PROGRAM CURRICULUM

MECHANICAL ENGINEERING

for

B. TECH. FOUR YEAR DEGREE PROGRAM

(Applicable for the batches admitted from A.Y 2024-25)

ADITYA UNIVERSITY

Aditya Nagar, ADB Road, Surampalem - 533 437

Department of Mechanical Engineering

VISION:

To be a globally recognized pioneer in Mechanical Engineering by promoting Excellence in Education, fostering Innovative Research, and delivering Sustainable Solutions to address global challenges.

MISSION

M1: Ensure educational excellence through infrastructure supporting industry-aligned design and development.

M2: Develop innovative research ecosystem through collaborations with industry and academia.

M3: Integrate Leadership and Teamwork Capabilities for solving inclusive community challenges.

PROGRAM EDUCATIONAL OUTCOMES:

Graduates of the Program will

PEO 1: Excel in careers or entrepreneurship by applying mechanical engineering knowledge with innovation and responsibility.

PEO 2: Pursue higher education, interdisciplinary research, and contribute to sustainable development.

PEO 3: Engage in lifelong learning and adapt to emerging technologies for professional growth

PROGRAM SPECIFIC OUTCOMES:

After successful completion of the program, the graduates will be able to

PSO 1: Design and develop components for enhancement of manufacturing processes with modern engineering tools.

PSO 2: Create sustainable energy systems effectively for a variety of technical applications.

PROGRAM OUTCOMES (PO's)

The 11 Program Outcomes are described as below.

After successful completion of the program, the graduates will be able to

PO1 **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

PO3 **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

PO4 **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

PO5 **Engineering tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

PO6 **The Engineer and the world :** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice

PO7 **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice

PO8 **Individual and collaborative teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings

PO9 **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO10 **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO11 **Life-long learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

ADITYA UNIVERSITY

Department of Mechanical Engineering

B. Tech (ME) Program Curriculum – 2024

(Applicable for the batches admitted from the A.Y 2024-25)

UG Programs Offered

- B. Tech in (Mechanical Engineering)
- B. Tech in (Mechanical Engineering) with
  - Minor degree in Civil Engineering
  - Minor degree in Electrical and Electronics Engineering
  - Minor degree in Electronics and Communication Engineering
  - Minor degree in Computer Science and Engineering
  - Minor degree in Data Science
  - Minor degree in Artificial Intelligence and Machine Learning
  - Minor degree in Petroleum Technology
  - Minor degree in Mining Engineering
  - Minor degree in Agricultural Engineering
  - Minor degree in Entrepreneurship Development and Incubation
  - Minor Degree in Quantum Technologies

Minor Streams offered in B. Tech (Mechanical Engineering)

- Minor Stream in Automation & Robotics
- Minor Stream in Thermal Engineering
- Minor Stream in Automotive Engineering
- Minor Stream in Design and Manufacturing
- Minor Stream in Advanced Specialization on Electric Vehicles Industry Integrated Program- L & T

Credit Division Category wise

S. No	Broad Category of Course	UGC	Credits
1	Major Core Courses (MCC)	80	80
2	Minor Stream Courses (MSC) (or) University Open Elective Courses (UEC)	32	32
3	Multidisciplinary Courses (MDC)	9	11
4	Ability Enhancement Courses (AEC)	8	9
5	Skill Enhancement Courses (SEC)	9	6
6	Value Added Courses (VAC)	6-8	8
7	Summer Internship (SI)	2-4	4
8	Full Semester Internship (or) Project (PROJ)	12	10
9	Mandatory Course (MC)	0	0
Total Credits to be earned for B. Tech Degree		**160**	**160**

Foundation Courses – FC

Intermediate-level Courses - IC

Advanced Courses – AC

Major Core Courses (MCC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241MA001	Linear Algebra & Calculus	FC	2	1		3	50	50	100	-
241MA002	Differential Equations & Vector Calculus	FC	2	1		3	50	50	100	-
241PH001	Solid State Physics	FC	2		1	3	50	50	100	-
241CH001	Engineering Chemistry	FC	2		1	3	50	50	100	-
241ME001	Engineering Graphics	FC	1		2	3	50	50	100	-
241ME003	Engineering Workshop	FC			1	1	100	-	100	-
241ME002	Engineering Mechanics	FC	2	1	1	4	50	50	100	-
241ME004	Engineering Thermodynamics	IC	2	1		3	50	50	100	SSP/ MP
241MA003	Integral Transforms & Applications of Partial Differential Equations	IC	2	1		3	50	50	100	LAC
241MA004	Numerical Methods & Statistical Techniques	IC	2	1		3	50	50	100	ITAPDE
241ME005	Fluid Mechanics & Hydraulic Machines	IC	2	1	1	4	50	50	100	SSP
241ME006	Material Science and Deformation	IC	2		2	4	50	50	100	EC
241ME007	Manufacturing Process-I	IC	2		2	4	50	50	100	EW
241ME008	Automobile Engineering	IC	3		1	4	50	50	100	SSP
241ME009	Kinematics of Machinery	IC	2	1	1	4	50	50	100	EM
241ME010	Internal Combustion Engine	IC	2		2	4	50	50	100	ETD
241ME011	Manufacturing Process-II	IC	2		2	4	50	50	100	MP – I
241ME012	Heat Power Engineering	IC	2	1		3	50	50	100	ETD
241ME013	Machine Design	IC	2	1		3	50	50	100	EG
241ME014	Computer Aided Machine Drawing (CAMD)	IC			3	3	50	50	100	EG

241MB001	Engineering Economics & Management	IC	2			2	50	50	100	-
241ME015	Mechatronics	IC	3		1	4	50	50	100	MP-I
241ME016	Heat Transfer	AC	2	1	1	4	50	50	100	HPE
241ME017	Dynamics of Machinery	AC	2	1	1	4	50	50	100	KOM
Total			**45**	**12**	**23**	**80**				

Multidisciplinary Courses (MDC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241EE001	Basic Electrical & Electronics Engineering	FC	2		2	4	50	50	100	-
241CS001	Programming for Problem Solving Using C	FC	2		2	4	50	50	100	-
241ME018	Operations Research	IC	2	1		3	50	50	100	-
Total			**6**	1	**4**	**11**				

Ability Enhancement Courses (AEC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Prerequisite
241EN001	Essential Cognitive Skills for Engineers	FC			1	1	100	-	100	-
241EN002/ 241UC005/ 241UC004/ 241UC003/ 241UC006	Advanced Cognitive Skills for Engineers / Proficiency in Foreign language (Japanese/ German / French / Spanish)	FC			1	1	100	-	100	-
241UC007	Design Thinking	FC			1	1	100	-	100	-
241UC008	Universal Human Values	FC	2			2	100	-	100	-
241UC009	Technical Paper Publication	AC			2	2	100	-	100	-
241ME091	Student Activity-Based Learning	AC				2				
Total			**2**		**5**	**9**				

Skill Enhancement Courses (SEC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241ME019	Digital Manufacturing Lab	IC			2	2	50	50	100	-
241ME020	Analysis & Simulation Lab	AC			2	2	50	50	100	-
241AI001	Artificial Intelligence & Machine Learning Lab	AC			2	2	50	50	100	-
	Total				**6**	**6**				

Value Added Courses (VAC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241PE001	Sports & Yoga	FC			1	1	100	-	100	-
241UC010	Indian Cultural Heritage & Fine Arts	FC			1	1	100	-	100	-
241IT001	IT & AI Skills	FC			2	2	50	50	100	-
241CS004	Internet of Things	FC			1	1	100	-	100	-
241CS002	Data Analysis using Python	IC			2	2	50	50	100	-
241UC011	Employability Skills - I	FC			3	0	100	-	100	-
241UC013	Employability Skills - II	FC			3	0	100	-	100	ES-I
241UC014	Employability Skills - III	IC			3	0	100	-	100	ES-II
241UC015	Employability Skills – IV	IC			3	0	100	-	100	ES-III
241UC016	Employability Skills - V	AC			3	1	100	-	100	ES-IV
	Total				**22**	**8**				

Summer Internships (SI)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241ME021	Summer Internship - I	IC			2	2	100	-	100	-
241ME022	Summer Internship -II	AC			2	2	100	-	100	-
	Total				**4**	**4**				

Full Semester Internship (PROJ)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241ME023	Full Semester Internship (or) Project	AC			10	10	50	50	100	-
	Total				**10**	**10**				

Mandatory Course (MC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241AC001	Environmental Science	FC	2			0	100	-	100	-
241AC002	Constitution of India	FC	2			0	100	-	100	-
241AC003	Research Methodology	FC	2			0	100	-	100	-
241AC004	Intellectual Property Rights & Patents	FC	2			0	100	-	100	-
241AC005	Indian Knowledge Systems	FC	2			0	100	-	100	-
	Total		**10**			**0**				

Minor Stream: Automation & Robotics

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241ME024	Elements of Robotics	FC	2			2	50	50	100	-
241ME025	Programming for Robotics	IC	2		1	3	50	50	100	PPSC
241ME026	Digital Manufacturing	IC	3			3	50	50	100	MP-I
241ME027	Advanced Fluid Power & Control Systems	IC	2		1	3	50	50	100	FMHM
241ME028	Robotic Mobility Systems	AC	2		1	3	50	50	100	EOR
241ME029	Control of Robotic System	AC	2		1	3	50	50	100	RMS
241ME030	AI for Robotics	AC	2		1	3	50	50	100	EOR
241ME031	Robotic Operating System	AC	2		1	3	50	50	100	DAP
241ME032	Advanced Robotic Operating System	AC	2		1	3	50	50	100	ROS
241ME033	Field & Service Robotics	AC	2		1	3	50	50	100	PFR
241ME034	Robotic Process Automation (Industry Partnered Certification Program)	AC	3			3	50	50	100	EOR
	Total		**24**		**8**	**32**				

Minor Stream: Thermal Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241ME035	Power Plant Engineering	FC	2			2	50	50	100	-
241ME036	Sustainable Energy Systems	FC	3			3	50	50	100	-
241ME037	Solar Energy Systems	FC	3			3	50	50	100	-
241ME038	Alternative Fuels for IC engines	IC	3			3	50	50	100	ICE
241ME039	Fuel Cell Technology	IC	3			3	50	50	100	ICE
241ME040	Refrigeration & Air Conditioning	IC	2	1		3	50	50	100	ETD
241ME041	Hydraulic Machinery & Systems	IC	3			3	50	50	100	FMHM
241ME042	Cryogenic Engineering	AC	3			3	50	50	100	R&AC
241ME044	Energy Storage Systems	AC	3			3	50	50	100	BEEE
241ME045	Gas Dynamics & Jet Propulsion	AC	2	1		3	50	50	100	HPE
241ME046	Computational Fluid Dynamics	AC	2	1		3	50	50	100	HT, FMHM
	Total		**29**	**3**		**32**				

Minor Stream: Automotive Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241ME047	Automotive Electrical & Electronics	FC	2			2	50	50	100	BEEE
241ME048	Automotive Maintenance	IC	2		1	3	50	50	100	AE
241EE054	Hybrid & Electric Vehicles	IC	3			3	50	50	100	BEEE
241ME049	Electronic Engine Management System	IC	3			3	50	50	100	HEV
241ME050	Automotive Certification & Homologation	IC	3			3	50	50	100	AE
241ME051	Vehicle Infotronics	IC	3			3	50	50	100	AEE
241ME052	Automotive Aerodynamics	AC	3			3	50	50	100	FMHM, AE
241ME053	Automotive Noise Vibration & Harshness	AC	3			3	50	50	100	DOM
241ME054	Vehicle Stability & Control	AC	3			3	50	50	100	AE
241ME055	Special Purpose Vehicles	AC	3			3	50	50	100	AE
241ME056	Automotive & Pedestrian Safety	AC	3			3	50	50	100	AE
	Total		**31**		**1**	**32**				

Minor Stream: Design and Manufacturing

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241ME057	Plant Layout & Material Handling	FC	2			2	50	50	100	-
241ME059	Additive Manufacturing	IC	3			3	50	50	100	MF - I
241ME060	Composite Materials	IC	3			3	50	50	100	SSP/MP
241ME061	Design for Manufacturing	IC	3			3	50	50	100	MSD
241ME062	Industrial Automation	IC	3			3	50	50	100	MF - I
241ME063	Flexible Manufacturing System	IC	3			3	50	50	100	MF - I
241ME058	Industry 5.0 for Engineers	AC	3			3	50	50	100	-
241ME064	Design of Transmission Systems	AC	2	1		3	50	50	100	MD
241ME065	Advanced Mechanics of Solids	AC	2	1		3	50	50	100	MSD
241ME066	Mechanical Vibrations	AC	2	1		3	50	50	100	DOM
241ME067	Condition Monitoring	AC	3			3	50	50	100	MV
	Total		**30**	**2**		**32**				

Minor Stream: Advanced Specialization on Electric Vehicles Industry Integrated Program- L & T

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241EE041	Foundations of EV & Hybrid Vehicles	FC	3			3	50	50	100	-
241ME068	Automotive Mechanics for EV	IC	2			2	50	50	100	MF - I
241ME069	EV Mechanical Design Development & Analysis	IC	3			3	50	50	100	MSD
241ME070	EV Product Development, Homologation & Hydrogen FCEV	IC	3			3	50	50	100	AE
241EE042	EV Battery Technology & Powertrain Development	IC	3			3	50	50	100	BEEE
241ME043	EV Charging Infrastructure, Vehicle Testing & Homologation	IC	3			3	50	50	100	BEEE
241EE044	EV Power Electronics & Embedded Systems	AC	3			3	50	50	100	BEEE
241ME071	EV Data Analytics & Cyber Security	AC	3			3	50	50	100	MD
241ME072	EV FEA Analysis	AC	3			3	50	50	100	MSD
241ME054	Vehicle Stability & Control	AC	3			3	50	50	100	AE
241ME056	Automotive & Pedestrian Safety	AC	3			3	50	50	100	AE
	Total		**32**			**32**				

 # L&T Syllabus for the industry partnered courses will be released in the department as and when required.

University Open Elective Courses(UEC)

AI & ML											
Course Code	**Course Name**	**Level**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**	**Offered to Programs**	**Pre-requisite**
241AI002	Artificial Intelligence	FC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241AI005	Machine Learning	FC	2		2	4	50	50	100	CE,EEE,ME, ECE, PT,Min.E	DAP
241AI027	AI & Data Science	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	DAP
241AI028	AI in Healthcare	IC	2		1	3	50	50	100	CE,EEE, ME, ECE,CSE, IT, AIML,CSE (DS) PT,Min.E	DAP
241AI011	Deep Learning	IC	2		2	4	50	50	100	CE,EEE,ME, ECE, PT,Min.E	DAP
241AI010	Natural Language Processing	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	DAP
241AI009	Reinforcement Learning	AC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	DAP
241AI029	AI in Agriculture	AC	2		1	3	50	50	100	CE,EEE,ME, ECE,CSE,IT, AIML,CSE(DS) PT,Min.E	DAP
241AI030	Robotics & AI	AC	2		1	3	50	50	100	CE,EEE,ME, ECE,CSE,IT, AIML,CSE(DS) PT,Min.E	DAP
241AI031	AI in Finance & Economics	AC	2		1	3	50	50	100	CE,EEE,ME, ECE,CSE,IT, AIML,CSE(DS) PT,Min.E	DAP
Total			**20**		**12**	**32**					

Production Excellence											
Course Code	**Course Name**	**Level**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**	**Offered to Programs**	**Pre-requisite**
241ME081	Fundamentals of Production Excellence	FC	2			2	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML,CSE(DS) PT,Min.E	-
241ME082	Six Sigma for Production Excellence	FC	2		1	3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	FPE
241ME083	Quality Excellence in Production	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	FPE
241ME084	Digital Transformation for Production Excellence	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	FPE
241ME085	Agile Production Systems	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	FPE
241ME086	Process Excellence & Optimization	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	FPE
241ME087	Risk Management in Production Excellence	AC	2		1	3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	FPE
241ME088	Ethical & Social Responsibility in Production Excellence	AC	2		1	3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	FPE

241ME089	Data-Driven Decision Making for Production Excellence	AC	2		1	3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,MinE	FPE
241ME058	Industry 5.0 for Engineers	AC	3			3	50	50	100	CE,EEE, ECE, CSE,IT, AIML, CSE(DS) PT,MinE	FPE
241ME090	Cost Excellence in Production	AC	2		1	3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	FPE
Total			**23**		**09**	**32**					

Supply Chain Management											
Course Code	**Course Name**	**Level**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**	**Offered to Programs**	**Pre-requisite**
241MB017	Introduction to Supply Chain Management	FC	2			2	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML,CSE(DS) PT,Min.E	-
241MB018	Logistics & Distribution Management	FC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
241MB019	Supply Chain Project Management	IC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
241MB020	Supply Chain Innovation &Trends	IC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
241MB021	Supply Chain Analytics	IC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM

241MB022	Demand Planning & Forecasting	IC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
241MB023	Supply Chain Risk Management	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
241MB024	Inventory Management & Control	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
241MB025	E-Commerce & Supply Chain Management	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
241MB026	Operations Management	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
241MB027	Supply Chain Ethics & Corporate Social Responsibility (CSR)	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
Total			**32**			**32**					

Sustainability											
Course Code	**Course Name**	**Level**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**	**Offered to Programs**	**Pre-requisite**
241CE074	Introduction to Sustainable Development	FC	2			2	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML,CSE(DS) PT,Min.E	-
241CE079	Natural Disaster Management & Mitigation	FC	3			3	50	50	100	EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241CE081	Waste Water Management	IC	3			3	50	50	100	EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241CE082	Integrated Solid Waste Management for a Smart City	IC	3			3	50	50	100	EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241CE083	Watershed Management	IC	3			3	50	50	100	EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241EE033	Energy Audit, Conservation & Management	IC	3			3	50	50	100	CE, ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	BEEE
241EE006	Electric Power Generation, Transmission & Distribution Systems	AC	3			3	50	50	100	CE, ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	BEEE

241CE075	Sustainable Agriculture & Food Systems	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241CE076	Sustainable Supply Chain Management	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241CE077	Sustainable Production Excellence	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241CE078	AI in Environmental Science and Sustainability	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
Total			**32**			**32**					

Security											
Course Code	**Course Name**	**Level**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**	**Offered to Programs**	**Pre-requisite**
241CS032	Cybersecurity Essentials	FC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT035	Security in Software Development	FC	3			3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241CS028	Ethical Hacking	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241CS069	Cloud Security	IC			3	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT036	Security &Compliance in Business	IC	3			3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT037	Cryptography & Data Security	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT038	Security Awareness & Social Engineering	AC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT039	Cybersecurity Policy & Strategy	AC	3			3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT040	Security in Emerging Technologies	AC	3			3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241CS030	Information Security Analysis & Audit	AC	2			2	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT041	Financial Information Security & Privacy	AC	3			3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
Total			**25**		**7**	**32**					

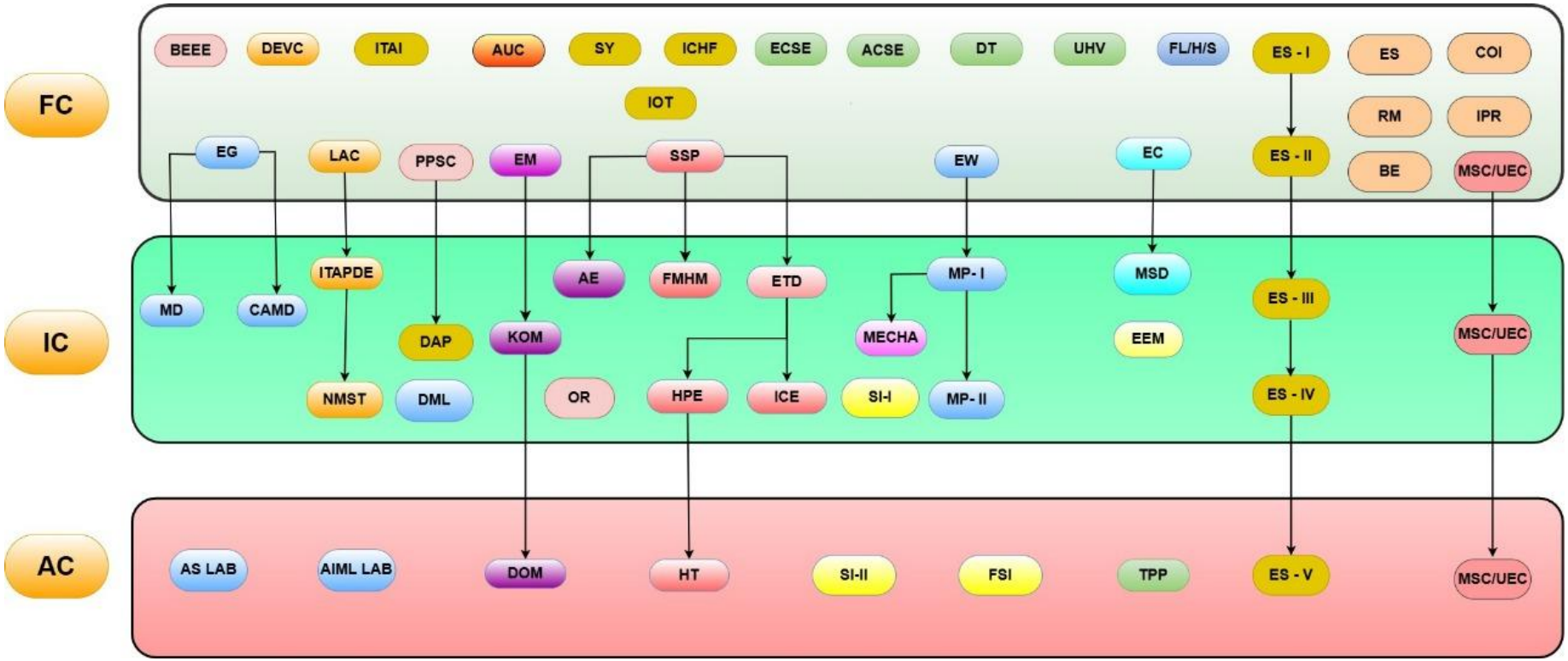
Others											
Course Code	**Course Name**	**Level**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**	**Offered to Programs**	**Pre-requisite**
241CE080	Remote Sensing & GIS Applications	FC	3			3	50	50	100	EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241EE036	Electric Energy Storage Systems	FC	3			3	50	50	100	CE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	BEEE
241EE043	Electrical safety	IC	3			3	50	50	100	CE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	BEEE
241EE054	Hybrid & Electric Vehicles	IC	3			3	50	50	100	CE, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	BEEE
241ME073	Organizational Behaviour	FC	3			3	50	50	100	CE,EEE, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241ME036	Sustainable Energy Systems	FC	3			3	50	50	100	CE, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241ME037	Solar Energy Systems	FC	3			3	50	50	100	CE,EEE,ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241ME060	Composite Materials	IC	3			3	50	50	100	CE,EEE,ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	SSP/MP
241EC082	Communication Systems	FC	3			3	50	50	100	CE,EEE,ME,CSE,IT, AIML, CSE(DS) PT,Min.E	-
241EC083	Electronic Measurements & Instrumentation	FC	3			3	50	50	100	CE,EEE,ME, CSE,IT, AIML, CSE(DS) PT,Min.E	BEEE
241EC084	Introduction to Embedded Systems	FC	3			3	50	50	100	CE,EEE,ME, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241EC085	Fundamentals of Image Processing	FC	3			3	50	50	100	CE,EEE,ME, CSE,IT, AIML, CSE(DS) PT,Min.E	
241EC077	Sensors and Transducers	IC	3			3	50	50	100	CE,EEE,ME, CSE,IT, AIML, CSE(DS) PT,Min.E	
241CS003	Data Structures	FC	2		2	4	50	50	100	CE,EEE,ME, ECE, PT,Min.E	PPSC
241CS065	Computer Organization	FC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-

241CS013	Operating Systems	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT005	Database Management Systems	IC	2		2	4	50	50	100	CE,EEE,ME, ECE, PT,Min.E	PPSC
241IT007	Agile Software Engineering	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	PPSC
241CS007	Computer Networks	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT006	Java Programming	IC	2		2	4	50	50	100	CE,EEE,ME, ECE, PT,Min.E	PPSC
241CS068	Fundamentals of RedHat Enterprise Linux	FC			2	2	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241CS067	AWS Cloud Foundations	IC			3	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241CS066	AWS Cloud Development	AC			3	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241CS070	Continuous integration & delivery using DevOps	AC			3	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT024	Fundamentals of Salesforce Administration	FC			2	2	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT034	Advanced Salesforce Administration	AC			3	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT023	Principles of Pega Systems	IC			3	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT026	Pega System Architecture & Design	AC			3	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241MB004	Entrepreneurship Development & Incubation	IC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241MB005	Business Ethics & Corporate Governance	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241MB006	Entrepreneurship Development & Business Management	AC	1		2	3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-

241EC029	SoC Design	AC	3			3	50	50	100	CE, EEE, ME, CSE, IT, AIML, CSE (DS), PT, Min.E.	MPMC
241CS023	Cloud Computing	FC	2		2	4	50	50	100	CE, EEE, ME, ECE, PT, Min.E.	-

B.Tech (ME) Program Curriculum

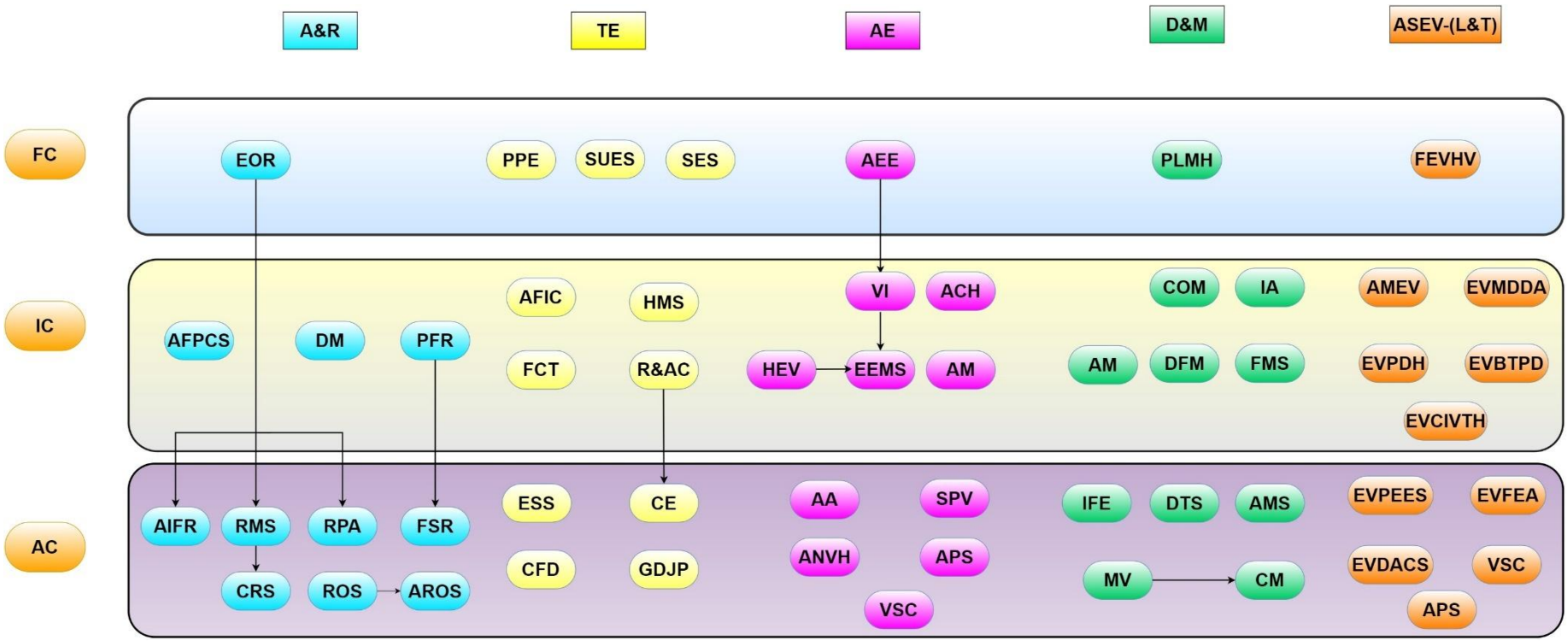
Pre-requisite Flow Chart



Foundation Courses (FC)		Intermediate-Level Courses (IC)		Advanced Courses (AC)	
LAC	Linear Algebra & Calculus	ITAPDE	Integral Transforms & Applications of Partial Differential Equations	HT	Heat Transfer
DEVC	Differential Equations & Vector Calculus	NMST	Numerical Methods & Statistical Techniques	DOM	Dynamics of Machinery
SSP	Solid State Physics	ETD	Engineering Thermodynamics	TPP	Technical Paper publication
EC	Engineering Chemistry	ICE	Internal Combustion Engine	SI-II	Summer Internship-II
EG	Engineering Graphics	MP-I	Manufacturing Process-I	FSI	Full Semester Internship
EM	Engineering Mechanics	HPE	Heat Power Engineering	AS LAB	Analysis & Simulation Lab
EW	Engineering Workshop	FMHM	Fluid Mechanics & Hydraulic Machines	AIML Lab	AIML Lab
BEEE	Basic Electrical & Electronics Engineering	MSD	Material Science and Deformation	ES - V	Employability Skills – V
PPSC	Programming for Problem Solving Using C	MP-II	Manufacturing Process-II		
ECSE	Essential Cognitive Skills for Engineers	AE	Automobile Engineering	**MSC** - Minor Stream Courses	
UHV	Universal Human Values	KOM	Kinematics of Machinery	**UEC** - University Open Elective Courses	
ACSE	Advanced Cognitive Skills for Engineers	MD	Machine Design		
FL/H/S	Proficiency in Foreign language (Japanese/ German / French / Spanish)	MECHA	Mechatronics		
DT	Design Thinking	OR	Operations Research		
IOT	Internet of Things	EEM	Engineering Economics & Management		
ITAI	IT & AI Skills	DAP	Data Analysis using Python		
SY	Sports & Yoga	DML	Digital Manufacturing Lab		
ICHF	Indian Cultural Heritage & Fine Arts	ES - III	Employability Skills – III		
ES - I	Employability Skills – I	ES - IV	Employability Skills – IV		
ES - II	Employability Skills – II	SI-I	Summer Internship-I		
ES	Environmental Science	CAMD	Computer Aided Machine Drawing		
COI	Constitution of India				
RM	Research Methodology				
IPR	Intellectual Property Rights & Patents				
BE	Biology for Engineers				

B.Tech (ME) Minor Stream

Pre-requisite Flow Chart



Minor Stream		FOUNDATION COURSE (FC)		INTERMEDIATE COURSE (IC)	ADVANCED COURSES (AC)	
Automation & Robotics (A&R)	EOR	Elements of Robotics	PFR	Programming for Robotics	RMS	Robotic Mobility Systems
			DM	Digital Manufacturing	CRS	Control of Robotic System
			AFPCS	Advanced Fluid Power & Control Systems	AIFR	AI for Robotics
					ROS	Robotic Operating System
					AROS	Advanced Robotic Operating System
					FSR	Field & Service Robotics
					RPA	Robotic Process Automation (Industry Partnered Certification Program)
Thermal Engineering (TE)	PPE	Power Plant Engineering	AFIC	Alternative Fuels for IC engines	CE	Cryogenic Engineering
	SUES	Sustainable Energy Systems	FCT	Fuel Cell Technology	ESS	Energy Storage Systems
	SES	Solar Energy Systems	R&AC	Refrigeration & Air Conditioning	GDJP	Gas Dynamics & Jet Propulsion
			HMS	Hydraulic Machinery & Systems	CFD	Computational Fluid Dynamics
Automotive Engineering (AE)	AEE	Automotive Electrical & Electronics	AM	Automotive Maintenance	AA	Automotive Aerodynamics
			HEV	Hybrid & Electric Vehicles	ANVH	Automotive Noise Vibration & Harshness
			EEMS	Electronic Engine Management System	VSC	Vehicle Stability & Control
			ACH	Automotive Certification & Homologation	SPV	Special Purpose Vehicles
			VI	Vehicle Infotronics	APS	Automotive & Pedestrian Safety
Design and Manufacturing (D&M)	PLMH	Plant Layout & Material Handling	AM	Additive Manufacturing	IFE	Industry 5.0 for Engineers
			COM	Composite Materials	DTS	Design of Transmission Systems
			DFM	Design for Manufacturing	AMS	Advanced Mechanics of Solids
			IA	Industrial Automation	MV	Mechanical Vibrations
			FMS	Flexible Manufacturing System	CM	Condition Monitoring
Advanced Specialization on Electric Vehicles (Mechanical) Industry Integrated Program- L & T **(ASEV L & T)**	FEVHV	Foundations of EV & Hybrid Vehicles	AMEV	Automotive Mechanics for EV	EVPEES	EV Power Electronics & Embedded Systems
			EVMDDA	EV Mechanical Design Development & Analysis	EVDACS	EV Data Analytics & Cyber Security
			EVPDH	EV Product Development, Homologation & Hydrogen FCEV	EVFEA	EV FEA Analysis
			EVBTPD	EV Battery Technology and Powertrain Development	VSC	Vehicle Stability & Control
			EVCIVTH	EV Charging Infrastructure, Vehicle Testing & Homologation	APS	Automotive & Pedestrian Safety

Suggestive Semester wise Curriculum

I SEMESTER

Course Code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241MA001	Linear Algebra & Calculus	MCC	FC	2	1		3	3
241PH001	Solid State Physics	MCC	FC	2		1	3	4
241ME001	Engineering Graphics	MCC	FC	1		2	3	5
241ME003	Engineering Workshop	MCC	FC			1	1	2
241EE001	Basic Electrical & Electronics Engineering	MDC	FC	2		2	4	6
241EN001	Essential Cognitive Skills for Engineers	AEC	FC			1	1	2
241UC008	Universal Human Values	AEC	FC	2			2	2
241IT001	IT & AI Skills	VAC	FC			2	2	4
241PE001	Sports & Yoga	VAC	FC			1	1	2
	Total			**9**	**1**	**10**	**20**	**30**

II SEMESTER

Course Code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241MA002	Differential Equations & Vector Calculus	MCC	FC	2	1		3	3
241CH001	Engineering Chemistry	MCC	FC	2		1	3	4
241ME002	Engineering Mechanics	MCC	FC	2	1	1	4	5
241ME004	Engineering Thermodynamics	MCC	IC	2	1		3	3
241CS001	Programming for Problem Solving Using C	MDC	FC	2		2	4	6
241EN002/ 241UC005/ 241UC004/ 241UC003/ 241UC006	Advanced Cognitive Skills for Engineers / Proficiency in Foreign language (Japanese / German / French / Spanish)	AEC	FC			1	1	2
241UC007	Design Thinking	AEC	FC			1	1	2
241UC010	Indian Cultural Heritage & Fine Arts	VAC	FC			1	1	2
241UC011	Employability Skills – I	VAC	FC			3	0	3
241AC001	Environmental Science	MC	FC	2			0	0
	Total			**12**	**3**	**10**	**20**	**30**

III SEMESTER

Course Code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241MA003	Integral Transforms & Applications of Partial Differential Equations	MCC	IC	2	1		3	3
241ME010	Internal Combustion Engine	MCC	IC	2		2	4	6
241ME009	Kinematics of Machinery	MCC	IC	2	1	1	4	5
241ME005	Fluid Mechanics & Hydraulic Machines	MCC	IC	2	1	1	4	5
241ME006	Material Science and Deformation	MCC	IC	2		2	4	6
241ME019	Digital Manufacturing lab	SEC	IC			2	2	4
241UC013	Employability Skills – II	VAC	FC			3	0	3
241AC002	Constitution of India	MC	FC	2			0	0
	Total			**12**	**03**	**11**	**21**	**32**

IV SEMESTER

Course Code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241MA004	Numerical Methods & Statistical Techniques	MCC	IC	2	1		3	3
241ME017	Dynamics of Machinery	MCC	IC	2	1	1	4	5
241ME007	Manufacturing Process-I	MCC	IC	2		2	4	6
241ME008	Automobile Engineering	MCC	IC	3		1	4	5
241ME014	Computer Aided Machine Drawing	MCC	IC			3	3	6
	Minor Stream Course-1 (or) University Open Elective Course – 1	MSC/UEC	FC/IC	2			2	2
241CS002	Data Analysis using Python	VAC	IC			2	2	4
241UC014	Employability Skills – III	VAC	IC			3	0	3
241AC003	Research Methodology	MC	FC	2			0	0
	Total			**13**	**2**	**12**	**22**	**34**

V SEMESTER

Course Code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241ME012	Heat Power Engineering	MCC	IC	2	1		3	3
241ME011	Manufacturing Process-II	MCC	IC	2		2	4	6
241MB001	Engineering Economics & Management	MCC	IC	2			2	2
	Minor Stream Course-2 (or) University Open Elective Course -2	MSC/ UEC	FC/IC	3			3	3
	Minor Stream Course-3 (or) University Open Elective Course -3	MSC/ UEC	IC/AC	3			3	3
	Minor Stream Course -4 (or) University Open Elective Course -4	MSC/ UEC	IC/AC	3			3	3
241CS004	Internet of Things	VAC	FC			1	1	2
241UC015	Employability Skills – IV	VAC	IC			3	0	3
241ME021	Summer Internship – I	SI	IC			2	2	4
241AC004	Intellectual Property Rights & Patents	MC	FC	2			0	0
	Total			**17**	**1**	**8**	**21**	**29**

VI SEMESTER

Course Code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241ME016	Heat Transfer	MCC	IC	2	1	1	4	5
241ME018	Operations Research	MDC	IC	2	1		3	3
241ME013	Machine Design	MCC	IC	2	1		3	3
	Minor Stream Course-5 (or) University Open Elective Course -5	MSC/ UEC	IC/AC	3			3	3
	Minor Stream Course -6 (or) University Open Elective Course -6	MSC/ UEC	IC/AC	3			3	3
	Minor Stream Course -7 (or) University Open Elective Course -7	MSC/ UEC	IC/AC	3			3	3
241ME020	Analysis & Simulation Lab	SEC	AC			2	2	4
241AC005	Indian Knowledge Systems	MC	FC	2			0	2
	Total			**17**	**3**	**3**	**21**	**26**

VII SEMESTER

Course Code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241ME015	Mechatronics	MCC	IC	3		1	4	5
	Minor Stream-8 (or) University Elective Course -8	MSC/UEC	AC	3			3	3
	Minor Stream Course -9 (or) University Open Elective Course -9	MSC/UEC	AC	3			3	3
	Minor Stream Course -10 (or) University Open Elective Course -10	MSC/UEC	AC	3			3	3
	Minor Stream Course -11 (or) University Open Elective Course -11	MSC/UEC	AC	3			3	3
241AI001	Artificial Intelligence & Machine Learning Lab	SEC	AC			2	2	4
241ME022	Summer Internship – II	SI	IC			2	2	4
	Total			**15**	**0**	**5**	**20**	**25**

VIII SEMESTER

Course Code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241UC009	Technical Paper Publication	AEC	AC			2	2	4
241UC016	Employability Skills – V	VAC	AC			3	1	3
241ME091	Student Activity-Based Learning	VAC	AC				2	
241ME023	Full Semester Internship (or) Project	PROJ	AC			10	10	20
	Total					**15**	**15**	**27**

Total Credit: 160

***To acquire a minor degree, a student has to earn 20 credits in addition to the 160 credits.**

Minor Degree in Mechanical Engineering
(offered to other branches students):

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241ME074	Basic Mechanical Engineering	FC	2			2	50	50	100	-
241ME004	Engineering Thermodynamics	IC	2	1		3	50	50	100	SSP/ MP
241ME077	Introduction to Automobile Engineering (or)	IC	3			3	50	50	100	SSP/ MP
241ME078	Mechanics of Solids									
241ME012	Heat Power Engineering (or)	IC	2	1		3	50	50	100	ETD
241ME040	Refrigeration & Air Conditioning									
241ME075	Production Technology	IC	3			3	50	50	100	EW
241ME076	Metallurgy and Material Science	IC	3			3	50	50	100	SSP/ MP
241ME079	Theory of Machines (or)	AC	3			3	50	50	100	SSP/ MP
241ME080	Advanced Engineering Metrology									
	Total		**18**	**2**		**20**				

Minor Degree in Civil Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241CE025	Repair & Rehabilitation of Structures	FC	3			3	50	50	100	-
241CE043	Building Planning & Computer-Aided Drawing	FC			2	2	50	50	100	-
241CE027	Green Buildings	FC	3			3	50	50	100	-
241CE040	Fundamentals of Soil Behaviour	FC	3			3	50	50	100	-
241CE054	Railway Engineering (or)	FC	3			3	50	50	100	-
241CE047	Docks & Harbour Engineering									
241CE036	Environmental Impact & Risk Management	IC	3			3	50	50	100	-
241CE037										

	(or) Environmental Management									
241CE056 241CE049	Urban Transportation Planning (or) Intelligent Transportation Systems	IC	3			3	50	50	100	-
Total			**18**		**2**	**20**				

Minor Degree in Electrical and Electronics Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241EE055	Operation & Control of Electric machines	FC	2			2	50	50	100	BEEE
241EE056	Fundamentals of Power Electronics	FC	2			2	50	50	100	BEEE
241EE006	Electric Power Generation and Distribution Systems	IC	3			3	50	50	100	ENA-1/BEEE
241EE013	Electrical Measurements & Instrumentation	FC	2		2	4	50	50	100	ENA-1/BEEE
241EE034 241EE027	Alternative Energy Sources (or) Utilization of Electrical Energy	IC	3			3	50	50	100	EPGDS / BEEE/ ISM
241EE037 241EE035	Hybrid Electric Vehicles (or) Special Electric machines	AC	3			3	50	50	100	FPE/ OCEM
241EE043 241EE030	Electrical Safety (or) Methods & Algorithms for Intelligent Control	AC	3			3	50	50	100	EPGDS/PSA
	Total		**18**		**2**	**20**				

Minor Degree in Electronics and Communication Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241EC087	Fundamentals of Communications	FC	2		1	3	50	50	100	-
241EC088	Fundamentals of Signal Processing	FC	2		1	3	50	50	100	-
241EC089	Analog & Digital Circuits	IC	2			2	50	50	100	BEEE
241EC042	Wireless LAN's & PAN's	IC	3			3	50	50	100	-
241EC090 241EC091	Linear & Digital IC Applications (or) Sensors & Actuators	IC	3			3	50	50	100	ADC
241EC092 241EC093	Embedded Microcontrollers (or) Digital System Design	IC	2		1	3	50	50	100	ADC, PPSC
241EC067	Introduction to Internet of Things (or) Modern Wireless Communications	AC	2		1	3	50	50	100	EM, WLAN's & PAN's
241EC074			3			3	50	50	100	FC
Total			**16**		**4**	**20**				

Minor Degree in Computer Science and Engineering

Course Code	Course Title	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241CS013	Operating Systems	IC	2		1	3	50	50	100	-
241CS007	Computer Networks	IC	2		1	3	50	50	100	-
241IT007	Agile Software Engineering	IC	2		1	3	50	50	100	PPSC
241AI003	Data Mining	IC	2		1	3	50	50	100	-
241CS008 241IT006	Object Oriented Programming through C++ (or) Java Programming	IC	2		2	4	50	50	100	PPSC
241CS016	Introduction to MERN Stack Development (or) Information Security Analysis & Audit	IC			2	2		100	100	JP
241CS030		IC	2			2	50	50	100	-
241CS018	Advanced MERN Stack Development (or) Flutter Fundamentals	AC			2	2		100	100	IMSD
241IT012		AC			2	2	50	50	100	-
Total			**12**		**8**	**20**				

Minor Degree in Data Science

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241IT007	Agile Software Engineering	IC	2		1	3	50	50	100	PPSC
241CS034	Fundamentals of Data Science	IC	2		1	3	50	50	100	-
241CS012	NoSQL Databases	IC	2			2	50	50	100	-
241AI003	Data Mining	IC	2		1	3	50	50	100	-
241CS037	Health Care Data Analytics (or) Business Intelligence & Analytics	IC	2		1	3	50	50	100	-
241CS036										PPSC
241AI004	Big Data Analytics (or) Data Visualization	AC	2		1	3	50	50	100	DM
241AI019										DAP
241CS041	Social Network Analysis (or) Social Networks & Semantic Web	AC	2		1	3	50	50	100	-
241CS040										
	Total		**14**		**6**	**20**				

Minor Degree in Artificial Intelligence and Machine Learning

Course Code	Course Title	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241AI002	Artificial Intelligence	IC	2		1	3	50	50	100	-
241AI005	Machine Learning	IC	2		2	4	50	50	100	DAP
241AI015	AI Chatbots	IC	2			2	50	50	100	AI
241AI014	Soft Computing (or) Fundamentals of Data Science	IC	2		1	3	50	50	100	AI
241CS034			2		1					-
241AI010	Natural Language Processing (or) Data Visualization	AC	2		1	3	50	50	100	DAP
241AI019										
241AI016	Prompt Engineering & GenAI (or) Social Network Analysis	AC	2		1	3	50	50	100	ML
241CS041										
241AI017	Federated Machine Learning	AC	2			2	50	50	100	ML
Total			**14**		**6**	**20**				

Minor Degree in Petroleum Technology

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241PT027	Introduction to Petroleum Engineering	FC	2			2	50	50	100	-
241PT035	Unit Operations in Petroleum Industry	FC	3			3	50	50	100	-
241PT047	Fundamentals of Geology & Reservoir Engineering	IC	3			3	50	50	100	-
241PT048 241PT016	Fundamentals of Drilling & Production Engineering (or) Unconventional Hydrocarbon Resources	IC	3			3	50	50	100	-
241PT049 241PT005	Natural Gas Hydrates (or) Fundamentals of Liquefied Natural Gas	AC	3			3	50	50	100	-
241PT050 241PT003	Artificial Lift Techniques (or) Enhanced Oil Recovery	AC	3			3	50	50	100	-
241PT012	Petroleum Refinery Engineering	AC	3			3	50	50	100	-
	Total		**20**			**20**				

Minor Degree in Mining Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241MN003	Development of Mineral Deposits	FC	3			3	50	50	100	-
241MN041	Green Mining	FC	3			3	50	50	100	-
241MN006	Surface Mining	IC	3			3	50	50	100	DMD
241MN024	Drilling & Blasting	IC	3			3			100	DMD
241MN007 241MN008	Underground Coal Mining Technology (or) Underground Metal Mining Technology	IC	3			3	50	50	100	DMD
241MN014 241MN028	Mine Legislation & General Safety (or) Environmental Pollution & Control	AC	3			3	50	50	100	UCMT / UMMT
241MN045 241MN046	Industrial Safety Practices (or) Ground Control	AC	2			2	50	50	100	-
TOTAL			**20**			**20**				

Minor Degree in Agricultural Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241AE082	Fundamentals of Renewable Energy Sources	FC	3			3	50	50	100	-
241AE083	Post-harvest Engineering of Cereal Crops	FC	3			3	50	50	100	-
241AE084	Ground Water Hydrology	FC	3			3	50	50	100	-
241AE085	Micro Irrigation Systems	IC	2			2	50	50	100	-
241AE086 241AE087	Surface Water Hydrology (OR) Land & Water Management Engineering	IC	3			3	50	50	100	GWH
241AE088 241AE089	Agricultural Process Engineering & Food Quality (OR) Post-harvest Engineering for Horticultural Produce.	AC	3			3	50	50	100	PHECC
241AE090 241AE091	Agricultural Machinery & Equipment (OR) Design of Bio-energy systems	AC	3			3	50	50	100	FRES
	Total		**20**			**20**				

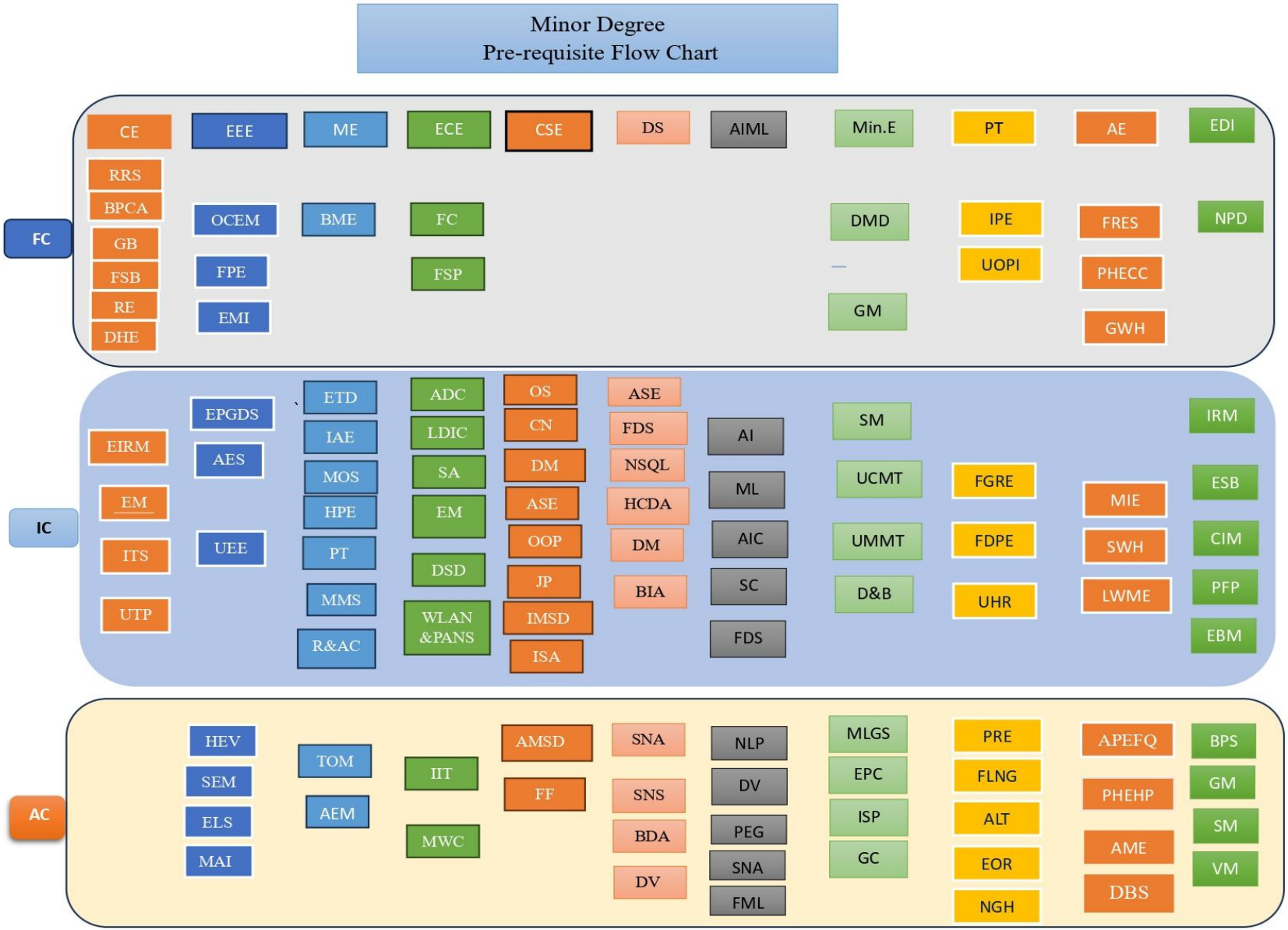
Minor Degree in Entrepreneurship Development & Incubation

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241MB007	New Product Development	FC	3			3	50	50	100	-
241MB008	Entrepreneurship & Small Business Management	IC	2			2	50	50	100	-
241MB009	Insurance & Risk Management	IC	3			3	50	50	100	-
241MB010	Change & Innovations Management	IC	3			3	50	50	100	-
241MB011 241MB012	Personal Financial Planning (or) E-Business management	IC	3			3	50	50	100	-
241MB013 241MB014	Business Policy & Strategic Management (or) Green Marketing	AC	3			3	50	50	100	-
241MB015 241MB016	Startup Management (or) Venture Management	AC	3			3	50	50	100	-
Total			**20**			**20**				

Minor Degree in Quantum Technologies

S.No.	Course Code	Course Name	L	T	P	C	Semester
Mandatory Courses							
1	241EC097	Survey of Quantum technologies and Application	3	0	0	3	IV
2	241EC098	Foundations of Quantum Technologies	3	0	0	3	V
3	241EC099	Basic Programming Lab (or)	1	0	2	3	V
	241EC100	Basic Laboratory Course for Quantum Technologies					
4	241EC101	Quantum Algorithms and Cryptography	12 week 3 Credit - NPTEL MOOC			3	VII/VIII

Any One course from the below							
5	241EC102	Introduction to Quantum Computation	3	0	0	3	VI
6	241EC103	Introduction to Quantum Communication	3	0	0	3	VI
7	241EC104	Introduction to Quantum Sensing	3	0	0	3	VI
8	241EC105	Introduction to Quantum Materials	3	0	0	3	VI
Any One course from the below							
9	241EC106	Engineering Foundations of Quantum Technologies	3	0	0	3	VII
10	241EC107	Solid State Physics for Quantum Technologies	3	0	0	3	VII
11	241EC108	Quantum Optics	3	0	0	3	VII
12	241EC109	Quantum Cybersecurity	3	0	0	3	VII
13	241EC110	Quantum Machine Learning	3	0	0	3	VII
Total			**18**	**0**	**0**	**18**	


Minor Degree
Pre-requisite Flow Chart
FC
CE
RRS
BPCA
GB
FSB
RE
DHE
EEE
OCEM
FPE
EMI
ME
BME
ECE
FC
FSP
CSE
DS
AIML
Min.E
DMD
GM
PT
IPE
UOPI
AE
FRES
PHECC
GWH
EDI
NPD
IC
EIRM
EM
ITS
UTP
EPGDS
AES
UEE
ETD
IAE
MOS
HPE
PT
MMS
R&AC
ADC
LDIC
SA
EM
DSD
WLAN &PANS
OS
CN
DM
ASE
OOP
JP
IMSD
ISA
ASE
FDS
NSQL
HCDA
DM
BIA
AI
ML
AIC
SC
FDS
SM
UCMT
UMMT
D&B
FGRE
FDPE
UHR
MIE
SWH
LWME
IRM
ESB
CIM
PFP
EBM
AC
HEV
SEM
ELS
MAI
TOM
AEM
IIT
MWC
AMSD
FF
SNA
SNS
BDA
DV
NLP
DV
PEG
SNA
FML
MLGS
EPC
ISP
GC
PRE
FLNG
ALT
EOR
NGH
APEFQ
PHEHP
AME
DBS
BPS
GM
SM
VM

Dept.	FOUNDATION COURSE		INTERMEDIATE- LEVEL COURSE		ADVANCED COURSE	
CE	RRS	Repair & Rehabilitation of Structures	EIRM	Environmental Impact & Risk Management		
	BPCA	Building Planning & Computer-Aided Drawing	EM	Environmental Microbiology		
	GB	Green Building	UTP	Urban Transportation Planning		
	FSB	Fundamental of Soil Behaviour	ITS	Intelligent Transportation Systems		
	RE	Railway Engineering				
	DHE	Docks & Harbour Engineering				
EEE	OCEM	Operation control of Electric Machines	AES	Alternative Energy Sources	MAI	Methods &Algorithms for Intelligent Control
	FPE	Fundamentals of Power Electronics	EPGDS	Electric Power Generation & Distribution Systems	HEV SEM	Hybrid Electric Vehicles Special Electric Machines
	EMI	Electrical Measurements & Instrumentation	UEE	Utilization of Electrical Energy		
					ELS	Electrical Safety
					MAI	Methods &Algorithms for Intelligent Control
ME	BME	Basic Mechanical Engineering	ETD	Engineering Thermodynamics	TOM	Theory of Machines
			IAE	Introduction to Automobile Engineering	AEM	Advanced Engineering Metrology
			MOS	Mechanics of Solids		
			HPE	Heat Power Engineering		
			PT	Production Technology		
			MMS	Metallurgy & Material Science		
			R&AC	Refrigeration &Air Conditioning		
ECE	FC	Fundamentals of Communications	ADC	Analog & Digital Circuits	IIT	Introduction to Internet of things
			LDIC	Linear & Digital IC Applications		
			SA	Sensors & Actuators		
	FSP	Fundamentals of Signal Processing	EM	Embedded Microcontrollers	MWC	Modern Wireless Communications
			DSD	Digital System Design		
			WLAN&PAN	Wireless LAN'S & PAN'S		
CSE			ASE	Agile Software Engineering	AMSD	Advanced MERN Stack Development
			OOP	Object Oriented Programming through C++		
			OS	Operating Systems	FF	Flutter Fundamentals
			CN	Computer Networks		
			JP	Java Programming		
			IMSD	Introduction to MERN Stack Development		
			ISA	Information Security Analysis & Audit		
			DM	Data Mining		
DS			DM	Data Mining	SNA	Social Network Analysis
			FDS	Fundamentals of Data Science	DV	Data Visualization
			ASE	Agile Software Engineering	BDA	Big Data Analytics
			NSQL	NoSQL Databases	SNSW	Social Networks & Semantic Web
			BIA	Business Intelligence & Analytics		
			HCDA	Health Care Data Analysis		
AIML			ML	Machine Learning	DV	Data Visualization
			AI	Artificial Intelligence	PEG	Prompt Engineering & GenAI
			AI C	AI Chatbot	SNA	Social Network Analysis
			FDS	Fundamentals of Data Science	FML	Federated Machine Learning
			SC	Soft Computing	NLP	Natural language processing
Min.E	DMD	Development of Mineral Deposits	SM	Surface Mining	MLGS	Mine Legislation & General Safety
	GM	Green Mining	UCMT	Underground Coal Mining Technology	EPC	Environmental Pollution & Control

			UMMT	Underground Metal Mining Technology	ISP	Industrial Safety Practices
			DB	Drilling & Blasting	GC	Ground Control
PT	IPE	Introduction to Petroleum Engineering	FGRE	Fundamentals of Geology & Reservoir Engineering	PRE	Petroleum Refinery Engineering
	UOPI	Unit operations in Petroleum Industry	FDPE	Fundamentals of Drilling & Production Engineering	FLNG	Fundamentals of Liquefied Natural Gas
					NGH	Natural Gas Hydrates
			UHR	Unconventional Hydrocarbon Resources	ALT	Artificial Lift Techniques
					EOR	Enhanced Oil Recovery
Ag.E	GWH	Ground Water Hydrology	LWME	Land & Water Management	DBS	Design of Bio-Energy Systems
	PHECC	Post-harvest Engineering of Cereal Crops	SWH	Surface Water Hydrology	PHEHP	Post-Harvest Engineering for Horticultural Produce
			MIE	Micro Irrigation Systems		
	FRES	Fundamentals of Renewable Energy Sources			AME	Agricultural Machinery & Equipment
					APEFQ	Agriculture Process Engineering & Food Quality
EDC	NPD	New Product Development	ESB	Entrepreneurship & Small Business Management	BPS	Business Policy & Strategic Management
			CIM	Change & Innovations Management	GM	Green Marketing
			PFP	Personal Financial Planning	SM	Startup Management
			EBM	E-Business Management	VM	Venture Management
			IRM	Insurance & Risk Management		