JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

(Established by an Act No.30 of 2008 of A.P. State Legislature)

Kukatpally, Hyderabad – 500 085, Andhra Pradesh (India)

R 15 - ACADEMIC REGULATIONS (CBCS) FOR M. Tech. (REGULAR) DEGREE PROGRAMMES

Applicable for the students of M. Tech. (Regular) programme from the Academic Year ***2015-16*** and onwards

The M. Tech. Degree of Jawaharlal Nehru Technological University Hyderabad shall be conferred on candidates who are admitted to the programme and who fulfill all the requirements for the award of the Degree.

1.0 ELIGIBILITY FOR ADMISSIONS

Admission to the above programme shall be made subject to eligibility, qualification and specialization as prescribed by the University from time to time.

Admissions shall be made on the basis of merit/rank obtained by the candidates at the qualifying Entrance Test conducted by the University or on the basis of any other order of merit as approved by the University, subject to reservations as laid down by the Govt. from time to time.

2.0 AWARD OF M. Tech. DEGREE

2.1 A student shall be declared eligible for the award of the M. Tech. Degree, if he pursues a course of study in not less than two and not more than four academic years. However, he is permitted to write the examinations for two more years after four academic years of course work, failing which he shall forfeit his seat in M. Tech. programme.

2.2 The student shall register for all 88 credits and secure all the 88 credits.

2.3 The minimum instruction days in each semester are 90.

3.0 COURSES OF STUDY

The following specializations are offered at present for the M. Tech. programme of study.

1. Advanced Manufacturing Systems
2. Aerospace Engineering/ Aeronautical Engineering
3. Automation
4. Biomedical Signal Processing and Instrumentation
5. Bio-Technology
6. CAD/CAM
7. Chemical Engineering
8. Communication Systems
9. Computer Networks

7.6 In general, a student shall not be permitted to repeat any Subject/ Course (s) only for the sake of 'Grade Improvement' or 'SGPA/ CGPA Improvement'.

7.7 A student earns Grade Point (GP) in each Subject/ Course, on the basis of the Letter Grade obtained by him in that Subject/ Course. The corresponding 'Credit Points' (CP) are computed by multiplying the Grade Point with Credits for that particular Subject/ Course.

Credit Points (CP) = Grade Point (GP) x Credits …. For a Course

7.8 The Student passes the Subject/ Course only when he **gets GP ñ 6 (B Grade or above).**

7.9 The Semester Grade Point Average (SGPA) is calculated by dividing the Sum of Credit Points (ΣCP) secured from ALL Subjects/ Courses registered in a Semester, by the Total Number of Credits registered during that Semester. SGPA is rounded off to TWO Decimal Places. SGPA is thus computed as

SGPA = $\{ \sum_{i=1}^{N} C_i G_i \} / \{ \sum_{i=1}^{N} C_i \}$ …. For each Semester,

where 'i' is the Subject indicator index (takes into account all Subjects in a Semester), 'N' is the no. of Subjects 'REGISTERED' for the Semester (as specifically required and listed under the Course Structure of the parent Department), C_i is the no. of Credits allotted to the i^{th} Subject, and G_i represents the Grade Points (GP) corresponding to the Letter Grade awarded for that i^{th} Subject.

7.10 The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulative performance of a student over all Semesters considered for registration. The CGPA is the ratio of the Total Credit Points secured by a student in ALL registered Courses in ALL Semesters, and the Total Number of Credits registered in ALL the Semesters. CGPA is rounded off to TWO Decimal Places. CGPA is thus computed from the I Year Second Semester onwards, at the end of each Semester, as per the formula

CGPA = $\{ \sum_{j=1}^{M} C_j G_j \} / \{ \sum_{j=1}^{M} C_j \}$ … for all S Semesters registered
(ie., upto and inclusive of S Semesters, S ñ 2),

where 'M' is the TOTAL no. of Subjects (as specifically required and listed under the Course Structure of the parent Department) the Student has 'REGISTERED' from the 1^{st} Semester onwards upto and inclusive of the Semester S (obviously M > N), 'j' is the Subject indicator index (takes into account all Subjects from 1 to S Semesters), C_j is the no. of Credits allotted to the j^{th} Subject, and G_j represents the Grade Points (GP) corresponding to the Letter Grade awarded for that j^{th} Subject. After registration and completion of I Year I Semester however, the SGPA of that Semester itself may be taken as the CGPA, as there are no cumulative effects.

7.11 For Calculations listed in Item 7.6 – 7.10, performance in failed Subjects/ Courses (securing F Grade) will also be taken into account, and the Credits of such Subjects/ Courses will also be included in the multiplications and summations.

8. EVALUATION OF PROJECT/DISSERTATION WORK

Every candidate shall be required to submit a thesis or dissertation on a topic approved by the Project Review Committee.

8.1 A Project Review Committee (PRC) shall be constituted with Head of the Department as Chairperson, Project Supervisor and one senior faculty member of the Departments offering the M. Tech. programme.

8.2 Registration of Project Work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the subjects, both theory and practical.

8.3 After satisfying 8.2, a candidate has to submit, in consultation with his Project Supervisor, the title, objective and plan of action of his project work to the PRC for approval. Only after obtaining the approval of the PRC the student can initiate the Project work.

8.4 If a candidate wishes to change his supervisor or topic of the project, he can do so with the approval of the PRC. However, the PRC shall examine whether or not the change of topic/supervisor leads to a major change of his initial plans of project proposal. If yes, his date of registration for the project work starts from the date of change of Supervisor or topic as the case may be.

8.5 A candidate shall submit his project status report in two stages at least with a gap of 3 months between them.

8.6 The work on the project shall be initiated at the beginning of the II year and the duration of the project is two semesters. A candidate is permitted to submit Project Thesis only after successful completion of all theory and practical courses with the approval of PRC not earlier than 40 weeks from the date of registration of the project work. For the approval of PRC the candidate shall submit the draft copy of thesis to the Head of the Department and make an oral presentation before the PRC.

8.7 After approval from the PRC, the soft copy of the thesis should be submitted to the University for ANTI-PLAGIARISM for the quality check and the plagiarism report should be included in the final thesis. If the copied information is less than 24%, then only thesis will be accepted for submission.

8.8 Three copies of the Project Thesis certified by the supervisor shall be submitted to the College/School/Institute.

8.9 For Project work Review I in II Year I Sem. there is an internal marks of 50, the evaluation should be done by the PRC for 25 marks and Supervisor will evaluate for 25 marks. The Supervisor and PRC will examine the Problem Definition, Objectives, Scope of Work, Literature Survey in the same domain. A candidate has to secure a minimum of 50% of marks to be declared successful for Project Work Review I. If he fails to fulfill minimum marks, he has to reappear during the supplementary examination.

8.10 For Project work Review II in II Year II Sem. there is an internal marks of 50, the evaluation should be done by the PRC for 25 marks and Supervisor will evaluate for 25 marks. The PRC will examine the overall progress of the Project Work and decide the Project is eligible for final submission or not. A candidate has to secure a minimum of 50% of marks to be declared successful for Project Work Review II. If he fails to fulfill minimum marks, he has to reappear during the supplementary examination.

8.11 For Project Evaluation (Viva Voce) in II Year II Sem. there is an external marks of 150 and the same evaluated by the External examiner appointed by the University. The

candidate has to secure minimum of 50% marks in Project Evaluation (Viva-Voce) examination.

8.12 If he fails to fulfill as specified in 8.11, he will reappear for the Viva-Voce examination only after three months. In the reappeared examination also, fails to fulfill, he will not be eligible for the award of the degree.

8.13 The thesis shall be adjudicated by one examiner selected by the University. For this, the Principal of the College shall submit a panel of 3 examiners, eminent in that field, with the help of the guide concerned and Head of the Department.

8.14 If the report of the examiner is not favourable, the candidate shall revise and resubmit the Thesis. If the report of the examiner is unfavourable again, the thesis shall be summarily rejected.

8.15 If the report of the examiner is favourable, Project Viva-Voce examination shall be conducted by a board consisting of the Supervisor, Head of the Department and the external examiner who adjudicated the Thesis.

8.16 The Head of the Department shall coordinate and make arrangements for the conduct of Project Viva- Voce examination.

9. AWARD OF DEGREE AND CLASS

9.1 A Student who registers for all the specified Subjects/ Courses as listed in the Course Structure, satisfies all the Course Requirements, and passes the examinations prescribed in the entire PG Programme (PGP), and secures the required number of **88** Credits (with CGPA $\geq$ 6.0), shall be declared to have 'QUALIFIED' for the award of the M.Tech. Degree in the chosen Branch of Engineering and Technology with specialization as he admitted.

9.2 **Award of Class**

After a student has satisfied the requirements prescribed for the completion of the programme and is eligible for the award of M. Tech. Degree, he shall be placed in one of the following three classes based on the CGPA:

Class Awarded	CGPA
First Class with Distinction	≥ 7.75
First Class	$6.75 \leq$ CGPA < 7.75
Second Class	$6.00 \leq$ CGPA < 6.75

9.3 A student with final CGPA (at the end of the PGP) < 6.00 will not be eligible for the Award of Degree.

10. WITHHOLDING OF RESULTS

If the student has not paid the dues, if any, to the University or if any case of indiscipline is pending against him, the result of the student will be withheld and he will not be allowed into the next semester. His degree will be withheld in such cases.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. TECH (POWER ELECTRONICS/
POWER AND INDUSTRIAL DRIVES/POWER ELECTRONICS AND ELECTRIC DRIVES)
COURSE STRUCTURE AND SYLLABUS

I Year – I Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course I	Machine Modeling and Analysis	25	75	4	--	4
Core Course II	Modern Control Theory	25	75	4	--	4
Core Course III	Power Electronic Devices and Circuits	25	75	4	--	4
Core Elective I	1. Special Machines 2. HVDC Transmission 3. Programmable Logic Controllers and their Applications	25	75	4	--	4
Core Elective II	1. Microcontrollers and Applications 2. Embedded Systems 3. Digital Control Systems	25	75	4	--	4
Open Elective I	1. Optimization Techniques 2. Digital control systems 3. Renewable energy systems 4. HVDC Transmission 5. Analysis of power converters 6. Embedded Systems	25	75	4	--	4
Laboratory I	Power Converters Simulation Lab	25	75	--	4	2
Seminar I	Seminar-I	50	--	--	4	2
Total Credits				**24**	**8**	**28**

I Year – II Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course IV	Power Electronic Converters	25	75	4	--	4
Core Course V	Power Electronic Control of DC Drives	25	75	4	--	4
Core Course VI	Power Electronic Control of AC Drives	25	75	4	--	4
Core Elective III	1. Power Quality 2. Advanced Digital Signal Processing 3. Switched Mode Power Supplies (SMPS)	25	75	4	--	4
Core Elective IV	1. Flexible AC Transmission Systems 2. High-Frequency Magnetic Components 3. Dynamics of Electrical Machines	25	75	4	--	4
Open Elective II	1. Instrumentation & Control 2. Intelligent Control 3. Smart grid technologies 4. AI Techniques in Electrical Engineering 5. Reliability Engineering 6. Energy Auditing, Conservation & Management	25	75	4	--	4
Laboratory II	Power Converters and Drives Lab	25	75	--	4	2
Seminar II	Seminar-II	50	--	--	4	2
Total Credits				**24**	**8**	**28**

II Year - I Semester

Course Title	Int. marks	Ext. marks	L	P	C
Comprehensive Viva-Voce	--	100	--	--	4
Project work Review I	50	--	--	24	12
Total Credits			--	24	**16**

II Year - II Semester

Course Title	Int. marks	Ext. marks	L	P	C
Project work Review II	50	--	--	8	4
Project Evaluation (Viva-Voce)	--	150	--	16	12
Total Credits			**--**	**24**	**16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. TECH (STRUCTURAL ENGINEERING)

COURSE STRUCTURE AND SYLLABUS

I Year – I Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course I	Theory of Elasticity and plasticity	25	75	4	--	4
Core Course II	Theory of Plates	25	75	4	--	4
Core Course III	Advanced Structural Analysis	25	75	4	--	4
Core Elective I	Advanced Concrete Technology Tall Buildings Advanced Foundation Engineering	25	75	4	--	4
Core Elective II	Advanced R.C. Design Bridge Engineering Plastic Analysis & Design	25	75	4	--	4
Open Elective I	Computer Oriented Numerical Methods Reliability Engineering Experimental Stress Analysis	25	75	4	--	4
Laboratory I	Advanced Concrete Lab	25	75	--	4	2
Seminar I	Seminar	50	--	--	4	2
Total Credits				**24**	**8**	**28**

I Year – II Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course IV	Finite Element Method	25	75	4	--	4
Core Course V	Structural Dynamics	25	75	4	--	4
Core Course VI	Pre-stressed Concrete	25	75	4	--	4
Core Elective III	Advanced Steel Design Soil Dynamic & Foundation Engineering Stability of Structures	25	75	4	--	4
Core Elective IV	Design of shells & folded plates Earthquake Resistant Design of Buildings Fracture Mechanics	25	75	4	--	4
Open Elective II	Repair & Rehabilitation of Buildings Composite Materials Optimisation Techniques	25	75	4	--	4
Laboratory II	CAD Lab	25	75	--	4	2
Seminar II	Seminar	50	--	--	4	2
Total Credits				**24**	**8**	**28**

II Year - I Semester

Course Title	Int. marks	Ext. marks	L	P	C
Comprehensive Viva-Voce	--	100	--	--	4
Project work Review I	50	--	--	24	12
Total Credits			--	24	**16**

II Year - II Semester

Course Title	Int. marks	Ext. marks	L	P	C
Project work Review II	50	--	--	8	4
Project Evaluation (Viva-Voce)	--	150	--	16	12
Total Credits			**--**	**24**	**16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH. (COMPUTER SCIENCE AND ENGINEERING)
COURSE STRUCTURE AND SYLLABUS

I Year – I Semester

	Course Title	Int. marks	Ext. marks	L	P	C
Core Course I	Data Structures and Algorithms	**25**	**75**	**4**	**--**	**4**
Core Course II	Database Internals	25	75	4	--	4
Core Course III	Distributed Systems	25	75	4	--	4
Core Elective I	1. Network Security 2. Android Application Development 3. Cloud Computing 4. Internet of Things	25	75	4	--	4
Core Elective II	1. Machine Learning 2. Parallel and Distributed Algorithms 3. Software Architecture and Design Patterns 4. Embedded Systems	25	75	4	--	4
Open Elective I	**Open Elective – 1**	25	75	4	--	4
Laboratory I	Data Structures and Algorithms Lab	25	75	--	4	2
Seminar I	Seminar	50	--	--	4	2
Total Credits				**24**	**8**	**28**

I Year – II Semester

	Course Title	Int. marks	Ext. marks	L	P	C
Core Course IV	Network Programming	25	75	4	--	4
Core Course V	Information Retrieval Systems	25	75	4	--	4
Core Course VI	Internet Technologies and Services	25	75	4	--	4
Core Elective III	**Core Elective– 3** 1. Data Mining 2. Storage Area Networks 3. Semantic Web and Social Networks 4. Cyber Security	25	75	4	--	4
Core Elective IV	**Core Elective– 4** 1. Big Data Analytics 2. Soft Computing 3. Software Process and Project Management 4. Distributed Computing	25	75	4	--	4
Open Elective II	**Open Elective – 2**	25	75	4	--	4
Laboratory II	Internet Technologies and Services Lab	25	75	--	4	2
Seminar II	Seminar	50	--	--	4	2
Total Credits			**24**	**8**	**28**	

II Year - I Semester

Course Title	Int. marks	Ext. marks	L	P	C
Comprehensive Viva-Voce	--	100	--	--	4
Project work Review I	50	--	--	24	12
Total Credits			--	24	**16**

II Year - II Semester

Course Title	Int. marks	Ext. marks	L	P	C
Project work Review II	50	--	--	8	4
Project Evaluation (Viva-Voce)	--	150	--	16	12
Total Credits			**--**	**24**	**16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech. (VLSI/ VLSI DESIGN/VLSI SYSTEM DESIGN)

COURSE STRUCTURE AND SYLLABUS

I Year – I Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course I	VLSI Technology	25	75	4	--	4
Core Course II	CMOS Analog Integrated Circuit Design	25	75	4	--	4
Core Course III	CMOS Digital Integrated Circuit Design	25	75	4	--	4
Core Elective I	Digital System Design Hardware Software Co-Design CPLD and FPGA Architectures and Applications	25	75	4	--	4
Core Elective II	Algorithms for VLSI Design Automation Embedded System Design Device Modeling	25	75	4	--	4
Open Elective I	Soft Computing Techniques Image and Video processing Software Defined Radio	25	75	4	--	4
Laboratory I	VLSI Laboratory – I	25	75	--	4	2
Seminar I	Seminar	50	--	--	4	2
Total Credits				**24**	**8**	**28**

I Year – II Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course IV	Low Power VLSI Design	25	75	4	--	4
Core Course V	Design for Testability	25	75	4	--	4
Core Course VI	CMOS Mixed Signal Circuit Design	25	75	4	--	4
Core Elective III	VLSI and DSP Architectures Full custom IC Design Hardware Description Language	25	75	4	--	4
Core Elective IV	Optimization Techniques in VLSI Design System On Chip Architecture Semiconductor Memory Design and Testing	25	75	4	--	4
Open Elective II	Scripting Languages Coding Theory and Techniques Adhoc Wireless Networks	25	75	4	--	4
Laboratory II	VLSI Laboratory – II	25	75	--	4	2
Seminar II	Seminar	50	--	--	4	2
Total Credits				**24**	**8**	**28**

II Year - I Semester

Course Title	Int. marks	Ext. marks	L	P	C
Comprehensive Viva-Voce	--	100	--	--	4
Project work Review I	50	--	--	24	12
Total Credits			--	24	**16**

II Year - II Semester

Course Title	Int. marks	Ext. marks	L	P	C
Project work Review II	50	--	--	8	4
Project Evaluation (Viva-Voce)	--	150	--	16	12
Total Credits			**--**	**24**	**16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech. (

COURSE STRUCTURE AND SYLLABUS

I Year – I Semester

	Course Title	Int. marks	Ext. marks	L	P	C
Core Course I	Data Structures and Algorithms	**25**	**75**	**4**	**--**	**4**
Core Course II	Software Development Methodologies	25	75	4	--	4
Core Course III	Software Requirements and Estimation	25	75	4	--	4
Core Elective I	1. Cloud Computing 2. Database Internals 3. Component Based Software Engineering 4. Internet Technologies and Services	25	75	4	--	4
Core Elective II	1. Big Data Analytics 2. Web Mining 3. Object Oriented Modelling 4. Information Theory and Coding	25	75	4	--	4
Open Elective I	**Open Elective – 1**	25	75	4	--	4
Laboratory I	Software Development Methodologies Lab	25	75	--	4	2
Seminar I		50	--	--	4	2
Total Credits				**24**	**8**	**28**

I Year – II Semester

	Course Title	Int. marks	Ext. marks	L	P	C
Core Course IV	Software Architecture and Design Patterns	25	75	4	--	4
Core Course V	Software Process and Project Management	25	75	4	--	4
Core Course VI	Software Quality Assurance and Testing	25	75	4	--	4
Core Elective III	1. Scripting Languages 2. Information Retrieval Systems 3. Semantic Web and Social Networks 4. E-Commerce	25	75	4	--	4
Core Elective IV	1. Software Security Engineering 2. Cyber Security 3. Information Security And Audit 4. Business Process Management	25	75	4	--	4
Open Elective II	**Open Elective – 2**	25	75	4	--	4
Laboratory II	Software Testing Lab	25	75	--	4	2
Seminar II	Seminar	50	--	--	4	2
Total Credits			**24**	**8**	**28**	

II Year - I Semester

Course Title	marks	Ext. marks	L	P	C
Comprehensive Viva-Voce	--	100	--	--	4
Project work Review I	50	--	--	24	12
Total Credits			--	24	**16**

II Year - II Semester

Course Title	marks	Ext. marks	L	P	C
Project work Review II	50	--	--	8	4
Project Evaluation (Viva-Voce)	--	150	--	16	12
Total Credits			**--**	**24**	**16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech. (CAD/CAM)
COURSE STRUCTURE AND SYLLABUS

I Year – I Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course I	Advanced CAD	25	75	4	--	4
Core Course II	Computer Aided Manufacturing	25	75	4	--	4
Core Course III	Advanced FEM	25	75	4	--	4
Core Elective I	Mechanical Behaviour of Materials Stress Analysis and Vibration Rapid Prototyping Technolgies	25	75	4	--	4
Core Elective II	Automation in Manufacturing Computer Aided Process Planning Performance Modeling and Analysis of Manufacturing Systems	25	75	4	--	4
Open Elective I	Numerical Methods for Partial Differential Equations Production and Operations Management	25	75	4	--	4
Laboratory I	Laboratory	25	75	--	4	2
Seminar I	Seminar	50	--	--	4	2
Total Credits				**24**	**8**	**28**

I Year – II Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course IV	Design for Manufacturing And Assembly	25	75	4	--	4
Core Course V	Flexible Manufacturing Systems	25	75	4	--	4
Core Course VI	Industrial Robotics	25	75	4	--	4
Core Elective III	Intelligent Manufacturing Systems Special Manufacturing Process Design Optimization	25	75	4	--	4
Core Elective IV	Advanced Mechatronics Design and Manufacturing of MEMS and Micro Systems Fuzzy Logic and Neural Networks	25	75	4	--	4
Open Elective II	Engineering Research and Methodology Quality Engineering in Manufacturing	25	75	4	--	4
Laboratory II	Manufacturing Simulation & Precision Engineering Lab	25	75	--	4	2
Seminar II	Seminar	50	--	--	4	2
Total Credits				**24**	**8**	**28**

II Year - I Semester

Course Title	Int. marks	Ext. marks	L	P	C
Comprehensive Viva-Voce	--	100	--	--	4
Project work Review I	50	--	--	24	12
Total Credits			--	24	**16**

II Year - II Semester

Course Title	Int. marks	Ext. marks	L	P	C
Project work Review II	50	--	--	8	4
Project Evaluation (Viva-Voce)	--	150	--	16	12
Total Credits			**--**	**24**	**16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. TECH. (ELECRICAL POWER SYSTEMS/POWER ENGINEERING AND ENERGY SYSTEMS/ POWER SYSTEM CONTROL AND AUTOMATION/ ELECRICAL POWER ENGINEERING)
COURSE STRUCTURE AND SYLLABUS

I Year – I Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course I	Advanced Power System Analysis	25	75	4	--	4
Core Course II	Advanced Power System Protection	25	75	4	--	4
Core Course III	Modern Control Theory	25	75	4	--	4
Core Elective I	1. EHV AC Transmission 2. High Voltage Engineering 3. Advanced Digital Signal Processing	25	75	4	--	4
Core Elective II	1. Power Quality 2. Microcontrollers and applications 3. Distribution Automation	25	75	4	--	4
Open Elective I	1. Optimization Techniques 2. Digital control systems 3. Renewable energy systems 4. HVDC Transmission 5. Analysis of power converters 6. Embedded Systems	25	75	4	--	4
Laboratory I	Power Systems Lab-I	25	75	--	4	2
Seminar I	Seminar-I	50	--	--	4	2
Total Credits				**24**	**8**	**28**

I Year – II Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course IV	Power System Dynamics	25	75	4	--	4
Core Course V	Flexible AC Transmission Systems (FACTS)	25	75	4	--	4
Core Course VI	Power System Operation and Deregulation	25	75	4	--	4
Core Elective III	1. Gas Insulated Systems(GIS) 2. Programmable Logic Controllers and their applications 3. High frequency magnetic components	25	75	4	--	4
Core Elective IV	1. Reactive Power Compensation and Management 2. Power System Reliability 3. Voltage Stability	25	75	4	--	4
Open Elective II	1. Instrumentation & Control 2. Intelligent Control 3. Smart grid technologies 4. AI Techniques in Electrical Engineering 5. Reliability Engineering 6. Energy Auditing, Conservation & Management	25	75	4	--	4
Laboratory II	Power Systems Lab-II	25	75	--	4	2
Seminar II	Seminar-II	50	--	--	4	2
Total Credits				**24**	**8**	**28**

II Year - I Semester

Course Title	Int. marks	Ext. marks	L	P	C
Comprehensive Viva-Voce	--	100	--	--	4
Project work Review I	50	--	--	24	12
Total Credits			--	24	**16**

II Year - II Semester

Course Title	Int. marks	Ext. marks	L	P	C
Project work Review II	50	--	--	8	4
Project Evaluation (Viva-Voce)	--	150	--	16	12
Total Credits			**--**	**24**	**16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech (WIRELESS AND MOBILE COMMUNICATIONS)
COURSE STRUCTURE AND SYLLABUS

I Year – I Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course I	Advanced Data Communications	25	75	4	--	4
Core Course II	Coding Theory and Techniques	25	75	4	--	4
Core Course III	Spread Spectrum Communication	25	75	4	--	4
Core Elective I	Detection and Estimation Theory Random Processes and Time Series Analysis RF Circuit Design	25	75	4	--	4
Core Elective II	Voice Over Internet Protocol Queueing Theory and Applications GPS Applications	25	75	4	--	4
Open Elective I	Image and Video Processing Internetworking Advanced Digital Signal Processing	25	75	4	--	4
Laboratory I	Advanced Communications Lab	25	75	--	4	2
Seminar I	Seminar	50	--	--	4	2
Total Credits				**24**	**8**	**28**

I Year – II Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course IV	Advanced communications & Networks	25	75	4	--	4
Core Course V	Wireless Communications & Networks	25	75	4	--	4
Core Course VI	Wireless MIMO Communications	25	75	4	--	4
Core Elective III	Optical Communications Technology Wireless LANs and PANs Adhoc and Wireless Sensor Networks	25	75	4	--	4
Core Elective IV	Network Security and Cryptography Software Defined Radio 4G Technologies	25	75	4	--	4
Open Elective II	Embedded system Design Mobile Computing Technologies Scripting Languages	25	75	4	--	4
Laboratory II	Wireless Communications and Networks Lab	25	75	--	4	2
Seminar II	Seminar	50	--	--	4	2
Total Credits				**24**	**8**	**28**

II Year - I Semester

Course Title	Int. marks	Ext. marks	L	P	C
Comprehensive Viva-Voce	--	100	--	--	4
Project work Review I	50	--	--	24	12
Total Credits			--	24	**16**

II Year - II Semester

Course Title	Int. marks	Ext. marks	L	P	C
Project work Review II	50	--	--	8	4
Project Evaluation (Viva-Voce)	--	150	--	16	12
Total Credits			**--**	**24**	**16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.TECH. (EMBEDDED SYSTEMS)

COURSE STRUCTURE AND SYLLABUS

I Year – I Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course I	Embedded System Design	25	75	4	--	4
Core Course II	ARM Architectures	25	75	4	--	4
Core Course III	Real Time Operating Systems	25	75	4	--	4
Core Elective I	Advanced Computer Architecture VLSI Technology and Design Embedded Computing	25	75	4	--	4
Core Elective II	Digital System Design Embedded C Design for Testability	25	75	4	--	4
Open Elective I	TCP/IP Networks Coding Theory and Techniques Soft Computing Techniques	25	75	4	--	4
Laboratory I	Embedded Systems Laboratory	25	75	--	4	2
Seminar I	Seminar	50	--	--	4	2
Total Credits				**24**	**8**	**28**

I Year – II Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course IV	Digital Signal Processors and Architectures	25	75	4	--	4
Core Course V	Embedded Networking	25	75	4	--	4
Core Course VI	Sensors and Actuators	25	75	4	--	4
Core Elective III	CPLD and FPGA Architectures and Applications Wireless Communication and Networks System On Chip Architecture	25	75	4	--	4
Core Elective IV	Multimedia and Signal Coding Network Security and Cryptography Hardware Software Co-Design	25	75	4	--	4
Open Elective II	Scripting languages Adhoc Wireless and Sensor Networks Device Modeling	25	75	4	--	4
Laboratory II	Advanced Embedded Systems Laboratory	25	75	--	4	2
Seminar II	Seminar	50	--	--	4	2
Total Credits				**24**	**8**	**28**

II Year - I Semester

Course Title	Int. marks	Ext. marks	L	P	C
Comprehensive Viva-Voce	--	100	--	--	4
Project work Review I	50	--	--	24	12
Total Credits			--	24	**16**

II Year - II Semester

Course Title	Int. marks	Ext. marks	L	P	C
Project work Review II	50	--	--	8	4
Project Evaluation (Viva-Voce)	--	150	--	16	12
Total Credits			**--**	**24**	**16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

(Established by Act No.30 of 2008)
Kukatpally, Hyderabad–500085, Telangana State (India)

Academic Regulations of M.Tech (Regular/Full Time) Programmes, 2017-18 (R17) (CBCS)

(Effective for the students admitted into I year from the Academic Year 2017-18 and onwards)

1.0 Post-Graduate Degree Programmes in Engineering & Technology (PGP in E & T)
Jawaharlal Nehru Technological University Hyderabad (JNTUH) offers **Two** Years (**Four** Semesters) full-time Master of Technology (M. Tech.) Degree programmes, under Choice Based Credit System (CBCS) at its constituent (non- autonomous) and affiliated colleges in different branches of Engineering and Technology with different specializations.

2.0 Eligibility for Admissions

2.1 Admission to the PGPs shall be made subject to eligibility, qualification and specializations prescribed by the University from time to time, for each specialization under each M.Tech programme.

2.2 Admission to the post graduate programme shall be made on the basis of either the merit rank or Percentile obtained by the qualified student in the relevant qualifying GATE Examination/ the merit rank obtained by the qualified student in an entrance test conducted by Telangana State Government (PGECET) for M.Tech. programmes / an entrance test conducted by JNTUH/ on the basis of any other exams approved by the University, subject to reservations as laid down by the Govt. from time to time.

2.3 The medium of instructions for all PG Programmes will be **ENGLISH** only.

3.0 M.Tech. Programme (PGP in E & T) Structure

3.1 The M.Tech Programmes in E & T of JNTUH are of Semester pattern, with **Four** Semesters consisting of **Two** academic years, each academic year having **Two** Semesters (First/Odd and Second/Even Semesters). Each Semester shall be of 22 weeks duration (inclusive of Examinations), with a minimum of 90 instructional days per Semester.

3.2 The student shall not take more than four academic years to fulfill all the academic requirements for the award of M.Tech. degree from the date of commencement of first year first semester, failing which the student shall forfeit the seat in M.Tech. programme.

3.3 **UGC/AICTE** specified definitions/descriptions are adopted appropriately for various terms and abbreviations used in these PG academic regulations, as listed below:

3.3.1 Semester Scheme

Each Semester shall have 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) are taken as 'references' for the present set of Regulations. The terms 'SUBJECT' and 'COURSE' imply the same meaning here and refer to 'Theory Subject', or

'Lab Course', or 'Design/Drawing Subject', or 'Seminar', or 'Comprehensive Viva', or 'Project', or 'Technical Paper Writing' as the case may be.

3.3.2 Credit Courses

All subjects/courses are to be registered by the student in a semester to earn credits which shall be assigned to each subject/course in an L: T: P: C (Lecture Periods: Tutorial Periods: Practical Periods: Credits) structure based on the following general pattern:

- One credit for one hour/week/semester for theory/lecture (L) courses
- One credit for two hours/ week/semester for laboratory/ practical (P) courses or tutorials (T)

Other student activities like study tour, guest lecture, conference/workshop participations, technical paper presentations, and identified mandatory courses, if any, will not carry credits.

3.3.3 Subject Course Classification

All subjects/courses offered for the Post-Graduate Programme in E & T (M.Tech Degree Programme) are broadly classified as follows. The University has followed in general the guidelines issued by AICTE/UGC.

S.No.	Broad Course Classification	Course Group/ Category	Course Description
1	Core Courses (CoC)	PC- Professional Core	Includes subjects related to the parent discipline/department/ branch of Engineering
		Project Work	M.Tech Project or PG Project or Major Project
		Seminar, Technical Paper Writing	Seminar/Colloquium based on core contents related to parent discipline/department/branch of Engineering
		Comprehensive Viva-Voce	Viva-voce covering all the PG subjects studied during the course work and related aspects
2	Elective Courses (ElE)	PE - Professional Electives	Includes elective subjects related to the parent discipline/department/branch of Engineering
		OE - Open Electives	Elective subjects which include inter-disciplinary subjects or subjects in an area outside the parent discipline/department/ branch of Engineering
Total number of Credits			

4.0 Course Registration

4.1 A 'Faculty Advisor or Counselor' shall be assigned to each specialization, who will advise on the Post Graduate Programme (PGP), its Course Structure and Curriculum, Choice/Option for Subjects/ Courses, based on his competence, progress, pre-requisites and interest.

4.2 The Academic Section of the College invites 'Registration Forms' from students within 15 days from the commencement of class work through 'ON-LINE SUBMISSIONS', ensuring

marks and Letter Grade alone will be indicated in the Grade Card/Marks Memo, as a performance measure, subject to completion of the attendance and academic requirements as stated in items 5 and 6.1 - 6.3.

6.6 When a student is detained due to shortage of attendance in any subject(s) in any semester, no Grade allotment will be made for such subject(s). However, he is eligible for re-registration of such subject(s) in the subsequent semester(s), as and when next offered, with the academic regulations of the batch into which he is re-registered, by paying the prescribed fees per subject. In all these re-registration cases, the student shall have to secure a fresh set of internal marks and Semester End Examination marks for performance evaluation in such subject(s), and SGPA/CGPA calculations.

6.7 A student eligible to appear for the Semester End Examination in any subject, but absent from it or failed (failing to secure 'B' Grade or above), may reappear for that subject at the supplementary examination as and when conducted. In such cases, his Internal Marks assessed earlier for that subject will be carried over, and added to the marks secured in the supplementary examination, for the purpose of evaluating his performance in that subject.

6. 8 A Student who fails to earn 88 credits as per the specified course structure, and as indicated above, within **four** academic years from the date of commencement of his first year first semester, shall forfeit his seat in M.Tech. programme and his admission **shall stand cancelled.**

7.0 Evaluation - Distribution and Weightage of Marks

The performance of a student in each semester shall be evaluated subject- wise (irrespective of credits assigned) for a maximum of 100 marks. The M.Tech. project work (major project) will also be evaluated for 100 marks.

7.1 For the theory subjects 75 marks shall be awarded for the performance in the Semester End Examination and 25 marks shall be awarded for Continuous Internal Evaluation (CIE). The Continuous Internal Evaluation shall be made based on the average of the marks secured in the two Mid-Term Examinations conducted, first Mid-Term examinations in the middle of the Semester and second Mid-Term examinations during the last week of instruction. Each Mid-Term Examination shall be conducted for a total duration of 120 minutes with Part 'A' as compulsory consisting of 5 questions carrying 2 marks each (10 marks), and Part 'B' with 3 questions to be answered out of 5 questions, each question carrying 5 marks (15 marks). The details of the Question Paper pattern for Semester End Examination (Theory) are given below:

- The Semester End Examination will be conducted for 75 marks. It consists of two parts. i).Part A for 25 marks, ii). Part B for 50 marks.
- Part A is compulsory and consists of 5 questions, one from each unit and carrying 5 marks each.
- Part B consists of 5 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

7.2 For practical subjects, 75 marks shall be awarded for performance in the Semester End Examinations and 25 marks shall be awarded for day-to-day performance as Internal Marks.

7.3 For conducting laboratory end examinations of all PG Programmes, one internal examiner and one external examiner are to be appointed by the Principal of the College and this is to be informed to the Director of Evaluation within two weeks, before commencement of the lab end examinations. The external examiner should be selected from outside the College concerned but within the cluster. No external examiner should be appointed from any other College in the same cluster/any other cluster which is run by the same Management.

7.4 There shall be two seminar presentations during I year I semester and II semester respectively. For seminar, a student shall collect the literature on the advanced topic in relevant fields and critically review the literature and submit it to the department in a form of report and shall make an oral presentation before the Department Academic Committee consisting of Head of the Department, seminar coordinator and two other senior faculty members of the department. For each Seminar there will be only internal evaluation for 100 marks. A candidate has to secure a minimum of 50% of marks to be declared successful. If he fails to obtain the minimum mark, he has to reappear for the seminar during the supplementary examinations. The word 'Seminar' implies presentation of Technical Report, presentation/ discussion on the state of Art of Technology.

7.5 Technical Paper Writing shall cover concepts of abstract, introduction, material and methods, conclusion, references, acknowledgement etc of advanced topics in a branch of Engineering through the medium of attending seminars/ referring to peer reviewed journals, which will enhance the skill of writing technical reports. The students shall not be required to give oral presentation of technical paper. The report shall be presented as a printed document for evaluation. Evaluation shall be made solely by the teacher, but may be moderated by committees appointed by the Head of the Department as per Institute rules.

7.6 There shall be a Comprehensive Viva-Voce in II year I Semester. The Comprehensive Viva-Voce is intended to assess the student's understanding of various subjects he has studied during the M.Tech. course of study. The Head of the Department shall be associated with the conduct of the Comprehensive Viva-Voce through a Committee. The Committee shall consist of Head of the Department, one senior faculty member and an external examiner. The external examiner shall be appointed by the Principal of the college concerned and this is to be informed to the Director of Evaluation within two weeks. The external examiner should be selected from outside the College concerned but within the cluster. No external examiner should be appointed from any other College in the same cluster/any other cluster which is run by the same Management. There are no internal marks for the Comprehensive Viva-Voce and it is evaluated for a maximum of 100 marks. A candidate has to secure a minimum of 50% of marks to be declared successful. If he fails to obtain the minimum marks, he has to reappear for the viva-voce during the supplementary examinations.

7.7 Every candidate shall be required to submit a thesis or dissertation on a topic approved by the Project Review Committee.

7.8 A Project Review Committee (PRC) shall be constituted with the Head of the Department as Chairperson, Project Supervisor and one senior faculty member of the Departments offering the M. Tech. programme.

7.9 Registration of Project Work: A candidate is permitted to register for the project work after satisfying the attendance requirement in all the subjects, both theory and practicals.

7.10 After satisfying 7.9, a candidate has to present in Project Work Review I, in consultation with his Project Supervisor, the title, objective and plan of action of his project work to the

Project Work Review Committee (PRC) for approval within four weeks from the commencement of Second year First Semester. Only after obtaining the approval of the PRC can the student initiate the Project work.

7.11 If a candidate wishes to change his supervisor or topic of the project, he can do so with the approval of the PRC. However, the PRC shall examine whether or not the change of topic/supervisor leads to a major change of his initial plans of project proposal. If yes, his date of registration for the project work starts from the date of change of Supervisor or topic as the case may be.

7.12 A candidate shall submit his project progress report in two stages at least with a gap of **three** months between them.

7.13 The work on the project shall be initiated at the beginning of the II year and the duration of the project is two semesters. A candidate is permitted to submit Project Thesis only after successful completion of all theory and practical courses with the approval of PRC not earlier than 40 weeks from the date of approval of the project work. For the approval of PRC the candidate shall submit the draft copy of thesis to the Head of the Department and make an oral presentation before the PRC.

7.14 The Project Work Review II in II Year I Sem. carries internal marks of 100. Evaluation should be done by the PRC for 50 marks and the Supervisor will evaluate the work for the other 50 marks. The Supervisor and PRC will examine the Problem Definition, Objectives, Scope of Work, Literature Survey in the same domain and progress of the Project Work. A candidate has to secure a minimum of 50% of marks to be declared successful in Project Work Review II. If he fails to obtain the minimum required marks, he has to reappear for Project Work Review-II as and when conducted.

7.15 The Project Work Review III in II Year II Sem. carries 100 internal marks. Evaluation should be done by the PRC for 50 marks and the Supervisor will evaluate it for the other 50 marks. The PRC will examine the overall progress of the Project Work and decide whether or not the Project is eligible for final submission. A candidate has to secure a minimum of 50% of marks to be declared successful in Project Work Review III. If he fails to obtain the required minimum marks, he has to reappear for Project Work Review III as and when conducted. For Project Evaluation (Viva Voce) in II Year II Sem. there are external marks of 100 and it is evaluated by the external examiner. The candidate has to secure a minimum of 50% marks in Project Evaluation (Viva-Voce) examination.

7.16 Project Work Reviews II and III shall be conducted in phase I (Regular) and Phase II (Supplementary). Phase II will be conducted only for unsuccessful students in Phase I. The unsuccessful students in Project Work Review II (Phase II) shall reappear for it at the time of Project Work Review III (Phase I). These students shall reappear for Project Work Review III in the next academic year at the time of Project Work Review II only after completion of Project Work Review II, and then Project Work Review III follows. The unsuccessful students in Project Work Review III (Phase II) shall reappear for Project Work Review III in the next academic year only at the time of Project Work Review II (Phase I).

7.17 After approval from the PRC, a soft copy of the thesis should be submitted for ANTI-PLAGIARISM check and the plagiarism report should be submitted to the University and be included in the final thesis. The Thesis will be accepted for submission, if the similarity index is less than **30%**. If the similarity index has more than the required percentage, the

student is advised to modify accordingly and re-submit the soft copy of the thesis after one month. The maximum number of re-submissions of thesis after plagiarism check is limited to TWO. The candidate has to register for the Project work and work for two semesters. After three attempts, the admission is liable to be cancelled. The college authorities are advised to make plagiarism check of every soft copy of theses before submissions.

7.18 Three copies of the Project Thesis certified by the supervisor shall be submitted to the College/School/Institute, after submission of a research paper related to the project work in a UGC approved journal. A copy of the submitted research paper shall be attached to thesis.

7.19 The thesis shall be adjudicated by an external examiner selected by the University. For this, the Principal of the College/School/Institute shall submit a panel of **three** examiners from among the list of experts in the relevant specialization as submitted by the supervisor concerned and Head of the Department.

7.20 If the report of the external examiner is unsatisfactory, the candidate shall revise and resubmit the Thesis. If the report of the examiner is unsatisfactory again, the thesis shall be summarily rejected. Subsequent actions for such dissertations may be considered, only on the specific recommendations of the external examiner and /or Project work Review Committee. No further correspondence in this matter will be entertained, if there is no specific recommendation for resubmission.

7.21 If the report of the examiner is satisfactory, the Head of the Department shall coordinate and make arrangements for the conduct of Project Viva- Voce examination. The Project Viva-Voce examination shall be conducted by a board consisting of the Supervisor, Head of the Department and the external examiner who adjudicated the Thesis. The candidate has to secure a minimum of 50% of marks in Project Evaluation (Viva-Voce) examination.

7.22 If he fails to fulfill the requirements as specified in 7.21, he will reappear for the Viva-Voce examination only after three months. In the reappeared examination also, if he fails to fulfill the requirements, he will not be eligible for the award of the degree, unless he is asked to revise and resubmit his project work by the board within a specified time period (within **four** years from the date of commencement of his first year first semester).

7.23 The Project Viva-Voce External examination marks must be submitted to the University on the day of the examination.

8.0 Re-Admission/Re-Registration

8.1 Re-Admission for Discontinued Student

A student, who has discontinued the M.Tech. degree programme due to any reason whatsoever, may be considered for '**readmission**' into the same degree programme (with the same specialization) with the academic regulations of the batch into which he gets readmitted, with prior permission from the authorities concerned, subject to item 6.6.

8.2 If a student is detained in a subject (s) due to shortage of attendance in any semester, he may be permitted to **re-register** for the same subject(s) in the same category (core or elective group) or equivalent subject, if the same subject is not available, as suggested by the Board of Studies of that department, as and when offered in the subsequent semester(s), with the

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech in STRUCTURAL ENGINEERING
Effective from Academic Year 2017- 18 admitted batch

COURSE STRUCTURE AND SYLLABUS

I Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-1	Theory of Elasticity	25	75	4	0	0	4
PC-2	Structural Dynamics	25	75	4	0	0	4
PC-3	Advanced Structural Analysis	25	75	4	0	0	4
PE-1	Advanced Concrete Technology Tall Buildings Advanced Foundation Engineering	25	75	**3**	0	0	3
PE-2	Advanced R.C. Design Soil Dynamic & Foundation Engineering Plastic Analysis & Design	25	75	**3**	0	0	3
OE-1	***Open Elective -I**	25	75	3	0	0	3
Laboratory I	Advanced Structural Engineering Laboratory	25	75	0	0	3	2
Seminar I	Seminar-I	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

II Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-4	Advanced Steel Design	25	75	4	0	0	4
PC-5	Theory of Plates	25	75	4	0	0	4
PC-6	Pre-stressed Concrete	25	75	4	0	0	4
PE-3	Finite Element Method Bridge Engineering Design of Sub Structures	25	75	**3**	0	0	3
PE4	Earthquake Resistant Design of Buildings Repair & Rehabilitation of Buildings Stability of Structures	25	75	**3**	0	0	3
OE-2	***Open Elective – II**	25	75	3	0	0	3
Laboratory II	CAD Lab	25	75	0	0	3	2
Seminar II	Seminar-II	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

III Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Technical Paper Writing	100	0	0	3	0	2
Comprehensive Viva-Voce	0	100	0	0	0	4
Project work Review II	100	0	0	0	22	8
Total	**200**	**100**	0	**3**	22	**14**

IV Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Project work Review III	100	0	0	0	24	8
Project Evaluation (Viva-Voce)	0	100	0	0	0	16
Total	**100**	**100**	**0**	**0**	**24**	**24**

***Open Elective subjects must be chosen from the list of open electives offered by OTHER departments.**

 # For Project review I, please refer 7.10 in R17 Academic Regulations.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. TECH. (ELECTRICAL POWER SYSTEMS/ POWER SYSTEM CONTROL AND AUTOMATION/ ELECTRICAL POWER ENGINEERING)

EFFECTIVE FROM ACADEMIC YEAR 2017- 18 ADMITTED BATCH

COURSE STRUCTURE AND SYLLABUS

I Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-1	Advanced Power System Analysis	25	75	4	0	0	4
PC-2	Advanced Power System Protection	25	75	4	0	0	4
PC-3	Modern Control Theory	25	75	4	0	0	4
PE-1	1. EHV AC Transmission 2. High Voltage Engineering 3. Advanced Digital Signal Processing	25	75	3	0	0	3
PE-2	1. Power Quality 2. Microcontrollers and applications 3. Distribution Automation	25	75	3	0	0	3
OE-1	***Open Elective – I**	25	75	3	0	0	3
Laboratory I	Power & Energy Systems Lab - I	25	75	0	0	3	2
Seminar I	Seminar – I	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

II Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-4	Power System Dynamics and Control	25	75	4	0	0	4
PC-5	Flexible AC Transmission Systems (FACTS)	25	75	4	0	0	4
PC-6	Power System Operation and Deregulation	25	75	4	0	0	4
PE-3	1. Gas Insulated Systems(GIS) 2. Programmable Logic Controllers and applications 3. Energy Auditing Conservation and Management	25	75	**3**	0	0	3
PE4	1. Reactive Power Compensation and Management 2. Power System Reliability 3. Voltage Stability	25	75	**3**	0	0	3
OE-2	***Open Elective – II**	25	75	3	0	0	3
Laboratory II	Power & Energy Systems Lab - II	25	75	0	0	3	2
Seminar II	Seminar –II	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

III Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Technical Paper Writing	100	0	0	3	0	2
Comprehensive Viva-Voce	0	100	0	0	0	4
Project work Review II	100	0	0	0	22	8
Total	**200**	**100**	0	**3**	22	**14**

IV Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Project work Review III	100	0	0	0	24	8
Project Evaluation (Viva-Voce)	0	100	0	0	0	16
Total	**100**	**100**	**0**	**0**	**24**	**24**

***Open Elective subjects must be chosen from the list of open electives offered by OTHER departments.**

 # For Project review I, please refer 7.10 in R17 Academic Regulations.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. TECH IN EMBEDDED SYSTEMS.
EFFECTIVE FROM ACADEMIC YEAR 2017- 18 ADMITTED BATCH

COURSE STRUCTURE AND SYLLABUS

I Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-1	Embedded System Design	25	75	4	0	0	4
PC-2	ARM Processor Architectures	25	75	4	0	0	4
PC-3	Real Time Operating Systems	25	75	4	0	0	4
PE-1	Advanced Computer Architecture CMOS VLSI Design CPLD and FPGA Architectures and Applications	25	75	**3**	0	0	3
PE-2	Digital System Design Embedded C TCP / IP Internetworking	25	75	**3**	0	0	3
OE-1	***Open Elective – I**	25	75	3	0	0	3
Laboratory I	Embedded Systems Laboratory	25	75	0	0	3	2
Seminar I	Seminar	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

II Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-4	Embedded Computing	25	75	4	0	0	4
PC-5	System On Chip Architecture	25	75	4	0	0	4
PC-6	Sensors and Actuators	25	75	4	0	0	4
PE-3	Design for Testability Wireless Communication and Networks Scripting Languages	25	75	**3**	0	0	3
PE4	Advanced Digital Signal Processors Network Security and Cryptography Hardware Software Co-Design	25	75	**3**	0	0	3
OE-2	***Open Elective – II**	25	75	3	0	0	3
Laboratory II	Advanced Embedded Systems Laboratory	25	75	0	0	3	2
Seminar II	Seminar	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

III Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Technical Paper Writing	100	0	0	3	0	2
Comprehensive Viva-Voce	0	100	0	0	0	4
Project work Review II	100	0	0	0	22	8
Total	**200**	**100**	0	**3**	22	**14**

IV Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Project work Review III	100	0	0	0	24	8
Project Evaluation (Viva-Voce)	0	100	0	0	0	16
Total	**100**	**100**	**0**	**0**	**24**	**24**

***Open Elective subjects must be chosen from the list of open electives offered by OTHER departments.**

 # For Project review I, please refer 7.10 in R17 Academic Regulations.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. TECH. IN WIRELESS AND MOBILE COMMUNICATIONS.
EFFECTIVE FROM ACADEMIC YEAR 2017- 18 ADMITTED BATCH

COURSE STRUCTURE AND SYLLABUS

I Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-1	Wireless Communications & Networks	25	75	4	0	0	4
PC-2	Random Processes and Time Series Analysis	25	75	4	0	0	4
PC-3	Advanced Data Communications	25	75	4	0	0	4
PE-1	Detection and Estimation Theory Radio Navigational Aids Coding Theory and Techniques	25	75	**3**	0	0	3
PE-2	Voice over Internet Protocol Queuing Theory and Applications TCP/IP Internetworking	25	75	**3**	0	0	3
OE-1	***Open Elective – I**	25	75	3	0	0	3
Laboratory I	Wireless Communications and Networks Lab	25	75	0	0	3	2
Seminar I	Seminar	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

II Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-4	Advanced Communication Systems	25	75	4	0	0	4
PC-5	Spread Spectrum Communications	25	75	4	0	0	4
PC-6	Adhoc Wireless Networks	25	75	4	0	0	4
PE-3	Optical Communications and Networks Wireless LANs and PANs Wireless Sensor Networks	25	75	**3**	0	0	3
PE4	Network Security and Cryptography Software Defined Radio 3G Networks	25	75	**3**	0	0	3
OE-2	***Open Elective – II**	25	75	3	0	0	3
Laboratory II	Advanced Communications Lab	25	75	0	0	3	2
Seminar II	Seminar	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

III Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Technical Paper Writing	100	0	0	3	0	2
Comprehensive Viva-Voce	0	100	0	0	0	4
Project work Review II	100	0	0	0	22	8
Total	**200**	**100**	0	**3**	22	**14**

IV Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Project work Review III	100	0	0	0	24	8
Project Evaluation (Viva-Voce)	0	100	0	0	0	16
Total	**100**	**100**	**0**	**0**	**24**	**24**

***Open Elective subjects must be chosen from the list of open electives offered by OTHER departments.**

 # For Project review I, please refer 7.10 in R17 Academic Regulations.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech in CAD/CAM

Effective from Academic Year 2017- 18 admitted batch

COURSE STRUCTURE AND SYLLABUS

I Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-1	Advanced CAD	25	75	4	0	0	4
PC-2	Computer Aided Manufacturing	25	75	4	0	0	4
PC-3	Advanced FEM	25	75	4	0	0	4
PE-1	1. Mechanical Behavior of Materials 2. Stress Analysis and Vibration 3. Additive Manufacturing Technologies	25	75	**3**	0	0	3
PE-2	1. Automation in Manufacturing 2. Computer Aided Process Planning 3. Performance Modeling and Analysis of Manufacturing Systems	25	75	**3**	0	0	3
OE-1	***Open Elective - I**	25	75	3	0	0	3
Laboratory I	Advanced CAD/CAM Laboratory	25	75	0	0	3	2
Seminar I	Seminar-I	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

II Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-4	Design for Manufacturing And Assembly	25	75	4	0	0	4
PC-5	Flexible Manufacturing Systems	25	75	4	0	0	4
PC-6	Industrial Robotics	25	75	4	0	0	4
PE-3	1. Intelligent Manufacturing Systems 2. Special Manufacturing Process 3. Optimization Techniques and Applications	25	75	**3**	0	0	3
PE4	1. Advanced Mechatronics 2. MEMS and Micro Systems **:** Design and Manufacture 3. Fuzzy Logic and Neural Networks	25	75	**3**	0	0	3
OE-2	***Open Elective - II**	25	75	3	0	0	3
Laboratory II	Manufacturing simulation & Precision Engineering lab	25	75	0	0	3	2
Seminar II	Seminar-II	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

III Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Technical Paper Writing	100	0	0	3	0	2
Comprehensive Viva-Voce	0	100	0	0	0	4
Project work Review II	100	0	0	0	22	8
Total	**200**	**100**	0	**3**	22	**14**

IV Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Project work Review III	100	0	0	0	24	8
Project Evaluation (Viva-Voce)	0	100	0	0	0	16
Total	**100**	**100**	**0**	**0**	**24**	**24**

***Open Elective subjects must be chosen from the list of open electives offered by OTHER departments.**

 # For Project review I, please refer 7.10 in R17 Academic Regulations.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. TECH (POWER ELECTRONICS/ POWER AND INDUSTRIAL DRIVES/ POWER ELECTRONICS AND ELECTRIC DRIVES)

EFFECTIVE FROM ACADEMIC YEAR 2017- 18 ADMITTED BATCH

COURSE STRUCTURE AND SYLLABUS

I Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-1	Machine Modeling and Analysis	25	75	4	0	0	4
PC-2	Modern Control Theory	25	75	4	0	0	4
PC-3	Power Electronic Devices and Converters	25	75	4	0	0	4
PE-1	1. Special Machines 2. High Frequency Magnetic Components 3. Programmable Logic Controllers and Applications	25	75	3	0	0	3
PE-2	1. Electric Traction systems 2. Advanced Digital Signal Processing 3. Digital Control Systems	25	75	3	0	0	3
OE-1	***Open Elective – I**	25	75	3	0	0	3
Laboratory I	Power Converters Simulation Lab	25	75	0	0	3	2
Seminar I	Seminar - I	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

II Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-4	Power Electronic Applications to Renewable Energy	25	75	4	0	0	4
PC-5	Embedded Systems for Power Electronic Applications	25	75	4	0	0	4
PC-6	Power Electronic Control of Drives	25	75	4	0	0	4
PE-3	1. HVDC & FACTS 2. Switched Mode Power Supplies (SMPS) 3. AI Techniques in Electrical Engineering	25	75	3	0	0	3
PE4	1. Dynamics of Electrical Machines 2. Hybrid Electric Vehicles 3. Smart Grid Technologies	25	75	3	0	0	3
OE-2	***Open Elective – II**	25	75	3	0	0	3
Laboratory II	Power Converters and Drives Lab	25	75	0	0	3	2
Seminar II	Seminar -II	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

III Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Technical Paper Writing	100	0	0	3	0	2
Comprehensive Viva-Voce	0	100	0	0	0	4
Project work Review II	100	0	0	0	22	8
Total	**200**	**100**	0	**3**	22	**14**

IV Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Project work Review III	100	0	0	0	24	8
Project Evaluation (Viva-Voce)	0	100	0	0	0	16
Total	**100**	**100**	**0**	**0**	**24**	**24**

***Open Elective subjects must be chosen from the list of open electives offered by OTHER departments.**

 # For Project review I, please refer 7.10 in R17 Academic Regulations.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. TECH IN VLSI/ VLSI DESIGN/VLSI SYSTEM DESIGN.
EFFECTIVE FROM ACADEMIC YEAR 2017- 18 ADMITTED BATCH

COURSE STRUCTURE AND SYLLABUS

I Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-1	Advanced Digital System Design	25	75	4	0	0	4
PC-2	Device Modeling	25	75	4	0	0	4
PC-3	CMOS Analog Integrated Circuit Design	25	75	4	0	0	4
PE-1	VLSI Technology Hardware Software Co-Design CPLD and FPGA Architectures and Applications	25	75	**3**	0	0	3
PE-2	Algorithms for VLSI Design Automation Embedded System Design Advanced Computer Architecture	25	75	**3**	0	0	3
OE-1	***Open Elective – I**	25	75	3	0	0	3
Laboratory I	Digital IC Design Lab	25	75	0	0	3	2
Seminar I	Seminar	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

II Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-4	Low Power VLSI Design	25	75	4	0	0	4
PC-5	Design for Testability	25	75	4	0	0	4
PC-6	CMOS Mixed Signal Circuit Design	25	75	4	0	0	4
PE-3	VLSI and DSP Architectures Full custom IC Design Verilog Hardware Description Language	25	75	**3**	0	0	3
PE4	RF IC Design System On Chip Architecture Scripting Languages	25	75	**3**	0	0	3
OE-2	***Open Elective – II**	25	75	3	0	0	3
Laboratory II	Analog IC Design Lab	25	75	0	0	3	2
Seminar II	Seminar	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

III Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Technical Paper Writing	100	0	0	3	0	2
Comprehensive Viva-Voce	0	100	0	0	0	4
Project work Review II	100	0	0	0	22	8
Total	**200**	**100**	0	**3**	22	**14**

IV Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Project work Review III	100	0	0	0	24	8
Project Evaluation (Viva-Voce)	0	100	0	0	0	16
Total	**100**	**100**	**0**	**0**	**24**	**24**

***Open Elective subjects must be chosen from the list of open electives offered by OTHER departments.**

 # For Project review I, please refer 7.10 in R17 Academic Regulations.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech in COMPUTER SCIENCE AND ENGINEERING
Common to (CS, CSE)

EFFECTIVE FROM ACADEMIC YEAR 2017- 18 ADMITTED BATCH

COURSE STRUCTURE AND SYLLABUS

I Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-1	Advanced Algorithms	25	75	4	0	0	4
PC-2	Computer Networking	25	75	4	0	0	4
PC-3	Software Engineering	25	75	4	0	0	4
PE-1	1. Network Security and Cryptography 2. Mobile Application Development 3. Graph Theory 4. Internet of Things	25	75	**3**	0	0	3
PE-2	1. Game Theory 2. Parallel and Distributed Algorithms 3. Software Architecture and Design Patterns 4. Embedded Systems	25	75	**3**	0	0	3
OE-1	***Open Elective – 1**	25	75	3	0	0	3
Laboratory I	Advanced Algorithms Lab	25	75	0	0	3	2
Seminar I	Seminar-I	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

II Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-4	Network Programming	25	75	4	0	0	4
PC-5	Distributed Systems and Cloud Computing	25	75	4	0	0	4
PC-6	Theory of Computation	25	75	4	0	0	4
PE-3	1. Data Warehousing and Data Mining 2. Storage Area Networks 3. Semantic Web and Social Networks 4. Cyber Security	25	75	**3**	0	0	3
PE4	1. Big Data Analytics 2. Soft Computing 3. Software Process and Project Management 4. Machine Learning	25	75	**3**	0	0	3
OE-2	***Open Elective – 2**	25	75	3	0	0	3
Laboratory II	Internet Technologies and Services Lab	25	75	0	0	3	2
Seminar II	Seminar -II	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

III Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Technical Paper Writing	100	0	0	3	0	2
Comprehensive Viva-Voce	0	100	0	0	0	4
Project work Review II	100	0	0	0	22	8
Total	**200**	**100**	0	**3**	22	**14**

IV Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Project work Review III	100	0	0	0	24	8
Project Evaluation (Viva-Voce)	0	100	0	0	0	16
Total	**100**	**100**	**0**	**0**	**24**	**24**

***Open Elective subjects must be chosen from the list of open electives offered by OTHER departments.**

 # For Project review I, please refer 7.10 in R17 Academic Regulations.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
(Established by Act No.30 of 2008)
Kukatpally, Hyderabad–500085, Telangana State (India)

Academic Regulations of M.Tech (Regular/Full Time) Programmes, 2019-20 (R19)
(CBCS)
(Effective for the students admitted into I year from the Academic Year 2019-20 and onwards)

1.0 **Post-Graduate Degree Programmes in Engineering & Technology (PGP in E & T)** Jawaharlal Nehru Technological University Hyderabad (JNTUH) offers **Two** Years (**Four** Semesters) full-time Master of Technology (M. Tech.) Degree programmes, under Choice Based Credit System (CBCS) at its constituent (non-autonomous) and affiliated colleges in different branches of Engineering and Technology with different specializations.

2.0 Eligibility for Admissions

2.1 Admission to the PGPs shall be made subject to eligibility, qualification and specializations prescribed by the University from time to time, for each specialization under each M.Tech programme.

2.2 Admission to the post graduate programme shall be made on the basis of either the merit rank or Percentile obtained by the qualified student in the relevant qualifying GATE Examination/ the merit rank obtained by the qualified student in an entrance test conducted by Telangana State Government (PGECET) for M.Tech. programmes / an entrance test conducted by JNTUH/ on the basis of any other exams approved by the University, subject to reservations as laid down by the Govt. from time to time.

2.3 The medium of instructions for all PG Programmes will be **ENGLISH** only.

3.0 M.Tech. Programme (PGP in E & T) Structure

3.1 The M.Tech Programmes in E & T of JNTUH are of Semester pattern, with **Four** Semesters consisting of **Two** academic years, each academic year having **Two** Semesters (First/Odd and Second/Even Semesters). Each Semester shall be of 22 weeks duration (inclusive of Examinations), with a minimum of 90 instructional days per Semester.

3.2 The student shall not take more than four academic years to fulfill all the academic requirements for the award of M.Tech. degree from the date of commencement of first year first semester, failing which the student shall forfeit the seat in M.Tech. programme.

3.3 **UGC/AICTE** specified definitions/descriptions are adopted appropriately for various terms and abbreviations used in these PG academic regulations, as listed below:

3.3.1 Semester Scheme

Each Semester shall have 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) are taken as 'references' for the present set of Regulations. The terms 'SUBJECT' and 'COURSE' imply the same meaning here and refer to 'Theory Subject', or 'Lab Course', or 'Design/Drawing Subject', or 'Mini Project with Seminar', or 'Dissertation', as the case may be.

3.3.2 Credit Courses

All subjects/courses are to be registered by the student in a semester to earn credits which shall be assigned to each subject/course in an L: T: P: C (Lecture Periods: Tutorial Periods: Practical Periods:

Credits) structure based on the following general pattern:

- One credit for one hour/week/semester for theory/lecture (L) courses
- One credit for two hours/ week/semester for laboratory/ practical (P) courses or tutorials (T)

Other student activities like study tour, guest lecture, conference/workshop participations, technical paper presentations and mandatory courses (***Audit Courses***) will not carry any credits.

3.3.3 Subject Course Classification

All subjects/courses offered for the Post-Graduate Programme in E & T (M.Tech Degree Programme) are broadly classified as follows. The University has followed in general the guidelines issued by AICTE/UGC.

S.No.	Broad Course Classification	Course Group/ Category	Course Description
1	Core Courses (CoC)	PC- Professional Core	Includes subjects related to the parent discipline/department/ branch of Engineering
		Dissertation	M.Tech Project or PG Project or Major Project
		Mini Project with Seminar	Seminar based on core contents related to Parent Discipline/ Department/ Branch of Engineering
2	Elective Courses (EıE)	PE - Professional Electives	Includes elective subjects related to the parent discipline/department/branch of Engineering
		OE - Open Electives	Elective subjects which include inter-disciplinary subjects or subjects in an area outside the parent discipline/department/ branch of Engineering
3	***Mandatory Courses***	--	***Non-Credit Audit Courses***

4.0 Course Registration

4.1 A 'Faculty Advisor or Counselor' shall be assigned to each specialization, who will advise on the Post Graduate Programme (PGP), its Course Structure and Curriculum, Choice/Option for Subjects/ Courses, based on his competence, progress, pre-requisites and interest.

4.2 The Academic Section of the College invites 'Registration Forms' from students within 15 days from the commencement of class work through 'ON-LINE SUBMISSIONS', ensuring 'DATE and TIME Stamping'. The ON-LINE Registration Requests for any 'CURRENT SEMESTER' shall be completed BEFORE the commencement of SEEs (Semester End Examinations) of the 'PRECEDING SEMESTER'.

4.3 A Student can apply for ON-LINE Registration, ONLY AFTER obtaining the 'WRITTEN APPROVAL' from his Faculty Advisor, which should be submitted to the College Academic Section through the Head of Department (a copy of it being retained with Head of Department, Faculty Advisor and the Student).

4.4 If the Student submits ambiguous choices or multiple options or erroneous entries during ON-LINE Registration for the Subject(s) / Course(s) under a given/ specified Course Group/ Category as listed

in the Course Structure, only the first mentioned Subject/ Course in that Category will be taken into consideration.

4.5 Subject/ Course Options exercised through ON-LINE Registration are final and CANNOT be changed, nor can they be inter-changed; further, alternate choices also will not be considered. However, if the Subject/ Course that has already been listed for Registration by the University in a Semester could not be offered due to unforeseen or unexpected reasons, then the Student will be allowed to have alternate choice either for a new Subject, if it is offered, or for another existing Subject (subject to availability of seats). Such alternate arrangements will be made by the Head of Department, with due notification and time-framed schedule, within the FIRST WEEK from the commencement of Class-work for that Semester.

5.0 Attendance Requirements

The programmes are offered based on a unit system with each subject being considered a unit. Attendance is calculated separately for each subject.

5.1 Attendance in all classes (Lectures/Laboratories) is compulsory. The minimum required attendance in each theory subject (***also mandatory(audit) courses***) including the attendance of mid-term examination / Laboratory etc. is 75%. Two periods of attendance for each theory subject shall be considered, if the student appears for the mid-term examination of that subject. ***This attendance should also be included in the fortnightly upload of attendance to the University. The attendance of mandatory(audit) courses should be uploaded separately to the University.*** A student shall not be permitted to appear for the Semester End Examinations (SEE), if his attendance is less than 75%.

5.2 A student's Seminar report and presentation on Mini Project shall be eligible for evaluation, only if he ensures a minimum of 75% of his attendance in Seminar presentation classes on Mini Project during that Semester.

5.3 **Condoning of shortage of attendance** (between 65% and 75%) up to a maximum of 10% (considering the days of attendance in sports, games, NCC, NSS activities and Medical grounds) in each subject (Theory/Lab/Mini Project with Seminar) of a semester shall be granted by the College Academic Committee on genuine reasons.

5.4 A prescribed fee per subject shall be payable for condoning shortage of attendance after getting the approval of College Academic Committee for the same. The College Academic Committee shall maintain relevant documents along with the request from the student.

5.5 Shortage of Attendance below 65% in any subject shall in **no case be condoned.**

5.6 A Student, whose shortage of attendance is not condoned in any Subject(s) (Theory/Lab/Mini Project with Seminar) in any Semester, is considered as 'Detained in that Subject(s), and is not eligible to write Semester End Examination(s) of such Subject(s), (in case of Mini Project with Seminar, his/her Mini Project with Seminar Report or Presentation are not eligible for evaluation) in that Semester; and he/she has to seek re-registration for those Subject(s) in subsequent Semesters, and attend the same as and when offered.

5.7 A student fulfills the attendance requirement in the present semester, shall not be eligible for readmission into the same class.

5.8 **a)** A student shall put in a minimum required attendance in at least **three theory subjects (excluding *mandatory(audit)* course)** in first Year I semester for promotion to first Year II

Semester.

b) A student shall put in a minimum required attendance in at least **three theory subjects (excluding *mandatory(audit)* course)** in first Year II semester for promotion to second Year I Semester.

6.0 Academic Requirements

The following academic requirements must be satisfied, in addition to the attendance requirements mentioned in item no. 5. The performance of the candidate in each semester shall be evaluated subject-wise, with a maximum of 100 marks per subject / course (theory / practical), based on Internal Evaluation and Semester End Examination.

6.1 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course, if he secures not less than 40% of marks (30 out of 75 marks) in the End Semester Examination, and a minimum of 50% of marks in the sum total of CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of Letter Grades and this implies securing 'B' Grade or above in a subject.

6.2 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to Mini Project with seminar, if student secures not less than 50% marks (i.e. 50 out of 100 allotted marks). The student would be treated as failed, if student (i) does not submit a seminar report on Mini Project or does not make a presentation of the same before the evaluation committee as per schedule or (ii) secures less than 50% marks in Mini Project with seminar evaluation. The failed student shall reappear for the above evaluation when the notification for supplementary examination is issued.

6.3 A student shall register for all subjects for total of **68** credits as specified and listed in the course structure for the chosen specialization, put in the required attendance and fulfill the academic requirements for securing **68** credits obtaining a minimum of 'B' Grade or above in each subject, and all **68** credits securing Semester Grade Point Average **(SGPA) ≥6.0** (in each semester) and final Cumulative Grade Point Average **(CGPA)** (i.e., CGPA at the end of PGP**) ≥ 6.0**, and shall ***pass all the mandatory(audit) courses*** to complete the PGP successfully.

Note: (1) The SGPA will be computed and printed on the marks memo only if the candidate passes in all the subjects offered and gets minimum B grade in all the subjects.

(2) CGPA is calculated only when the candidate passes in all the subjects offered in all the semesters

6.4 Marks and Letter Grades obtained in all those subjects covering the above specified **68** credits alone shall be considered for the calculation of final CGPA, which will be indicated in the Grade Card /Marks Memo of second year second semester.

6.5 If a student registers for extra subject(s) (in the parent department or other departments/ branches of Engineering) other than those listed subjects totaling to **68** credits as specified in the course structure, the performance in extra subject(s) (although evaluated and graded using the same procedure as that of the required **68** credits) will not be considered while calculating the SGPA and CGPA. For such extra subject(s) registered, percentage of marks and Letter Grade alone will be indicated in the Grade Card/Marks Memo, as a performance measure, subject to completion of the attendance and academic requirements as stated in items 5 and 6.1 - 6.3.

6.6 When a student is detained due to shortage of attendance in any subject(s) in any semester, no

Grade allotment will be made for such subject(s). However, he is eligible for re-registration of such subject(s) in the subsequent semester(s), as and when next offered, with the academic regulations of the batch into which he is re-registered, by paying the prescribed fees per subject. In all these re-registration cases, the student shall have to secure a fresh set of internal marks and Semester End Examination marks for performance evaluation in such subject(s), and SGPA/CGPA calculations.

6.7 A student eligible to appear for the Semester End Examination in any subject, but absent from it or failed (failing to secure 'B' Grade or above), may reappear for that subject at the supplementary examination as and when conducted. In such cases, his Internal Marks assessed earlier for that subject will be carried over, and added to the marks secured in the supplementary examination, for the purpose of evaluating his performance in that subject.

6. 8 A Student who fails to earn **68** credits as per the specified course structure, and as indicated above, within **four** academic years from the date of commencement of his first year first semester, shall forfeit his seat in M.Tech. programme and his admission **shall stand cancelled.**

7.0 Evaluation - Distribution and Weightage of Marks

The performance of a student in each semester shall be evaluated subject- wise (irrespective of credits assigned) for a maximum of 100 marks.

7.1 For the theory subjects 75 marks shall be awarded for the performance in the Semester End Examination and 25 marks shall be awarded for Continuous Internal Evaluation (CIE). The Continuous Internal Evaluation shall be made based on the average of the marks secured in the two Mid-Term Examinations conducted, first Mid-Term examinations in the middle of the Semester and second Mid-Term examinations during the last week of instruction. Each Mid-Term Examination shall be conducted for a total duration of 120 minutes with Part 'A' as compulsory consisting of 5 questions carrying 2 marks each (10 marks), and Part 'B' with 3 questions to be answered out of 5 questions, each question carrying 5 marks (15 marks). The details of the Question Paper pattern for Semester End Examination (Theory) are given below:

- The Semester End Examination will be conducted for 75 marks. It consists of two parts.

  i) Part A for 25 marks, ii) Part B for 50 marks.
- Part A is compulsory and consists of 5 questions, one from each unit and carrying 5 marks each.
- Part B consists of 5 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

7.2 For practical subjects, 75 marks shall be awarded for performance in the Semester End Examinations and 25 marks shall be awarded for day-to-day performance as Internal Marks.

7.3 For conducting laboratory end examinations of all PG Programmes, one internal examiner and one external examiner are to be appointed by the Principal of the College and this is to be informed to the Director of Evaluation within two weeks, before commencement of the lab end examinations. The external examiner should be selected from outside the College concerned but within the cluster. No external examiner should be appointed from any other College in the same cluster/any other cluster which is run by the same Management.

7.4 There shall be Mini Project with Seminar during I year II semester for internal evaluation of 100 marks. The Departmental Academic Committee (DAC) will review the progress of the mini project during the seminar presentations and evaluate the same for 50 marks. Mini Project Viva Voce will be evaluated by the DAC for another 50 marks before the semester end examinations. Student shall

carryout the mini project in consultation with the mini project supervisor which may include critically reviewing the literature, project implementation and submit it to the department in the form of a report and shall make an oral presentation before the DAC consisting of Head of the Department, Mini Project supervisor and two other senior faculty members of the department. The student has to secure a minimum of 50% of marks in i) seminar presentation and ii) mini project viva voce, to be declared successful. If he fails to obtain the minimum marks, he has to reappear for the same as and when scheduled.

7.5 Every candidate shall be required to submit a dissertation on a topic approved by the Dissertation Review Committee.

7.6 A Dissertation Review Committee (DRC) shall be constituted with the Head of the Department as Chairperson, Dissertation Supervisor and one senior faculty member of the Department offering the M. Tech. programme.

7.7 Registration of Dissertation Work: A candidate is permitted to register for the Dissertation Work after satisfying the attendance requirement in all the subjects, both theory and laboratory.

7.8 After satisfying 7.7, a candidate must present in Dissertation Work Review - I, in consultation with his Dissertation Supervisor, the title, objective and plan of action of his Dissertation work to the Dissertation Review Committee (DRC) for approval within four weeks from the commencement of Second year First Semester. Only after obtaining the approval of the DRC can the student initiate the Dissertation work.

7.9 If a candidate wishes to change his supervisor or topic of the Dissertation, he can do so with the approval of the DRC. However, the DRC shall examine whether or not the change of topic/supervisor leads to a major change of his initial plans of Dissertation proposal. If yes, his date of registration for the project work starts from the date of change of Supervisor or topic as the case may be.

7.10 A candidate shall submit his Dissertation progress report in two stages at least with a gap of **three** months between them.

7.11 The work on the Dissertation shall be initiated at the beginning of the II year and the duration of the Dissertation is two semesters. A candidate is permitted to submit Dissertation Thesis only after successful completion of all theory and practical courses with the approval of DRC not earlier than 40 weeks from the date of approval of the Dissertation work. For the approval of DRC the candidate shall submit the draft copy of thesis to the Head of the Department and make an oral presentation before the DRC.

7.12 The Dissertation Work Review - II in II Year I Sem. carries internal marks of 100. Evaluation should be done by the DRC for 50 marks and the Supervisor will evaluate the work for the other 50 marks. The Supervisor and DRC will examine the Problem Definition, Objectives, Scope of Work, Literature Survey in the same domain and progress of the Dissertation Work. A candidate has to secure a minimum of 50% of marks to be declared successful in Dissertation Work Review - II. If he fails to obtain the minimum required marks, he has to reappear for Dissertation Work Review - II as and when conducted.

7.13 The Dissertation Work Review - III in II Year II Sem. carries 100 internal marks. Evaluation should be done by the DRC for 50 marks and the Supervisor will evaluate it for the other 50 marks. The DRC will examine the overall progress of the Dissertation Work and decide whether or not the Dissertation is eligible for final submission. A candidate has to secure a minimum of 50% of marks to be declared successful in Dissertation Work Review - III. If he fails to obtain the required minimum marks, he has to reappear for Dissertation Work Review - III as and when conducted. For Dissertation Evaluation

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech in STRUCTURAL ENGINEERING
Effective from Academic Year 2019 - 20 admitted batch

R19 COURSE STRUCTURE AND SYLLABUS

I YEAR I – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - I	Theory of Elasticity	3	0	0	3
Professional Core - II	Advanced Structural Analysis	3	0	0	3
Professional Elective - I	1. Theory of Plates and Shells 2. Theory and Applications of Cement Composites 3. Theory of Structural Stability	3	0	0	3
Professional Elective - II	1. Advanced Reinforced Concrete Design 2. Advanced foundation Design of reinforced concrete 3. Numerical Methods in Structural Engineering	3	0	0	3
Lab - I	Numerical Analysis Lab	0	0	4	2
Lab - II	Advanced Concrete Technology Lab	0	0	4	2
	Research Methodology & IPR	2	0	0	2
Audit - I	Audit Course - I	2	0	0	0
	Total	**16**	**0**	**8**	**18**

I YEAR II – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - III	FEM in Structural Engineering	3	0	0	3
Professional Core - IV	Structural Dynamics	3	0	0	3
Professional Elective - III	1. Advanced Steel Design 2. Design of High-Rise Buildings 3. Design of Masonry Structures	3	0	0	3
Professional Elective - IV	1. Soil Structure Interaction. 2. Design of Prestressed concrete Structures 3. Structural Optimization	3	0	0	3
Lab - III	Advanced Structural Engineering Lab	0	0	4	2
Lab - IV	Structural Design Lab	0	0	4	2
	Mini Project with Seminar	0	0	4	2
Audit - II	Audit Course - II	2	0	0	0
	Total	**14**	**0**	**12**	**18**

II YEAR I – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Elective - V	1. Earthquake Resistance Design of Buildings 2. Industrial structures 3. Bridge Engineering	3	0	0	3
Open Elective	Open Elective	3	0	0	3
Dissertation	Dissertation Work Review - II	0	0	12	6
	Total	**6**	**0**	**12**	**12**

II YEAR II - SEMESTER

Course Code	Course Title	L	T	P	Credits
Dissertation	Dissertation Work Review - III	0	0	12	6
Dissertation	Dissertation Viva-Voce	0	0	28	14
	Total	**0**	**0**	**40**	**20**

***For Dissertation Work Review - I, Please refer 7.8 in R19 Academic Regulations.**

Audit Course I & II:

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
7. Stress Management by yoga
8. Personality Development Through Life Enlightenment Skills

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. TECH. (CAD/CAM)

EFFECTIVE FROM ACADEMIC YEAR 2019- 20 ADMITTED BATCH

R19 COURSE STRUCTURE AND SYLLABUS

I Year I Semester

Course Code	Course Title	L	T	P	Credits
Professional Core - I	Advanced CAD	3	0	0	3
Professional Core - II	Computer Aided Manufacturing	3	0	0	3
Professional Elective - I	1. Mechanical Behaviour of Materials 2. Experimental Stress Analysis 3. Additive Manufacturing Technologies	3	0	0	3
Professional Elective - II	1. Automation in Manufacturing 2. Computer Aided Process Planning 3. Industrial Robotics	3	0	0	3
	Research Methodology & IPR	2	0	0	2
Lab - I	Advanced Computer Aided Design Lab	0	0	4	2
Lab - II	Computer Aided Manufacturing Lab	0	0	4	2
Audit - I	Audit Course - I	2	0	0	0
	Total	**16**	**0**	**8**	**18**

I Year II Semester

Course Code	Course Title	L	T	P	Credits
Professional Core - III	Advanced Finite Element and Boundary Element Methods	3	0	0	3
Professional Core - IV	Manufacturing Systems: Simulation Modelling & Analysis	3	0	0	3
Professional Elective - III	1. Intelligent Manufacturing Systems 2. Advanced Manufacturing Processes 3. Optimization Techniques & Applications	3	0	0	3
Professional Elective - IV	1. Advanced Mechatronics 2. MEMS: Design and Manufacturing 3. Fuzzy Logic & Neural Networks	3	0	0	3
	Mini Project with Seminar	0	0	4	2
Lab - III	Simulation of Manufacturing Systems Lab	0	0	4	2
Lab - IV	Computer Aided Engineering Lab	0	0	4	2
Audit - II	Audit Course - II	2	0	0	0
	Total	**14**	**0**	**12**	**18**

II Year I Semester

Course Code	Course Title	L	T	P	Credits
Professional Elective - V	1. Design for Manufacturing & Assembly 2. Composite Materials 3. Flexible Manufacturing Systems	3	0	0	3
Open Elective	Open Elective	3	0	0	3
Dissertation	Dissertation Work Review - II	0	0	12	6
	Total	**6**	**0**	**12**	**12**

II YEAR II SEMESTER

Course Code	Course Title	L	T	P	Credits
Dissertation	Dissertation Work Review - III	0	0	12	6
Dissertation	Dissertation Viva-Voce	0	0	28	14
	Total	**0**	**0**	**40**	**20**

***For Dissertation Work Review - I, Please refer 7.8 in R19 Academic Regulations.**

Audit Course I & II:

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
7. Stress Management by Yoga
8. Personality Development through Life Enlightenment Skills

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.TECH. IN EMBEDDED SYSTEMS & VLSI DESIGN/VLSI & EMBEDDED SYSTEMS
EFFECTIVE FROM ACADEMIC YEAR 2019-20 ADMITTED BATCH

R19 COURSE STRUCTURE AND SYLLABUS

I YEAR I – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - I	RTL Simulation and Synthesis with PLDs	3	0	0	3
Professional Core - II	Microcontrollers & Programmable Digital Signal Processors	3	0	0	3
Professional Elective - I	1. Digital Signal & Image Processing 2. Programming Languages for Embedded Software 3. Memory Technologies	3	0	0	3
Professional Elective - II	1. Parallel Processing 2. Advanced Computer Architecture 3. CAD of Digital Systems	3	0	0	3
Lab - I	RTL Simulation and Synthesis with PLDs Lab	0	0	3	2
Lab - II	Microcontrollers & Programmable Digital Signal Processors Lab	0	0	3	2
	Research Methodology & IPR	2	0	0	2
Audit - I	Audit Course - I	2	0	0	0
	Total	**16**	**0**	**6**	**18**

I YEAR II – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - III	Analog and Digital CMOS VLSI Design	3	0	0	3
Professional Core - IV	System Design with Embedded Linux	3	0	0	3
Professional Elective - III	1. Advanced Digital Signal Processing 2. SOC Design 3. Low Power VLSI Design	3	0	0	3
Professional Elective - IV	1. Communications Buses & Interfaces 2. Network Security & Cryptography 3. Physical Design Automation	3	0	0	3
Lab - III	Analog and Digital CMOS VLSI Design Lab	0	0	3	2
Lab - IV	System Design with Embedded Linux Lab	0	0	3	2
	Mini project with Seminar	0	0	4	2
Audit - II	Audit Course- II	2	0	0	0
	Total	**14**	**0**	**10**	**18**

III – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Elective - V	1. IOT and its Applications 2. AI and Machine Learning 3. Nano Materials and Nano Technology	3	0	0	3
Open Elective	Open Elective	3	0	0	3
Dissertation	Dissertation Work Review - II	0	0	12	6
	Total	**6**	**0**	**12**	**12**

II YEAR II - SEMESTER

Course Code	Course Title	L	T	P	Credits
Dissertation	Dissertation Work Review - III	0	0	12	6
Dissertation	Dissertation Viva-Voce	0	0	28	14
	Total	**0**	**0**	**40**	**20**

***For Dissertation Work Review - I, Please refer 7.8 in R19 Academic Regulations.**

Audit Course I & II:

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
7. Stress Management by yoga
8. Personality Development Through Life Enlightenment Skills

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. TECH. POWER ELECTRONICS/POWER ELECTRONICS AND ELECTRICAL DRIVES
EFFECTIVE FROM ACADEMIC YEAR 2019- 20 ADMITTED BATCH

R19 COURSE STRUCTURE AND SYLLABUS

I YEAR I SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - I	Power Electronic Converters	3	0	0	3
Professional Core - II	Machine Modeling and Analysis	3	0	0	3
Professional Elective - I	1. Power Electronics for Renewable Energy Systems 2. Smart Grid Technologies 3.Dynamics of Electrical Machines 4. Modern Control Theory	3	0	0	3
Professional Elective - II	1. Power Semiconductor Devices and Modelling 2. Reactive Power Compensation and Management 3. High Frequency Magnetic Components 4. Hybrid Electric Vehicles	3	0	0	3
	Research Methodology and IPR	2	0	0	2
Lab - I	Machine Modelling and Analysis Lab	0	0	4	2
Lab - II	Power Electronic Converters Lab	0	0	4	2
Audit - I	Audit Course - I	2	0	0	0
	Total	**16**	**0**	**8**	**18**

I YEAR II SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - III	Advanced Power Electronic Converters	3	0	0	3
Professional Core - IV	Electrical Drives	3	0	0	3
Professional Elective - III	1. Industrial Load Modelling and Control 2.Advanced Digital Signal Proceesing 3. SCADA Systems and Applications 4. PWM Converters and Applications	3	0	0	3
Professional Elective - IV	1.Advanced Microcontroller Based Systems 2.Distributed Generation 3. Power Quality 4. Integration of Energy Sources	3	0	0	3
	Mini Project with Seminar	0	0	4	2
Lab - III	Advanced Power Electronic Converters Lab	0	0	4	2
Lab - IV	Electrical Drives Lab	0	0	4	2
Audit - II	Audit Course - II	2	0	0	0
	Total	**14**	**0**	**12**	**18**

II YEAR I SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Elective - V	1. Reliability Engineering 2. Flexible AC Transmission Systems 3. HVDC Transmission 4. Energy Storage Technologies	3	0	0	3
Open Elective	Open Elective	3	0	0	3
Dissertation	Dissertation Work Review - II	0	0	12	6
	Total	**6**	**0**	**12**	**12**

II YEAR II SEMESTER

Course Code	Course Title	L	T	P	Credits
Dissertation	Dissertation Work Review - III	0	0	12	6
Dissertation	Dissertation Viva-Voce	0	0	28	14
	Total	**0**	**0**	**40**	**20**

***For Dissertation Work Review - I, Please refer 7.8 in R19 Academic Regulations.**

Audit Course I & II:

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
7. Stress Mangement by Yoga
8. Personality Development through Life Enlightenment Skills

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech. COMPUTER SCIENCE AND ENGINEERING/COMPUTER SCIENCE

EFFECTIVE FROM ACADEMIC YEAR 2019 - 20 ADMITTED BATCH

R19 COURSE STRUCTURE AND SYLLABUS

I YEAR I – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - I	Mathematical Foundations of Computer Science	3	0	0	3
Professional Core - II	Advanced Data Structures	3	0	0	3
Professional Elective - I	1. Information Security 2. Mobile Application Development 3. Machine Learning	3	0	0	3
Professional Elective - II	1. Network Security 2. Cloud Computing 3. Data Mining	3	0	0	3
Lab - I	Advanced Data Structures Lab	0	0	4	2
Lab - II	Machine Learning Lab	0	0	4	2
	Research Methodology & IPR	2	0	0	2
Audit - I	Audit Course - I	2	0	0	0
	Total	**16**	**0**	**8**	**18**

I YEAR II – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - III	Advanced Algorithms	3	0	0	3
Professional Core - IV	Advanced Computer Architecture	3	0	0	3
Professional Elective - III	1. Web and Database Security 2. Internet of Things 3. Data Science	3	0	0	3
Professional Elective - IV	1. Cyber Security ***2. Advanced Computer Networks*** 3. Big Data Analytics	3	0	0	3
Lab - III	Advanced Algorithms Lab	0	0	4	2
Lab - IV	Data Science Lab	0	0	4	2
	Mini Project with Seminar	0	0	4	2
Audit - II	Audit Course - II	2	0	0	0
	Total	**14**	**0**	**12**	**18**

II YEAR III – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Elective - V	1. Digital Forensics 2. High Performance Computing 3. Deep Learning	3	0	0	3
Open Elective	Open Elective	3	0	0	3
Dissertation	Dissertation Work Review - II	0	0	12	6
	Total	**6**	**0**	**12**	**12**

II YEAR II - SEMESTER

Course Code	Course Title	L	T	P	Credits
Dissertation	Dissertation Work Review - III	0	0	12	6
Dissertation	Dissertation Viva-Voce	0	0	28	14
	Total	**0**	**0**	**40**	**20**

***For Dissertation Work Review - I, Please refer 7.8 in R19 Academic Regulations.**

Audit Course I & II:

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
7. Stress Management by yoga
8. Personality Development Through Life Enlightenment Skills

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.TECH. IN VLSI /VLSI DESIGN/ VLSI SYSTEM DESIGN
EFFECTIVE FROM ACADEMIC YEAR 2019-20 ADMITTED BATCH

R19 COURSE STRUCTURE AND SYLLABUS

I YEAR I – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - I	Digital Design & Verification	3	0	0	3
Professional Core - II	Microcontrollers & Programmable Digital Signal Processors	3	0	0	3
Professional Elective - I	1. Advanced Computer Architecture 2. Communications Buses & Interface 3. Nanomaterials & Nanotechnology	3	0	0	3
Professional Elective - II	1. DSP Architecture 2. IOT and its Applications 3. Hardware and Software Co-Design	3	0	0	3
Lab - I	Digital Design and Verification Lab	0	0	3	2
Lab - II	Microcontrollers & Programmable Digital Signal Processors Lab	0	0	3	2
	Research Methodology & IPR	2	0	0	2
Audit - I	Audit Course - I	2	0	0	0
	Total Credits	**16**	**0**	**6**	**18**

I YEAR II – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - III	Analog and Digital CMOS VLSI Design	3	0	0	3
Professional Core - IV	Low Power System Design	3	0	0	3
Professional Elective - III	1. Physical Design and Automation 2. SOC Design 3. VLSI Signal Processing	3	0	0	3
Professional Elective - IV	1. Device Modeling 2. RF IC Architecture 3. Design for Testability	3	0	0	3
Lab - III	Analog and Digital CMOS Lab	0	0	3	2
Lab - IV	VLSI Design & Verification Lab	0	0	3	2
	Mini project with Seminar	0	0	4	2
Audit - II	Audit Course- II	2	0	0	0
	Total Credits	**14**	**0**	**10**	**18**

III – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Elective - V	1. Parallel Processing 2. AI and Machine Learning 3. Memory Technologies	3	0	0	3
Open Elective	Open Elective	3	0	0	3
Dissertation	Dissertation Work Review - II	0	0	12	6
	Total Credits	**6**	**0**	**12**	**12**

II YEAR II - SEMESTER

Course Code	Course Title	L	T	P	Credits
Dissertation	Dissertation Work Review - III	0	0	12	6
Dissertation	Dissertation Viva-Voce	0	0	28	14
	Total Credits	**0**	**0**	**40**	**20**

***For Dissertation Work Review - I, Please refer 7.8 in R19 Academic Regulations.**

Audit Course I & II:

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
7. Stress Management by yoga
8. Personality Development Through Life Enlightenment Skills

JAWAHARLAL NEHRU TECHNLOGICAL UNIVERSITY HYDERABAD
M. TECH. ELECTRICAL POWER ENGINEERING/ ELECTRICAL POWER SYSTEMS
EFFECTIVE FROM ACADEMIC YEAR 2019- 20 ADMITTED BATCH

R19 COURSE STRUCTURE AND SYLLABUS

I Year I Semester

Course Code	Course Title	L	T	P	Credits
Professional Core - I	Power System Analysis	3	0	0	3
Professional Core - II	Economic Operation of Power Systems	3	0	0	3
Professional Elective - I	1. HVDC Transmission 2. Renewable Energy Systems 3. Smart Grid Technologies 4. Modern Control Thoery	3	0	0	3
Professional Elective - II	1. Electrical Power Distribution System 2. Reactive Power Compensation and Management 3. Mathematical Methods for Power Engineering 4. Hybrid Electric Vehicles	3	0	0	3
	Research Methodology and IPR	2	0	0	2
Lab - I	Power Systems Computation Lab-I	0	0	4	2
Lab - II	Advanced Power Systems Lab	0	0	4	2
Audit - I	Audit Course - I	2	0	0	0
	Total	**16**	**0**	**8**	**18**

I Year II Semester

Course Code	Course Title	L	T	P	Credits
Professional Core - III	Digital Protection of Power System	3	0	0	3
Professional Core - IV	Power System Dynamics	3	0	0	3
Professional Elective - III	1. Restructured Power Systems 2. EHV AC Transmission 3. Swarm Intelligence Techniques in Power Systems 4. Industrial Load Modelling and Control	3	0	0	3
Professional Elective - IV	1. AI Techniques in Power Systems 2. Power Quality 3. Power Apparatus Design 4. Power System Reliability and Planning	3	0	0	3
	Mini Project with Seminar	0	0	4	2
Lab - III	Power Systems Computation Lab-II	0	0	4	2
Lab - IV	Power System Protection Lab	0	0	4	2
Audit - II	Audit Course - II	2	0	0	0
	Total	**14**	**0**	**12**	**18**

II Year I Semester

Course Code	Course Title	L	T	P	Credits
Professional Elective - V	1. Power System Transients 2. Flexible AC Transmission Systems 3. Gas Insulated Systems 4. SCADA System and Applications	3	0	0	3
Open Elective	Open Elective	3	0	0	3
Dissertation	Dissertation Work Review - II	0	0	12	6
	Total	**6**	**0**	**12**	**12**

II YEAR II - SEMESTER

Course Code	Course Title	L	T	P	Credits
Dissertation	Dissertation Work Review - III	0	0	12	6
Dissertation	Dissertation Viva-Voce	0	0	28	14
	Total	**0**	**0**	**40**	**20**

***For Dissertation Work Review - I, Please refer 7.8 in R19 Academic Regulations.**

Audit Course I & II:

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constiotution of India
6. Pedagogy Studies
7. Stress Mangement by Yoga
8. Personality Development through Life Enlightenment Skills

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
(Established by Act No.30 of 2008)
Kukatpally, Hyderabad–500085, Telangana State (India)

Academic Regulations of M. Tech (Regular/Full Time) Programmes, 2022-23 (R22)
(CBCS)
(Effective for the students admitted into I Year from the Academic Year 2022-23 and onwards)

1.0 **Post-Graduate Degree Programmes in Engineering & Technology (PGP in E & T)** Jawaharlal Nehru Technological University Hyderabad (JNTUH) offers **Two** Years (**Four** Semesters) full-time Master of Technology (M. Tech.) Degree programmes, under Choice Based Credit System (CBCS) at its constituent (non-autonomous) and affiliated colleges in different branches of Engineering and Technology with different specializations.

2.0 Eligibility for Admissions

2.1 Admission to the PGPs shall be made subject to eligibility, qualification and specializations prescribed by the University from time to time, for each specialization under each M. Tech programme.

2.2 Admission to the post graduate programme shall be made on the basis of either the merit rank or Percentile obtained by the qualified student in the relevant qualifying GATE Examination/ the merit rank obtained by the qualified student in an entrance test conducted by Telangana State Government (PGECET) for M. Tech. programmes / an entrance test conducted by JNTUH/ on the basis of any other exams approved by the University, subject to reservations as laid down by the Govt. from time to time.

2.3 The medium of instructions for all PG Programmes will be **ENGLISH** only.

3.0 M. Tech. Programme (PGP in E & T) Structure

3.1 The M. Tech. Programs in E & T of JNTUH are of Semester pattern, with **Four** Semesters consisting of **Two** academic years, each academic year having **Two** Semesters (First/Odd and Second/Even Semesters). Each Semester shall be of 22 weeks duration (inclusive of Examinations), with a minimum of 90 instructional days per Semester.

3.2 The two-year M. Tech. program consists of **68** credits and the student has to register for all **68** credits and earn all **68** credits for the award of M. Tech. degree. There is **NO** exemption of credits in any case.

3.3 The student shall not take more than four academic years to fulfill all the academic requirements for the award of M. Tech. degree from the date of commencement of first year first semester, failing which the student shall forfeit the seat in M. Tech. programme.

3.4 **UGC/AICTE** specified definitions/descriptions are adopted appropriately for various terms and abbreviations used in these PG academic regulations, as listed below:

3.4.1 Semester Scheme

Each Semester shall have 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) are taken as 'references' for the present set of Regulations. The terms 'SUBJECT' and 'COURSE' imply the same meaning here and refer to 'Theory Subject', or 'Lab Course', or 'Design/Drawing Subject', or 'Mini Project with Seminar', or 'Dissertation', as the case may be.

3.4.2 Credit Courses

All subjects/courses are to be registered by the student in a semester to earn credits which shall be assigned to each subject/course in an L: T: P: C (Lecture Periods: Tutorial Periods: Practical Periods: Credits) structure based on the following general pattern:

- One credit for one hour/week/semester for theory/lecture (L) courses
- One credit for two hours/ week/semester for laboratory/ practical (P) courses or tutorials (T)

Other student activities like study tour, guest lecture, conference/workshop participations, technical paper presentations and mandatory courses (***Non-credit Audit Courses***) will not carry any credits.

3.4.3 Subject Course Classification

All subjects/courses offered for the Post-Graduate Programme in E & T (M. Tech. Degree Programme) are broadly classified as follows. The University has followed in general the guidelines issued by AICTE/UGC.

S. No.	Broad Course Classification	Course Group/ Category	Course Description
1	Core Courses (CoC)	PC- Professional Core	Includes subjects related to the parent discipline/department/ branch of Engineering
		Dissertation	M. Tech. Project or PG Project or Major Project
		Mini Project with Seminar	Seminar based on core contents related to Parent Discipline/ Department/ Branch of Engineering
2	Elective Courses (EıE)	PE - Professional Electives	Includes elective subjects related to the parent discipline/department/branch of Engineering
		OE - Open Electives	Elective subjects which include inter-disciplinary subjects or subjects in an area outside the parent discipline/department/ branch of Engineering
3	***Mandatory Courses***	--	***Non-Credit Audit Courses***

4.0 Course Registration

4.1 A 'Faculty Advisor or Counselor' shall be assigned to each specialization, who will advise on the Post Graduate Programme (PGP), its Course Structure and Curriculum, Choice/Option for Subjects/ Courses, based on his competence, progress, pre-requisites and interest.

4.2 The Academic Section of the College invites 'Registration Forms' from students within 15 days from the commencement of class work through 'ON-LINE SUBMISSIONS', ensuring 'DATE and TIME Stamping'. The ON-LINE Registration Requests for any 'CURRENT SEMESTER' shall be completed BEFORE the commencement of SEEs (Semester End Examinations) of the 'PRECEDING SEMESTER'.

4.3 A Student can apply for ON-LINE Registration, ONLY AFTER obtaining the 'WRITTEN APPROVAL' from his Faculty Advisor, which should be submitted to the College Academic Section through the Head of Department (a copy of it being retained with Head of Department, Faculty Advisor and the Student).

4.4 If the Student submits ambiguous choices or multiple options or erroneous entries during ON-LINE Registration for the Subject(s) / Course(s) under a given/ specified Course Group/ Category as listed in the Course Structure, only the first mentioned Subject/ Course in that Category will be taken into consideration.

4.5 Subject/ Course Options exercised through ON-LINE Registration are final and CANNOT be changed, nor can they be inter-changed; further, alternate choices also will not be considered. However, if the Subject/ Course that has already been listed for Registration by the University in a Semester could not be offered due to unforeseen or unexpected reasons, then the Student will be allowed to have alternate

choice either for a new Subject, if it is offered, or for another existing Subject (subject to availability of seats). Such alternate arrangements will be made by the Head of Department, with due notification and time-framed schedule, within the FIRST WEEK from the commencement of Class-work for that Semester.

5.0 Attendance Requirements

The programmes are offered based on a unit system with each subject being considered a unit. Attendance is calculated separately for each subject.

5.1 Attendance in all classes (Lectures/Laboratories) is compulsory. The minimum required attendance in each theory subject (***also mandatory Audit Courses***) including the attendance of mid-term examination / Laboratory etc. is 75%. Two periods of attendance for each theory subject shall be considered, if the student appears for the mid-term examination of that subject. ***This attendance should also be included in the attendance uploaded every fortnight in the University Website. The attendance of mandatory Audit Courses should be uploaded separately to the University.*** A student shall not be permitted to appear for the Semester End Examinations (SEE), if his attendance is less than 75%.

5.2 A student's Seminar report and presentation on Mini Project shall be eligible for evaluation, only if he ensures a minimum of 75% of his attendance in Seminar presentation classes on Mini Project during that Semester.

5.3 **Condoning of shortage of attendance** (between 65% and 75%) up to a maximum of 10% (considering the days of attendance in sports, games, NCC, NSS activities and Medical grounds) in each subject (Theory/Lab/Mini Project with Seminar) of a semester shall be granted by the College Academic Committee on genuine reasons.

5.4 A prescribed fee per subject shall be payable for condoning shortage of attendance after getting the approval of College Academic Committee for the same. The College Academic Committee shall maintain relevant documents along with the request from the student.

5.5 Shortage of Attendance below 65% in any subject shall in **no case be condoned.**

5.6 A Student, whose shortage of attendance is not condoned in any Subject(s) (Theory/Lab/Mini Project with Seminar) in any Semester, is considered as 'Detained in that Subject(s), and is not eligible to write Semester End Examination(s) of such Subject(s), (in case of Mini Project with Seminar, his/her Mini Project with Seminar Report or Presentation are not eligible for evaluation) in that Semester; and he/she has to seek re-registration for those Subject(s) in subsequent Semesters, and attend the same as and when offered.

5.7 A student fulfills the attendance requirement in the present semester, shall not be eligible for readmission into the same class.

5.8 **a)** A student shall put in a minimum required attendance in at least **three theory subjects (excluding *mandatory (non-credit audit)* course)** in first Year I semester for promotion to first Year II Semester.

b) A student shall put in a minimum required attendance in at least **three theory subjects (excluding *mandatory (non-credit audit)* course)** in first Year II semester for promotion to second Year I Semester.

6.0 Academic Requirements

The following academic requirements must be satisfied, in addition to the attendance requirements mentioned in item no. 5. The performance of the candidate in each semester shall be evaluated subject-wise, with a maximum of 100 marks per subject / course (theory / practical), based on Internal Evaluation and Semester End Examination.

6.1 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course, if he secures not less than:

- 40% of Marks (24 out of 60 marks) in the Semester End Examination;
- 40% of Marks in the internal examinations (16 out of 40 marks allotted for CIE); and
- A minimum of 50% of marks in the sum total of CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of Letter Grades this implies securing **'B'** Grade or above in a subject.

6.2 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to Mini Project with seminar, if student secures not less than 50% marks (i.e. 50 out of 100 allotted marks). The student would be treated as failed, if student (i) does not submit a seminar report on Mini Project or does not make a presentation of the same before the evaluation committee as per schedule or (ii) secures less than 50% marks in Mini Project with seminar evaluation. The failed student shall reappear for the above evaluation when the notification for supplementary examination is issued.

6.3 A student shall register for all subjects for total of **68** credits as specified and listed in the course structure for the chosen specialization, put in the required attendance and fulfill the academic requirements for securing **68** credits obtaining a minimum of **'B'** Grade or above in each subject, and all **68** credits securing Semester Grade Point Average **(SGPA) ≥ 6.0** (in each semester) and final Cumulative Grade Point Average **(CGPA)** (i.e., CGPA at the end of PGP**) ≥ 6.0**, and shall ***pass all the mandatory Audit Courses*** to complete the PGP successfully.

Note: (1) The SGPA will be computed and printed on the marks memo only if the candidate passes in all the subjects offered and gets minimum B grade in all the subjects.

(2) CGPA is calculated only when the candidate passes in all the subjects offered in all the semesters

6.4 Marks and Letter Grades obtained in all those subjects covering the above specified **68** credits alone shall be considered for the calculation of final CGPA, which will be indicated in the Grade Card /Marks Memo of second year second semester.

6.5 If a student registers for extra subject(s) (in the parent department or other departments/ branches of Engineering) other than those listed subjects totaling to **68** credits as specified in the course structure, the performance in extra subject(s) (although evaluated and graded using the same procedure as that of the required **68** credits) will not be considered while calculating the SGPA and CGPA. For such extra subject(s) registered, percentage of marks and Letter Grade alone will be indicated in the Grade Card/Marks Memo, as a performance measure, subject to completion of the attendance and academic requirements as stated in items 5 and 6.1 - 6.3.

6.6 When a student is detained due to shortage of attendance in any subject(s) in any semester, no Grade allotment will be made for such subject(s). However, he is eligible for re-registration of such subject(s) in the subsequent semester(s), as and when next offered, with the academic regulations of the batch into which he is re-registered, by paying the prescribed fees per subject. In all these re-registration cases, the student shall have to secure a fresh set of internal marks and Semester End Examination marks for performance evaluation in such subject(s), and SGPA/CGPA calculations.

6.7 A student eligible to appear for the Semester End Examination in any subject, but absent from it or failed (failing to secure 'B' Grade or above), may reappear for that subject at the supplementary examination as and when conducted. In such cases, his Internal Marks assessed earlier for that subject will be carried over, and added to the marks secured in the supplementary examination, for the purpose of evaluating his performance in that subject.

6. 8 A Student who fails to earn **68** credits as per the specified course structure, and as indicated above, within **four** academic years from the date of commencement of his first year first semester, shall forfeit his seat in M. Tech. programme and his admission **shall stand cancelled.**

7.0 Evaluation - Distribution and Weightage of Marks

The performance of a student in each semester shall be evaluated subject- wise (irrespective of credits assigned) for a maximum of 100 marks.

7.1 The performance of a student in every subject/course (including practicals and Project) will be evaluated for 100 marks each, with 40 marks allotted for CIE (Continuous Internal Evaluation) and 60 marks for SEE (Semester End-Examination). The Continuous Internal Evaluation shall be made based on the average of the marks secured in the two Mid-Term Examinations conducted, first Mid-Term examinations in the middle of the Semester and second Mid-Term examinations during the last week of instruction.

7.2 In CIE, for theory subjects, during a semester, there shall be two mid-term examinations. Each Mid-Term examination consists of two parts i) **Part – A** for 10 marks, ii) **Part – B** for 20 marks with a total duration of 2 hours as follows:

1. Mid-Term Examination for 30 marks:
   a. Part - A: Objective/quiz paper for 10 marks.
   b. Part – B: Descriptive paper for 20 marks.

The objective/quiz paper is set with multiple choice, fill-in the blanks and match the following type of questions for a total of 10 marks. The descriptive paper shall contain 6 full questions out of which, the student has to answer 4 questions, each carrying 5 marks. The average of the two Mid Term Examinations shall be taken as the final marks for Mid Term Examination (for 30 marks).

The remaining 10 marks of Continuous Internal Assessment (out of 40) are distributed as:

2. Assignment for 5 marks. (Average of 2 Assignments each for 5 marks)
3. Subject Viva-Voce/PPT/Poster Presentation/ Case Study on a topic in the concerned subject for 5 marks.

While the first mid-term examination shall be conducted on 50% of the syllabus, the second mid-term examination shall be conducted on the remaining 50% of the syllabus.

Five (5) marks are allocated for assignments (as specified by the subject teacher concerned). The first assignment should be submitted before the conduct of the first mid-term examination, and the second assignment should be submitted before the conduct of the second mid-term examination. The average of the two assignments shall be taken as the final marks for assignment (for 5 marks).

Subject Viva-Voce/PPT/Poster Presentation/ Case Study on a topic in the concerned subject for 5 marks before II Mid-Term Examination.

- The Student, in each subject, shall have to earn 40% of marks (i.e. 16 marks out of 40 marks) in CIE, 40% of marks (i.e. 24 marks out of 60) in SEE and Overall 50% of marks (i.e. 50 marks out of 100 marks) both CIE and SEE marks taking together.

The student is eligible to write Semester End Examination of the concerned subject, if the student scores ≥ 40% (16 marks) of 40 Continuous Internal Examination (CIE) marks.

In case, the student appears for Semester End Examination (SEE) of the concerned subject but not scored minimum 40% of CIE marks (16 marks out of 40 internal marks), his performance in that subject in SEE shall stand cancelled inspite of appearing the SEE.

The details of the end semester question paper pattern are as follows:

external examiner should be appointed from any other College in the same cluster/any other cluster which is run by the same Management.

7.6 There shall be Mini Project with Seminar during I year II semester for internal evaluation of 100 marks. The Departmental Academic Committee (DAC) will review the progress of the mini project during the seminar presentations and evaluate the same for 50 marks. Mini Project Viva Voce will be evaluated by the DAC for another 50 marks before the semester end examinations. Student shall carryout the mini project in consultation with the mini project supervisor which may include critically reviewing the literature, project implementation and submit it to the department in the form of a report and shall make an oral presentation before the DAC consisting of Head of the Department, Mini Project supervisor and two other senior faculty members of the department. The student has to secure a minimum of 50% of marks in i) seminar presentation and ii) mini project viva voce, to be declared successful. If he fails to obtain the minimum marks, he has to reappear for the same as and when scheduled.

7.7 Every candidate shall be required to submit a dissertation on a topic approved by the Dissertation Review Committee.

7.8 A Dissertation Review Committee (DRC) shall be constituted with the Head of the Department as Chairperson, Dissertation Supervisor and one senior faculty member of the Department offering the M.Tech. programme.

7.9 Registration of Dissertation Work: A candidate is permitted to register for the Dissertation Work after satisfying the attendance requirement in all the subjects, both theory and laboratory.

7.10 After satisfying 7.9, a candidate must present in ***Dissertation Work Review - I***, in consultation with his Dissertation Supervisor, the title, objective and plan of action of his Dissertation work to the Dissertation Review Committee (DRC) for approval ***within four weeks*** from the commencement of **Second year First Semester**. Only after obtaining the approval of the DRC can the student initiate the Dissertation work.

7.11 If a candidate wishes to change his supervisor or topic of the Dissertation, he can do so with the approval of the DRC. However, the DRC shall examine whether or not the change of topic/supervisor leads to a major change of his initial plans of Dissertation proposal. If yes, his date of registration for the project work starts from the date of change of Supervisor or topic as the case may be.

7.12 A candidate shall submit his Dissertation progress report in two stages at least with a gap of **three** months between them.

7.13 The work on the Dissertation shall be initiated at the beginning of the II year and the duration of the Dissertation is two semesters. A candidate is permitted to submit Dissertation Thesis only after successful completion of all theory and practical courses with the approval of DRC ***not earlier than 40 weeks*** from the date of approval of the Dissertation work. For the approval of DRC, the candidate shall submit the draft copy of thesis to the Head of the Department and make an oral presentation before the DRC.

7.14 ***The Dissertation Work Review - II*** in II Year I Semester carries 100 internal marks. Evaluation should be done by the DRC for 50 marks and the Supervisor will evaluate the work for the other 50 marks. The Supervisor and DRC will examine the Problem Definition, Objectives, Scope of Work, Literature Survey in the same domain and progress of the Dissertation Work. A candidate has to secure a minimum of 50% of marks to be declared successful in Dissertation Work Review - II. If he fails to obtain the minimum required marks, he has to reappear for Dissertation Work Review - II as and when conducted.

7.15 ***The Dissertation Work Review - III*** in II Year II Sem. carries 100 internal marks. Evaluation should be done by the DRC for 50 marks and the Supervisor will evaluate it for the other 50 marks. The DRC will examine the overall progress of the Dissertation Work and decide whether or not the Dissertation is

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH. IN VLSI /VLSI DESIGN/ VLSI SYSTEM DESIGN
EFFECTIVE FROM ACADEMIC YEAR 2022-23 ADMITTED BATCH

R22 COURSE STRUCTURE AND SYLLABUS

I YEAR I – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - I	Digital System Design with FPGAs	3	0	0	3
Professional Core - II	CMOS Analog IC Design	3	0	0	3
Professional Elective - I	1. Pattern Recognition and Machine Learning 2. CMOS Mixed Signal Design 3. Memory Technologies	3	0	0	3
Professional Elective - II	1. Communication Buses & Interfaces 2. ARM Microcontrollers 3. Embedded Real Time Operating System	3	0	0	3
Lab - I	Digital System Design with FPGAs Lab	0	0	4	2
Lab - II	CMOS Analog IC Design Lab	0	0	4	2
	Research Methodology & IPR	2	0	0	2
Audit - I	Audit Course – I	2	0	0	0
	Total Credits	**16**	**0**	8	**18**

I YEAR II – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - III	VLSI Advanced Physical Design	3	0	0	3
Professional Core - IV	System Verilog Test Benches using UVM	3	0	0	3
Professional Elective - III	1. IoT Architectures and System Design 2. SoC Design 3. Design for Testability	3	0	0	3
Professional Elective - IV	1. Device Modeling 2. RF IC Design 3. Hardware and Software Co-Design	3	0	0	3
Lab - III	VLSI Advanced Physical Design Lab	0	0	4	2
Lab - IV	System Verilog Test Benches using UVM Lab	0	0	4	2
	Mini Project with Seminar	0	0	4	2
Audit - II	Audit Course- II	2	0	0	0
	Total Credits	**14**	**0**	**12**	**18**

II YEAR I – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Elective - V	1. Advanced Computer Architecture 2. Nanomaterials & Nanotechnology 3. Hardware Security	3	0	0	3
Open Elective	Open Elective	3	0	0	3
Dissertation	Dissertation Work Review – II	0	0	12	6
	Total Credits	**6**	**0**	**12**	**12**

II YEAR II - SEMESTER

Course Code	Course Title	L	T	P	Credits
Dissertation	Dissertation Work Review - III	0	0	12	06
Dissertation	Dissertation Viva-Voce	0	0	28	14
	Total	**0**	**0**	**40**	**20**

Open Electives:

1. Business Analytics
2. Industrial Safety
3. Operations Research
4. Cost Management of Engineering Projects
5. Composite Materials

Audit Course I & II:

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
7. Stress Management by Yoga
8. Personality Development Through Life Enlightenment Skills

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.TECH – ELECTRICAL POWER ENGINEERING/ ELECTRICAL POWER SYSTEMS

(Applicable for the Batch admitted from the Academic Year 2022-23 onwards)

(R22) COURSE STRUCTURE AND SYLLABUS

I YEAR I SEMESTER

			L	T	P	Credits
Sr.No	**Core/Elective**	**Course Name**				
1.	Program Core-I	Advanced Power System Analysis	3	0	0	3
2.	Program Core-II	Economic Operation of Power Systems	3	0	0	3
3.	Program Elective-I	1. Advanced Power Electronic Converters 2. Renewable Energy Technologies 3. Smart Grid Technologies 4. Modern Control Theory	3	0	0	3
4.	Program Elective-II	1. HVDC Transmission 2. Electrical Power Distribution System 3. Reactive Power Compensation and Management 4. Electric Vehicles and Design	3	0	0	3
5.	MC	Research Methodology & IPR	2	0	0	2
6.	Lab-I	Power Systems Computation Lab-I	0	0	4	2
7.	Lab-II	Advanced Power Systems Lab	2	0	4	2
8.	Audit-I	Audit Course-I	2	0	0	0
		Total Credits	**16**	**0**	**8**	**18**

I YEAR II SEMESTER

			L	T	P	Credits
Sr.No	**Core/Elective**	**Course Name**				
1.	Program Core-III	Digital Protection of Power System	3	0	0	3
2.	Program Core-IV	Power System Dynamics	3	0	0	3
3.	Program Elective-III	1. Restructured Power Systems 2. Power Quality Improvement Techniques 3. EHV AC Transmission 4. Swarm Intelligence Techniques in Power Systems	3	0	0	3
4.	Program Elective-IV	1. AI Techniques in Power Systems 2. Electric Vehicle Charging Techniques 3. Power System Reliability and Planning 4. Industrial Load Modelling and Control	3	0	0	3
5.	MPWS	Mini Project with Seminar	0	0	4	2
6.	Lab-III	Power Systems Computation Lab-II	0	0	4	2
7.	Lab-IV	Power System Protection Lab	0	0	4	2
8.	Audit-II	Audit Course-II	2	0	0	0
		Total Credits	**14**	**0**	**12**	**18**

II YEAR I SEMESTER

			L	T	P	Credits
Sr.No	**Core/Elective**	**Course Name**				
1.	Program Elective-V	1. Power System Transients 2. FACTS and custom Power Devices 3. Gas Insulated Systems 4. SCADA System and Applications	3	0	0	3
2.	Open Elective	1. Business Analytics 2. Industrial Safety 3. Operations Research 4. Cost Management of Engineering Projects 5. Composite Materials 6. Photovoltaic Systems	3	0	0	3
3.	Dissertation	Dissertation Stage-I	0	0	12	6
		Total Credits	**6**	**0**	**12**	**12**

II YEAR I SEMESTER

IV Semester			**L**	**T**	**P**	**Credits**
Sr.No	**Core/Elective**	**Course Name**				
1.	Dissertation	Dissertation Stage-II	0	0	12	6
2.	Dissertation	Dissertation Viva-Voce	0	0	28	14
		Total Credits	**0**	**0**	**40**	**20**

***For Dissertation Work Review - I, please refer 7.10 in R22 Academic Regulations.**

Open Elective

1. Business Analytics (Offered by **CSE** Department)
2. Industrial Safety (Offered by **Chemical Engineering** Department)
3. Operations Research (Offered by **Mechanical Engineering** Department)
4. Cost Management of Engineering Projects (Offered by **Civil Engineering** Department)
5. Composite Materials (Offered by **Metallurgical Engineering** Department)
6. Photovoltaic Systems (Offered by **EEE** Department)

Audit Course I & II

1. English for Research Paper Writing.
2. Disaster Management.
3. Sanskrit for Technical Knowledge.
4. Value Education.
5. Constitution of India.
6. Pedagogy Studies.
7. Stress Management by Yoga.
8. Personality Development through Life Enlightenment Skills.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH. IN EMBEDDED SYSTEMS & VLSI DESIGN/ VLSI & EMBEDDED SYSTEMS
EFFECTIVE FROM ACADEMIC YEAR 2022-23 ADMITTED BATCH

R22 COURSE STRUCTURE AND SYLLABUS

I YEAR I – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - I	Digital System Design with FPGAs	3	0	0	3
Professional Core - II	ARM Microcontrollers	3	0	0	3
Professional Elective - I	1. Pattern Recognition and Machine Learning 2. Embedded Sensors 3. Memory Technologies	3	0	0	3
Professional Elective - II	1. Embedded Real Time Operating Systems 2. Advanced Computer Architecture 3. Communication Buses & Interfaces	3	0	0	3
Lab - I	Digital System Design with FPGAs Lab	0	0	4	2
Lab - II	ARM Microcontrollers Lab	0	0	4	2
	Research Methodology & IPR	2	0	0	2
Audit - I	Audit Course – I	2	0	0	0
	Total	**16**	**0**	8	**18**

I YEAR II – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - III	CMOS Analog IC Design	3	0	0	3
Professional Core - IV	System Design with Embedded Linux	3	0	0	3
Professional Elective - III	1. IoT Architectures and System Design 2. SOC Design 3. Design For Testability	3	0	0	3
Professional Elective - IV	1. Device Modelling 2. Secure Networks 3. Physical Design Automation	3	0	0	3
Lab - III	CMOS Analog IC Design Lab	0	0	4	2
Lab - IV	System Design with Embedded Linux Lab	0	0	4	2
	Mini Project with Seminar	0	0	4	2
Audit - II	Audit Course- II	2	0	0	0
	Total	**14**	**0**	**1**	**18**

II YEAR I – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Elective - V	1. CMOS Mixed Signal Design 2. Embedded Networks 3. Nano Materials and Nano Technology	3	0	0	3
Open Elective	Open Elective	3	0	0	3
Dissertation	Dissertation Work Review – II	0	0	12	6
	Total	**6**	**0**	**12**	**12**

II YEAR II - SEMESTER

Course Code	Course Title	L	T	P	Credits
Dissertation	Dissertation Work Review - III	0	0	12	06
Dissertation	Dissertation Viva-Voce	0	0	28	14
	Total	**0**	**0**	**40**	**20**

Open Electives:

1. Business Analytics
2. Industrial Safety
3. Operations Research
4. Cost Management of Engineering Projects
5. Composite Materials

Audit Course I & II:

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
7. Stress Management by Yoga
8. Personality Development Through Life Enlightenment Skills

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech. COMPUTER SCIENCE AND ENGINEERING/ COMPUTER SCIENCE
EFFECTIVE FROM ACADEMIC YEAR 2022 - 23 ADMITTED BATCH

R22 COURSE STRUCTURE AND SYLLABUS

I YEAR I – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - I	Mathematical Foundations of Computer Science	3	0	0	3
Professional Core - II	Advanced Data Structures	3	0	0	3
Professional Elective - I	1. Database Programming with PL/SQL 2. Deep Learning 3. Natural Language Processing	3	0	0	3
Professional Elective - II	1. Applied Cryptography 2. Software Quality Engineering 3. Mining Massive Datasets	3	0	0	3
Lab - I	Advanced Data Structures Lab	0	0	4	2
Lab - II	Professional Elective - I Lab	0	0	4	2
	Research Methodology &IPR	2	0	0	2
Audit - I	Audit Course- I	2	0	0	0
	Total	**16**	**0**	**8**	**18**

I YEAR II – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - III	Advanced Algorithms	3	0	0	3
Professional Core - IV	Advanced Computer Architecture	3	0	0	3
Professional Elective - III	1. Enterprise Cloud Concepts 2. Advanced Computer Networks 3. Edge Analytics	3	0	0	3
Professional Elective - IV	1. Bio Informatics 2. Nature Inspired Computing 3. Robotic Process Automation	3	0	0	3
Lab - III	Advanced Algorithms Lab	0	0	4	2
Lab - IV	Professional Elective - III Lab	0	0	4	2
	Mini Project with Seminar	0	0	4	2
Audit - II	Audit Course- II	2	0	0	0
	Total	**14**	**0**	**12**	**18**

II YEAR III – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Elective - V	1. Digital Forensics 2. High Performance Computing 3. Quantum Computing	3	0	0	3
Open Elective	Open Elective	3	0	0	3
Dissertation	Dissertation Work Review - II	0	0	12	6
	Total	**6**	**0**	**12**	**12**

II YEAR II - SEMESTER

Course Code	Course Title	L	T	P	Credits
Dissertation	Dissertation Work Review - III	0	0	12	6
Dissertation	Dissertation Viva-Voce	0	0	28	14
	Total	**0**	**0**	**40**	**20**

***For Dissertation Work Review - I, Please refer 7.8 in R19 Academic Regulations.**

Audit Course I & II:

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
7. Stress Management by yoga
8. Personality Development Through Life Enlightenment Skills

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech in STRUCTURAL ENGINEERING

Effective from Academic Year 2022 - 23 admitted batch

R22 COURSE STRUCTURE AND SYLLABUS

I YEAR I – SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	Professional Core - I	Advanced Structural Mechanics	3	0	0	3
2	Professional Core - II	Theory of Elasticity and Plasticity	3	0	0	3
3	Professional Elective - I	1. Theory of Plates and Shells 2. Computer Oriented Numerical Methods 3. Structural Stability	3	0	0	3
4	Professional Elective - II	1. Advanced Reinforced Concrete Design 2. Structural Health Monitoring 3. Structural Optimization	3	0	0	3
5	Lab - I	Computer Aided Design Laboratory	0	1	2	2
6	Lab - II	Structural Engineering Laboratory	0	1	2	2
7		Research Methodology & IPR	2	0	0	2
8	Audit - I	Audit Course - I	2	0	0	0
		Total	**16**	**02**	**4**	**18**

I YEAR II – SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	Professional Core - III	Finite Element Analysis	3	0	0	3
2	Professional Core - IV	Structural Dynamics	3	0	0	3
3	Professional Elective - III	1. Advanced Structural Steel Design 2. Structural Reliability 3. Design of High-Rise Buildings	3	0	0	3
4	Professional Elective - IV	1. Advanced Prestressed Concrete Design 2. Structural Health Monitoring 3. Design of Bridges	3	0	0	3
5	Lab - III	Numerical Analysis Laboratory	0	1	2	2
6	Lab - IV	Advanced Structural Analysis and Design Laboratory	0	1	2	2
7		Mini Project with Seminar	0	0	4	2
8	Audit-II	Audit Course- II	2	0	0	0
		Total	**14**	**02**	**8**	**18**

II YEAR I – SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1.	Professional Elective - V	1. Earthquake Resistant Design of Structures 2. Pre-Engineered Buildings 3. Rehabilitation and Retrofitting of Structures	3	0	0	3
2.	Open Elective	Open Elective	3	0	0	3
3.	Dissertation	Dissertation Work Review - II	0	0	12	6
4.		**Total**	**6**	**0**	**12**	**12**

II YEAR II - SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1.	Dissertation	Dissertation Work Review - III	0	0	12	6
2.	Dissertation	Dissertation Viva-Voce	0	0	28	14
		Total	**0**	**0**	**40**	**20**

For Dissertation Work Review – I, please refer 7.10 in R22 Academic Regulations

Open Electives Offered by the Department:

1. Green Buildings
2. Construction Project Management
3. Safety and Construction Practice Regulations

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.TECH- POWER ELECTRONICS AND ELECTRICAL DRIVES
(Applicable for the Batch admitted from the Academic Year 2022-23 onwards)

(R22) COURSE STRUCTURE AND SYLLABUS

I YEAR I SEMESTER

			L	T	P	Credits
Sr.No	**Core/Elective**	**Course Name**				
1.	Program Core-I	Advanced Power Electronic Converters-I	3	0	0	3
2.	Program Core-II	Machine Modelling and Analysis	3	0	0	3
3.	Program Elective-I	1. HVDC Transmission 2. Microcontroller Applications to Power Electronics 3. Smart Grid Technologies 4. Modern Control Theory	3	0	0	3
4.	Program Elective-II	1. Power Semiconductor Devices and Modelling 2. Reactive Power Compensation and Management 3. High Frequency Magnetic Components 4. Hybrid Electric Vehicles and Design	3	0	0	3
5.		Research Methodology & IPR	2	0	0	2
6.	Lab-I	Machine Modelling and Analysis Lab	0	0	4	2
7.	Lab-II	Advanced Power Electronic Converters Lab-I	0	0	4	2
8.	Audit-I	Audit Course-I	2	0	0	0
		Total Credits	**16**	**0**	**8**	**18**

I YEAR II SEMESTER

			L	T	P	Credits
Sr.No	**Core/Elective**	**Course Name**				
1.	Program Core-III	Advanced Power Electronic Converters-II	3	0	0	3
2.	Program Core-IV	Electrical Drives	3	0	0	3
3.	Program Elective-III	1. Special Electrical Machines 2. Advanced Digital Signal Processing 3. SCADA Systems and Applications 4. Power Electronics for Renewable Energy Systems	3	0	0	3
4.	Program Elective-IV	1. DSP based Drive Control 2. Electric Vehicle Charging Techniques 3. Power Quality Improvement Techniques 4. Integration of Energy Sources	3	0	0	3
5.	MPWS	Mini Project with Seminar	0	0	4	2
6.	Lab-III	Advanced Power Electronic Converters Lab-II	0	0	4	2
7.	Lab-IV	Electrical Drives Lab	0	0	4	2
8.	Audit-II	Audit Course-II	2	0	0	0
		Total Credits	**14**	**0**	**12**	**18**

II YEAR I SEMESTER

			L	T	P	Credits
Sr.No	**Core/Elective**	**Course Name**				
1.	Program Elective-V	1. Reliability Engineering 2. Flexible AC Transmission System 3. Dynamics of Electrical Machines 4. Energy Storage Technologies	3	0	0	3
2.	Open Elective	1. Business Analytics 2. Industrial Safety 3. Operations Research 4. Cost Management of Engineering Projects 5. Composite Materials 6. Photovoltaic Systems	3	0	0	3
3.	Dissertation	Dissertation Stage-I	0	0	12	6
		Total Credits	**6**	**0**	**12**	**12**

II YEAR II SEMESTER

			L	T	P	Credits
Sr.No	**Core/Elective**	**Course Name**				
1.	Dissertation	Dissertation Stage-II	0	0	12	6
2.	Dissertation	Dissertation Viva-Voce	0	0	28	14
		Total Credits	**0**	**0**	**40**	**20**

***For Dissertation Work Review - I, please refer 7.10 in R22 Academic Regulations.**

Open Elective

1. Business Analytics (Offered by **CSE** Department)
2. Industrial Safety (Offered by **Chemical Engineering** Department)
3. Operations Research (Offered by **Mechanical Engineering** Department)
4. Cost Management of Engineering Projects (Offered by **Civil Engineering** Department)
5. Composite Materials (Offered by **Metallurgical Engineering** Department)
6. Photovoltaic Systems (Offered by **EEE** Department)

Audit Course I & II

1. English for Research Paper Writing.
2. Disaster Management.
3. Sanskrit for Technical Knowledge.
4. Value Education.
5. Constitution of India.
6. Pedagogy Studies.
7. Stress Management by Yoga.
8. Personality Development through Life Enlightenment Skills.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. TECH. (CAD/CAM)
EFFECTIVE FROM ACADEMIC YEAR 2022- 23 ADMITTED BATCH
R22 COURSE STRUCTURE AND SYLLABUS

I Year I Semester

Course Code	Course Title	L	T	P	Credits
Professional Core - I	Advanced CAD	3	0	0	3
Professional Core - II	Additive Manufacturing	3	0	0	3
Professional Elective - I	1. Finite Element Methods & Boundary Element Methods 2. Experimental Stress Analysis 3. Green Manufacturing	3	0	0	3
Professional Elective - II	1. Automation in Manufacturing 2. Computer Aided Process Planning 3. Industrial Robotics	3	0	0	3
	Research Methodology & IPR	2	0	0	2
Lab - I	Advanced Computer Aided Design Lab	0	0	4	2
Lab - II	3D Printing Lab	0	0	4	2
Audit - I	Audit Course - I	2	0	0	0
	Total	**16**	**0**	**8**	**18**

I Year II Semester

Course Code	Course Title	L	T	P	Credits
Professional Core - III	Computer Integrated Manufacturing	3	0	0	3
Professional Core - IV	Manufacturing Systems: Simulation Modeling & Analysis	3	0	0	3
Professional Elective - III	1. Intelligent Manufacturing Systems 2. IOT & Industry 4.0 3. Optimization Techniques & Applications	3	0	0	3
Professional Elective - IV	1. Mechatronics 2. MEMS: Design and Manufacturing 3. Fuzzy Logic & Neural Networks	3	0	0	3
	Mini Project with Seminar	0	0	4	2
Lab - III	Simulation of Manufacturing Systems Lab	0	0	4	2
Lab - IV	CAM Lab	0	0	4	2
Audit - II	Audit Course - II	2	0	0	0
	Total	**14**	**0**	**12**	**18**

II Year I Semester

Course Code	Course Title	L	T	P	Credits
Professional Elective - V	1. Design for Manufacturing & Assembly 2. Composite Materials 3. Artificial Intelligence in Manufacturing	3	0	0	3
Open Elective	Open Elective	3	0	0	3
Dissertation	Dissertation Work Review - II	0	0	12	6
	Total	**6**	**0**	**12**	**12**

II YEAR II SEMESTER

Course Code	Course Title	L	T	P	Credits
Dissertation	Dissertation Work Review - III	0	0	12	6
Dissertation	Dissertation Viva-Voce	0	0	28	14
	Total	**0**	**0**	**40**	**20**

Audit Course I & II:

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
7. Stress Management by Yoga
8. Personality Development through Life Enlightenment Skills

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH IN EMBEDDED SYSTEMS
EFFECTIVE FROM ACADEMIC YEAR 2022-23 ADMITTED BATCH

R22 COURSE STRUCTURE AND SYLLABUS

I YEAR I – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - I	Digital System Design with FPGAs	3	0	0	3
Professional Core - II	System Design with Embedded Linux	3	0	0	3
Professional Elective - I	1. CMOS VLSI Design 2. Pattern Recognition and Machine Learning 3. Wireless Sensor Networks	3	0	0	3
Professional Elective - II	1. Communications Buses & Interfaces 2. Advanced Computer Architecture 3. CMOS Analog IC Design	3	0	0	3
Lab - I	Digital system Design with FPGAs Lab	0	0	4	2
Lab - II	System Design with Embedded Linux Lab	0	0	4	2
	Research Methodology & IPR	2	0	0	2
Audit - I	Audit Course – I	2	0	0	0
	Total	**16**	**0**	8	**18**

I YEAR II – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - III	ARM Microcontrollers	3	0	0	3
Professional Core - IV	Digital Control Systems	3	0	0	3
Professional Elective - III	1. IoT Architectures and System Design 2. Design for Testability 3. SoC Design	3	0	0	3
Professional Elective - IV	1. Hardware and Software Co-Design 2. Secure Networks 3. Physical Design Automation	3	0	0	3
Lab - III	ARM Microcontrollers Lab	0	0	4	2
Lab - IV	Digital Control Systems Lab	0	0	4	2
	Seminar	0	0	4	2
Audit - II	Audit Course – II	2	0	0	0
	Total	**14**	**0**	**12**	**18**

II YEAR I – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Elective - V	1. Embedded Networks 2. CMOS Mixed Signal Design 3. Human -Machine Interface	3	0	0	3
Open Elective	Open Elective	3	0	0	3
Dissertation	Dissertation Work Review – II	0	0	12	6
	Total	**6**	**0**	**12**	**12**

II YEAR II - SEMESTER

Course Code	Course Title	L	T	P	Credits
Dissertation	Dissertation Work Review - III	0	0	12	06
Dissertation	Dissertation Viva-Voce	0	0	28	14
	Total	**0**	**0**	**40**	**20**

Open Electives:

1. Business Analytics
2. Industrial Safety
3. Operations Research
4. Cost Management of Engineering Projects
5. Composite Materials

Audit Course I & II:

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
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