241ECE101	Structural Dynamics	40	60	100	3- 0-0	3	3
	241ECE102	Theory of Elasticity	40	60	100	3- 0- 0	3	3
	241ECE103	Modern Construction Materials	40	60	100	3- 0- 0	3	3
	241ECE104	Advanced construction Techniques	40	60	100	3- 0- 0	3	3
	241ECE105	Construction Management and Engineering Economics	40	60	100	3- 0-0	3	3
	241ECE106	Construction Contracts Methods and Equipment	40	60	100	3- 0- 0	3	3
	241ECE107	High Rise Structures	40	60	100	3- 0- 0	3	3
	241ECE108	Finite Element Method	40	60	100	3- 0- 0	3	3

Semester 2								
Slot	Course Code	Course name	Marks		Total	L-T-P	Hours	Credit
			CIE	End				
A	242TCE001	Construction Personnel Management	40	60	100	3- 0-0	3	3
B	242TCE002	Advanced Concrete Technology	40	60	100	3- 0- 0	3	3
C	242ECEXXX	Program Elective 3	40	60	100	3- 0- 0	3	3
D	242ECEXXX	Program Elective 4	40	60	100	3- 0- 0	3	3
E	242ECEXXX	Program Elective 5	40	60	100	3- 0- 0	3	3
F	242PCE100	Mini Project	100	----	100	0- 0- 4	4	2
S	242LCE003	Computational Lab	100	—	100	0- 0- 2	2	1
		Total			700		19	18

PROGRAM ELECTIVES-S2								
Slot	Course Code	Course name	Marks		Total	L-T-P	Hours	Credit
			CIE	End				
C/ D/E	242ECE101	Advanced Metal Structures	40	60	100	3- 0-0	3	3
	242ECE102	Analysis And Design of Earthquake Resistant Structures	40	60	100	3- 0-0	3	3
	242ECE103	Quality control and project safety management	40	60	100	3- 0-0	3	3
	242ECE104	Project Planning and Implementation	40	60	100	3- 0-0	3	3
	242ECE105	Advanced Design of Foundation	40	60	100	3- 0-0	3	3
	242ECE106	Design of Bridges	40	60	100	3- 0-0	3	3
	242ECE107	Maintenance and Rehabilitation of Structures	40	60	100	3- 0-0	3	3
	242ECE108	Prestressed Concrete Design	40	60	100	3- 0-0	3	3
	242ECE109	Mechanics Of Composite Materials	40	60	100	3- 0-0	3	3
	242ECE110	Natural Hazards and Impact Management	40	60	100	3- 0-0	3	3
	242ECE111	Project Evaluation and Management	40	60	100	3- 0-0	3	3

SEMESTER III								
Slot	Course Code	Course name	Marks		Total	L-T-P	Hours	Credit
			CIE	End				
A	243MCEXXX	MOOC *	To be completed successfully					2
B	243AGE XXX	Audit Course	To be completed successfully			3- 0- 0	3	0
C	243ICE100	Internship	100	0	100			3
D	243PCE100	Research Project /Dissertation Phase 1	100	0	100	0-0- 17	17	11
		<b>Total</b>			<b>200</b>		<b>25</b>	<b>16</b>

**Teaching Assistance: 6 hours**

\*MOOC Course to be successfully completed before the commencement of fourth semester (starting from semester 1).

AUDIT COURSE					
Slot	Course Code	Course name	L-T-P	Hours	Credit
B	243AGE001	Academic Writing	3- 0-0	3	0
	243AGE002	Advanced Engineering Materials	3- 0-0	3	0
	243AGE003	Forensic Engineering	3- 0- 0	3	0
	243AGE004	Data Science for Engineers	3- 0- 0	3	0
	243AGE005	Design Thinking	3- 0- 0	3	0
	243AGE006	Functional Programming in HASKELL	3- 0- 0	3	0
	243AGE007	Principles Of Automation	3- 0- 0	3	0
	243AGE008	Reuse And Recycle Technology	3- 0- 0	3	0
	243AGE009	System Modelling	3- 0- 0	3	0
	243AGE010	Expert Systems	3- 0- 0	3	0
	243AGE011	IELTS (Minimum score of 6.5, with at least 5.5 in each individual section of the test)	Certificate to be submitted		0
	243AGE012	French Language (A1 Level)			0
	243AGE013	German Language (A1 Level)			0
	243AGE014	Japanese Language (N5 Level)			0

Semester 4								
Slot	Course Code	Course name	Marks		Total	L-T-P	Hours	Credit
			CIE	End				
A	244PCE100	Research Project /Dissertation Phase 1I	100	100	200	0-0- 24	24	16
		Total			200			16

**Teaching Assistance: 5 hours**

L-T-P- Lecture-Tutorial-Practical

CIA: Continuous Internal Assessment, ESE: End Semester Examination

### ASSESSMENT PATTERN

#### (i) CORE COURSES

Evaluation shall only be based on application, analysis or design-based questions (for both internal and end semester examinations).

Continuous Internal Evaluation: 40 marks

Micro project/Course based project : 20 marks

Course based task/Seminar/Quiz : 10 marks

Test paper, 1 no : 10marks

The project shall be done individually. Group projects not permitted. Test paper shall include minimum 80% of the syllabus.

#### (ii) ELECTIVE COURSES

Evaluation shall only be based on application, analysis or design-based questions (for both internal and end semester examinations)

Continuous Internal Evaluation: 40 marks

Preparing a review article based on peer reviewed original publications (minimum 10 publications shall be referred) : 15 marks

Course based task/Seminar/Data collection and interpretation : 15 marks

Test paper, 1 no : 10marks

Test paper shall include minimum 80% of the syllabus.

End Semester Examination: 60 marks

End Semester Examination: 60 marks

**The end semester examination of elective and core course** will be conducted as per exam Calender of VJEC (Autonomous). There will be two parts; Part A and Part B. Part A contain 8 numerical questions (such questions shall be useful in the testing of knowledge, skills, comprehension, application, analysis, synthesis, evaluation and understanding of the students), with 1 question from each module, having 4 marks for each question. Students shall answer all questions. Part B contains 7 questions (such questions shall be useful in the testing of overall achievement and maturity of the students in a course, through long answer questions relating to theoretical/practical knowledge, derivations, problem solving and quantitative evaluation), with minimum

one question from each module of which student shall answer any four. Each question can carry 7 marks. Total duration of the examination will be 150 minutes.

**(ii) RESEARCH METHODOLOGY & IPR**

Continuous Internal Evaluation: 40 marks

Continuous Internal Evaluation: 40 marks

Course based task : 15 marks

Seminar/Quiz : 15 marks

Test paper, 1 no : 10marks

Test paper shall include minimum 80% of the syllabus.

End Semester Examination: 60 marks

The end semester examination will be conducted as per exam Calander of VJEC (Autonomous). The examination will be for 150 minutes and Part A will contain 6 short answer questions with 1 question each from modules 1 to 4, and 2 questions from module 5. Each question carries 5 marks. (6x5 =30 marks) and **Part B** will contain only 1 question based on a research article from the respective discipline and carries 30 marks. The students are to answer the questions based on that research article. (1x30 = 30marks)

**(iv) LABORATORY COURSES**

The laboratory courses will be having only Continuous Internal Evaluation and carries 100 marks. Final assessment shall be done by two examiners; one examiner will be a senior faculty from the same department.

**(v) MOOC COURSES**

The MOOC course shall be considered only if it is conducted by the agencies namely AICTE/NPTTEL/SWAYAM or NITTTR. The MOOC course should have a minimum duration of 6 weeks and the content of the syllabus shall be enough for at least 40 hours of teaching. The course should have a proctored/offline end semester examination. The students can do the MOOC according to their convenience from the beginning of first semester, but shall complete it by third semester. The list of MOOC courses will be provided by the concerned BoS if at least 70% of the course content match with the area/stream of study. The course shall not be considered if its content has more than 50% of overlap with a core/elective course in the concerned discipline or with an open elective.

MOOC Course to be successfully completed before the commencement of fourth semester (starting from semester 1). A credit of 2 will be awarded to all students whoever successfully completes the MOOC course as per the evaluation pattern of the respective agency conducting the MOOC.

**(vi) MINIPROJECT**

Total marks: 100, only CIA

Mini project can help to strengthen the understanding of student's fundamentals through application of theoretical concepts and to boost their skills and widen the horizon of their thinking. The ultimate aim of an engineering student is to resolve a problem by applying theoretical knowledge. Doing more projects increases problem-

solving skills. The introduction of mini projects ensures preparedness of students to undertake dissertation. Students should identify a topic of interest in consultation with PG Programme Coordinator that should lead to their dissertation/research project. Demonstrate the novelty of the project through the results and outputs. The progress of the mini project is evaluated based on three reviews, two interim reviews and a final review. A report is required at the end of the semester.

Interim evaluation : 40 marks (20 marks for each review),  
final evaluation : 35 marks  
(will be evaluating the level of completion and demonstration of functionality/specifications, clarity of presentation, oral examination, work knowledge and involvement)  
Report : 15 marks  
(the committee will be evaluating for the technical content, adequacy of references, templates followed and permitted plagiarism level is not more than 25%)  
Supervisor/Guide : 10 Marks

### **(VII) Audit course**

The students can complete the Audit courses as a course in the institution or self-study. The completion of the Audit course can be marked by the faculty, based on the completion of a course-based task and a seminar/quiz conducted by the college. There will be no mark or attendance requirement for the course. The successful completion of the Audit course will be marked as "Completed" in the Grade Card. For the course offered by the external agency, successful completion of the Audit course can be assessed by the assigned faculty, with a minimum score or level as outlined in the curriculum and indicated on the certificate issued by the relevant authorities.

### **(VIII) INTERNSHIP**

A student shall opt for carrying out the Internship at an Industry/Research Organization or at another institute of higher learning and repute (Academia). The organization for Internship shall be selected/decided by the students on their own with prior approval from the faculty advisor/respective PG Programme Coordinator/Guide/Supervisor. Every student shall be assigned an internship Supervisor/Guide at the beginning of the Internship. The training shall be related to their specialisation after the second semester for a minimum duration of six to eight weeks.

#### **Guidelines**

- All the students need to go for internship for minimum duration of 6 to 8 weeks.
- Students can take mini projects, assignments, case studies by discussing it with concerned authority from industry and can work on it during internship.
- All students should compulsorily follow the rules and regulations as laid by industry.
- Every student should take prior permissions from concerned industrial authority if they want to use any drawings, photographs or any other document from industry.
- Student should follow all ethical practices and SOP of industry.



- Students have to take necessary health and safety precautions as laid by the industry.
- Student should contact his /her Guide/Supervisor from college on weekly basis to communicate the progress.
- Each student has to maintain a diary/log book
- After completion of internship, students are required to submit
  - Report of work done
  - Internship certificate copy
  - Feedback from employer / internship mentor
  - Stipend proof (in case of paid internship).

### **Evaluation**

Total Marks 100:

The marks awarded for the Internship will be on the basis of

- |       |                                 |            |
|-------|---------------------------------|------------|
| (i)   | Evaluation done by the industry | : 25 marks |
| (ii)  | Students' diary                 | : 25 marks |
| (iii) | Internship Report               | : 25 marks |
| (iv)  | Comprehensive Viva Voce         | : 25 marks |

**Internship Report:** After completion of the internship, the student should prepare a comprehensive report to indicate what he has observed and learnt in the training period and should be submitted to the faculty Supervisor. The training report should be signed by the Internship Supervisor, Programme Coordinator and Faculty Mentor.

At the end of the training, a presentation and review will be conducted by the department which will be evaluated by a panel of examiners. An Industrial Training report duly approved/certified by the supervisor and the HOD in the prescribed format should be submitted by the student for appearing for the presentation.

The Internship report (25 Marks) will be evaluated on the basis of following criteria:

- Originality
- Adequacy and purposeful write-up
- Organization, format, drawings, sketches, style, language etc.
- Variety and relevance of learning experience
- Practical applications, relationships with basic theory and concepts taught in the course

**Viva Voce (25 Marks)**

Members of the panel for Industrial Training evaluation (Internal)

- HOD / PG Coordinator / Senior faculty member in the PG stream as Chairman
- Faculty-in-charge of Industrial Training
- Faculty Supervisor of Industrial Training

### **(IX) RESEARCH PROJECT/DISSERTATION**

The students are to carry out the research project / dissertation in the Concerned department of VJEC (autonomous) or can work either in any CSIR/Industrial R&D organization/any other reputed Institute which have facilities for dissertation work in the area proposed.

**Dissertation outside the Institute:** For doing dissertation outside the Institution, the following conditions are to be met:

- They have completed successfully the course work prescribed in the approved curriculum up to the second semester.
- The student has to get prior approval from the DLAC
- They should have an external as well as an internal supervisor. (The internal supervisor should belong to the parent institution and the external supervisor should be Scientists or Engineers from the Institution/Industry/ R&D organization with which the student is associated for doing the dissertation work. The external supervisor shall be with a minimum post graduate degree in the related area.)
- The external guide is to be preferably present during all the stages of evaluation of the dissertation.

**Internship leading to Dissertation:** The M. Tech students who after completion of 6 to 8 weeks internship at some reputed organizations are allowed to continue their work as dissertation for the third and fourth semester after getting approval from the DLAC. Such students shall make a brief presentation regarding the work they propose to carry out before the DLAC for a detailed scrutiny and to resolve its suitability for accepting it as an M.Tech dissertation. These students will be continuing as regular students of the Institute in third semester for carrying out all academic requirements as per the curriculum/regulation. However, they will be permitted to complete their dissertation in the Industry/Organization (where they have successfully completed their internship) during fourth semester

**Dissertation as part of Employment:** Students may be permitted to discontinue the programme and take up a job provided they have completed all the courses till second semester (FE status students are not permitted) prescribed in the approved curriculum. The dissertation work can be done during a later period either in the organization where they work if it has R & D facility, or in the Institute. Such students should submit application with details (copy of employment offer, plan of completion of their project etc.) to the CoE through HoD. The application shall be vetted by CLAC before granting the approval. When the students are planning to do the dissertation work in the organization with R & D facility where they are employed, they shall submit a separate application having following details:

- Name of R&D Organization/Industry
- Name and designation of an external supervisor from the proposed Organization/Industry (Scientists or Engineers with a minimum post graduate degree in the related area) and his/her profile with consent.
- Name and designation of a faculty member of the Institute as internal supervisor with his/her consent
- Letter from the competent authority from the Organization/Industry granting permission to do the dissertation
- Details of the proposed work
- Work plan of completion of project
- DLAC will scrutinize the proposal and forward to principal for approval.
- When students are doing dissertation work along with the job in the organization (with R & D facility) where they are employed, the dissertation work shall be completed in four semesters normally (two semesters of dissertation work along with the job may be considered as equivalent to one semester of dissertation work at the Institute). Extensions may be granted based on requests from the student and recommendation of the supervisors such that he/she will complete the M.

Tech programme within four years from the date of admission as per the regulation.

- Method of assessment and grading of the dissertation will be the same as in the case of regular students. The course work in the 3rd semester for such students are to be completed as per the curriculum requirements
- MOOC can be completed as per the norms mentioned earlier
- Audit course is to be carried out either in their parent Institution or by self-learning. However, for self-learning students, all assessments shall be carried out in their parent Institution as in the case of regular students.

### **Plagiarism Issues in Project Phase-II Report**

Plagiarism means an act of academic dishonesty and a breach of ethics. It involves using someone else's original ideas, thoughts, data, or work as one's own. Particularly in professional education, plagiarism is undoubtedly scientific misconduct, and hence, the submitted reports should not be a mere reproduction of existing manuscripts. The **content similarity is within 20%**, the report shall be accepted, approved and recommended for further processing. However self-plagiarism is allowed. It is important that students learn how to properly attribute and acknowledge the work, data and ideas of others. Any documents that are publicly accessible/borrowed should be appropriately acknowledged and referenced. While submitting the report, every student shall submit an undertaking stating that the document prepared has been duly checked through a Plagiarism Detection Tool that is approved by the Institution and the percentage of similarity is well inside the acceptable limits. If the submitted report exceeds the acceptable limits, the student shall be asked to submit a revised script. The project report has to be submitted by the student through the supervisor(s) to the panel.

### **Project Phase – I& II Internal Evaluation Committee**

- HOD/PG Co-ordinator as Chairman
- A senior faculty member from the department in the project stream
- Project Supervisor(s) of the concerned project

As much as possible, the internal evaluation of Project Phase-II shall be done by the same committee constituted for Project Phase-I.

For ESE (project presentation and viva-voce), two experts specialised in the project stream (other than the faculty supervisor of the concerned project work) are the members. Out of the two experts, one person shall be from outside the institution, either from an academic / R&D organization or industry.

Mark Distribution:

Phase 1: Total marks: 100, only CIA

### **Continuous Internal Evaluation (CIE)**

Interim Evaluation by the internal committee	: 20 marks
Final Evaluation by the internal committee	:50 marks
Progress evaluation by the Project Supervisor(s)	:30 marks

Phase 2: Total marks: 200, CIA = 100 and ESE = 100 marks

Continuous Internal Evaluation (CIE)

Interim Evaluation by the internal committee :20 marks

Final Evaluation by the internal committee :50 marks

Progress evaluation by the Project Supervisor(s) :30 marks

End Semester Examination (ESE)

Project report :25 marks

Project presentation by the student :40 marks

Viva :30 marks

Publication / accepted for Publication :05 marks

### **(X)TEACHING ASSISTANCESHIP (TA)**

All M Tech students irrespective of their category of admission shall undertake TA duties for a minimum duration as per the curriculum. Being a TA, the student will get an excellent opportunity to improve their expertise in the technical content of the course, enhance communication skills, obtain a hands-on experience in handling the experiments in the laboratory and improve peer interactions.

The possible TA responsibilities include the following: facilitate a discussion section or tutorial for a theory/ course, facilitate to assist the students for a laboratory course, serve as a mentor for students, and act as the course web-master. TAs may be required to attend the instructor's lecture regularly. A TA shall not be employed as a substitute instructor, where the effect is to relieve the instructor of his or her teaching responsibilities.

For the tutorial session:

(i) Meet the teacher and understand your responsibilities well in advance, attend the lectures of the course for which you are a tutor, work out the solutions for all the tutorial problems yourself, approach the teacher if you find any discrepancy or if you need help in solving the tutorial problems, use reference text books, be innovative and express everything in English only.

(ii) Try to lead the students to the correct solutions by providing appropriate hints rather than solving the entire problem yourself, encourage questions from the students, lead the group to a discussion based on their questions, plan to ask them some questions be friendly and open with the students, simultaneously being firm with them.

(iii) Keep track of the progress of each student in your group, give periodic feedback to the student about his/her progress, issue warnings if the student is consistently underperforming, report to the faculty if you find that a particular student is consistently underperforming, pay special attention to slow-learners and be open to the feedback and comments from the students and faculty.

(iv) After the tutorial session you may be required to grade the tutorials/assignments/tests. Make sure that you work out the solutions to the questions yourself, and compare it with the answer key, think and work out possible alternate solutions to the same question, understand the marking scheme from the teacher. Consult the teacher if are and make sure that you are not partial to some student/students while grading. Follow basic ethics.

Handling a laboratory Session:

(i) Meet the faculty – in- charge a few days in advance of the actual lab class and get the details of the experiment, get clarifications from him/her regarding all aspects of the experiment and the expectations, prepare by reading about the theoretical background of the experiment, know the physical concepts involved in the experiment, go to the laboratory and check out the condition of the equipment/instrumentation, perform the laboratory experiment at least once one or two days before the actual laboratory class, familiarize with safety/ security aspects of the experiment / equipment /laboratory, prepare an instruction sheet for the experiment in consultation with the faculty, and keep sufficient copies ready for distribution to students for their reference.

(ii) Verify condition of the equipment/set up about 30 minutes before the students arrive in the class and be ready with the hand outs, make brief introductory remarks about the experiment, its importance, its relevance to the theory they have studied in the class, ask the students suitable questions to know their level of preparation for the experiment, discuss how to interpret results, ask them comment on the results.

(iii) Correct/evaluate/grade the submitted reports after receiving suitable instructions from the faculty in charge, continue to interact with students if they have any clarifications regarding any aspect of the laboratory session, including of course grading, Carefully observe instrument and human safety in laboratory class, Preparing simple questions for short oral quizzing during explanation of experiments enables active participation of students, facilitate attention, provides feedback and formative assessment.

**Chairperson, Civil Engineering BoS**  
**Dr. Biju Mathew**

**Chairman, Academic Council & Principal**  
**Dr Benny Joseph**