DMI COLLEGE OF ENGINEERING

(An Autonomous Institution)

Palanchur – Nazarethpet P.O., Chennai – 600 123

B. E. ELECTRONICS AND COMMUNICATION ENGINEERING

CHOICE BASED CREDIT SYSTEM

UG - CURRICULUM AND SYLLABI

R - 2024

I. PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

1. CORE COMPETENCY WITH EMPLOYABILITY SKILLS: Building on fundamental knowledge, to analyze, design and implement electronic circuits and systems in Electronics and Communication Engineering by applying knowledge of mathematics and science or in closely related fields with employability skills.

2. PROMOTE HIGHER EDUCATION AND RESEARCH AND DEVELOPMENT: To develop the ability to demonstrate technical competence and innovation that initiates interest for higher studies and research.

3. INCULCATING ENTREPRENEUR SKILLS: To motivate the students to become Entrepreneurs in multidisciplinary domain by adapting to the latest trends in technology catering the social needs.

4. ETHICAL PROFESSIONALISM: To develop the graduates to attain professional excellence with ethical attitude, communication skills, team work and develop solutions to the problems and exercise their capabilities.

II. PROGRAM OUTCOMES (POs)

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **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.
3. **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.
4. **Modern 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.
5. **The engineer and society**: 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.
6. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
7. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice

8. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
9. **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.
10. **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.
11. **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.

III. PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Analyze and design the Analog and Digital circuits or systems for a given specification and function.

PSO2: Implement functional blocks of hardware-software co-designs for signal processing and communication applications.

PSO3: Design, develop and test electronic and embedded systems for applications with real time constraint and to develop managerial skills with ethical behavior to work in a sustainable environment.

PEOs (1 to 4) mapped with POs and PSOs:

PEO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I	3	3	3	3	3	2	2	2	2	3	3	2	3	2	3
II	3	3	3	3	3	2	2	2	2	2	2	2	3	3	3
III	3	2	3	2	3	2	2	2	2	2	2	2	3	3	3
IV	3	2	2	2	3	2	2	3	2	2	2	2	2	2	2

1 - low, 2 - medium, 3 - high, '-' - no correlation

B. E. ELECTRONICS AND COMMUNICATION ENGINEERING
CHOICE BASED CREDIT SYSTEM
CURRICULUM AND SYLLABI FOR SEMESTERS III TO VIII

SEMESTER III

S.NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	MA1205	Random Processes and Linear Algebra	BS	3	1	0	4	**4**
2	CS1211	C Programming and Data Structures	ES	3	0	0	3	**3**
3	EC1201	Signals and Systems	PC	3	1	0	4	**4**
4	EC1202	Electronic Devices and Circuits	PC	3	0	0	3	**3**
5	EC1203	Control Systems	PC	3	1	0	4	**4**
6	EC1204	Digital Systems Design	PC	3	0	2	5	**4**
PRACTICALS								
7	EC1205	Electronic Devices and Circuits Laboratory	PC	0	0	4	4	**2**
8	CS1212	C Programming and Data Structures Laboratory	PC	0	0	4	4	**2**
9	EM1201	Professional Development[$]	EEC	0	0	2	2	**1**
			TOTAL	**18**	**3**	**12**	**33**	**27**

[$] **Skill Based Course**

SEMESTER IV

S.NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	EC1251	Electromagnetic Fields	PC	3	0	0	3	**3**
2	EC1252	Networks and Security	PC	3	0	2	5	**4**
3	EC1253	Linear Integrated Circuits	PC	3	0	0	3	**3**
4	EC1254	Digital Signal Processing	PC	3	0	2	5	**4**
5	EC1255	Communication Systems	PC	3	0	0	3	**3**
6	GE1251	Environmental Sciences and Sustainability	BS	2	0	0	2	**2**
		NCC Credit Course Level 2[#]		3	0	0	3	**3[#]**
PRACTICALS								
7	EC1256	Communication Systems Laboratory	PC	0	0	4	4	**2**
8	EC1257	Linear Integrated Circuits Laboratory	PC	0	0	4	4	**2**
			TOTAL	**17**	**0**	**12**	**32**	**23**

[#] **NCC Credit Course level 2 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.**

SEMESTER V

S .NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	EC1301	Wireless Communication	PC	3	0	2	5	**4**
2	EC1302	VLSI and Chip Design	PC	3	0	0	3	**3**
3	EC1303	Transmission lines and RF Systems	PC	3	0	0	3	**3**
4		Professional Elective I	PE	-	-	-	-	**3**
5		Professional Elective II	PE	-	-	-	-	**3**
6		Professional Elective III	PE	-	-	-	-	**3**
7		Mandatory Course-I[&]	MC	3	0	0	3	**0**
PRACTICALS								
8	EC1304	VLSI Laboratory	PC	0	0	4	4	**2**
			TOTAL	**-**	**-**	**-**	**-**	**21**

[&] Mandatory Course-I is a Non-credit Course (Student shall select one course from the list given under Mandatory Course-I)

SEMESTER VI

S.NO	COURS ECODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTAC T PERIODS	CREDITS
				L	T	P		
THEORY								
1	ET1351	Embedded Systems and IOT Design	PC	3	0	2	5	**4**
2	CS1361	Artificial Intelligence and Machine Learning	ES	3	0	2	5	**4**
3		Open Elective– I*	OE	3	0	0	3	**3**
4		Professional Elective IV	PE	-	-	-	-	**3**
5		Professional Elective V	PE	-	-	-	-	**3**
6		Professional Elective VI	PE	-	-	-	-	**3**
7		Mandatory Course-II [&]	MC	3	0	0	3	**0**
8		NCC Credit Course Level 3[#]		3	0	0	3	**3 [#]**
			TOTAL	**-**	**-**	**-**	**-**	**20**

***Open Elective – I Shall be chosen from the list of open electives offered by other Programmes**

[&] Mandatory Course-II is a Non-credit Course (Student shall select one course from the list given under Mandatory Course-II)

[#] NCC Credit Course level 3 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA

SEMESTER VII / VIII*

S. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	GE1401	Human Values and Ethics	HS	2	0	0	2	**2**
2		Elective - Management[#]	HS	3	0	0	3	**3**
3		Open Elective – II**	OE	3	0	0	3	**3**
4		Open Elective – III**	OE	3	0	0	3	**3**
5		Open Elective – IV**	OE	3	0	0	3	**3**
PRACTICALS								
6	EC1401	Summer internship	EEC	0	0	0	0	**2**
			TOTAL	**14**	**0**	**0**	**14**	**16**

***If students undergo internship in Semester VII, then the courses offered during semester VII will be offered during semester VIII.**
**** Open Elective II - IV (Shall be chosen from the list of open electives offered by other Programmes).**
[#] Elective - Management shall be chosen from the Elective Management courses.

SEMESTER VIII /VII*

S. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
PRACTICALS								
1	EC1451	Project Work / Internship	EEC	0	0	20	20	**10**
			TOTAL	**0**	**0**	**20**	**20**	**10**

***If students undergo internship in Semester VII, then the courses offered during semester VII will be offered during semester VIII.**

TOTAL CREDITS : 163

ELECTIVE – MANAGEMENT COURSES

S.NO	COURS ECODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	GE1402	Principles of Management	HS	3	0	0	3	**3**
2	GE1403	Total Quality Management	HS	3	0	0	3	**3**
3	GE1404	Engineering Economics and Financial Accounting	HS	3	0	0	3	**3**
4	GE1405	Human Resource Management	HS	3	0	0	3	**3**
5	GE1406	Knowledge Management	HS	3	0	0	3	**3**
6	GE1407	Industrial Management	HS	3	0	0	3	**3**

MANDATORY COURSES I

S.NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	MX1301	Introduction to Womenand Gender Studies	MC	3	0	0	3	**0**
2	MX1302	Elements of Literature	MC	3	0	0	3	**0**
3	MX1303	Film Appreciation	MC	3	0	0	3	**0**
4	MX1304	Disaster Risk Reductionand Management	MC	3	0	0	3	**0**

MANDATORY COURSES II

S.NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	MX1351	Well Being with Traditional Practices - Yoga, Ayurveda and Siddha	MC	3	0	0	3	**0**
2	MX1352	History of Science and Technology in India	MC	3	0	0	3	**0**
3	MX1353	Political and Economic Thought for a Humane Society	MC	3	0	0	3	**0**
4	MX1354	State,Nation Buildingand Politics in India	MC	3	0	0	3	**0**
5	MX1355	Industrial Safety	MC	3	0	0	3	**0**

PROFESSIONAL ELECTIVE COURSES: VERTICALS

Vertical I Semiconductor Chip Design and Testing	Vertical II Signal Processing	Vertical III RF Technologies	Vertical IV Bio Medical Technologies	Vertical V Sensor Technologies and IoT	Vertical VI High Speed Communications
Wide Bandgap Devices	Advanced Digital Signal Processing	RF Transceivers	WearableDevices	IoT Processors	Optical Communication & Networks
Validation and Testing Technology	Image Processing	Signal Integrity	Human Assist Devices	IoT Based System Design	Wireless Broad Band Networks
Low Power IC Design	Speech Processing	Antenna Design	Therapeutic Equipment	Wireless Sensor Network Design	4G/5G Communication Networks
VLSI Testing and Design For Testability	Software Defined Radio	MICs and RF System Design	Medical Imaging Systems	Industrial IoT and Industry 4.0	Software Defined Networks
Mixed Signal IC Design Testing	DSP Architectureand Programming	EMI/EMC Pre ComplianceTesting	Brain Computer Interface and Applications	MEMS Design	Massive MIMO Networks
Analog IC Design	Computer Vision	RFID System Design & Testing	Body Area Networks	Fundamentals of Nanoelectronics	Advanced Wireless Communication Techniques

Registration of Professional Elective Courses from Verticals:

The professional Elective Courses are listed in the Curriculum in Table format as verticals (Specialisation groups). A student can choose all the Professional Elective Courses either from one of the verticals or a combination of courses from all verticals in a semester. However, students irrespective of enrolling for additional courses for B.E. / B. Tech. are not permitted to choose more than one course from a row. Students are permitted to enroll more than one elective course from the same vertical in a semester. In the subsequent semesters students are permitted to enroll one more course in a row, provided if he/she has cleared the earlier course of the same row. For a professional elective course and open elective course, minimum number of students enrolment permitted shall be 10. However, the minimum number is not applicable for students enrolling B.E. / B. Tech. and B.E. / B. Tech. Minor. For the offer of each professional elective atleast two choices shall be offered.

PROFESSIONAL ELECTIVE COURSES: VERTICALS

VERTICAL 1: SEMICONDUCTOR CHIP DESIGN AND TESTING

S.NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EC1911	Wide Bandgap Devices	PE	2	0	2	4	**3**
2	EC1912	Validation and Testing Technology	PE	2	0	2	4	**3**
3	EC1913	Low Power IC Design	PE	2	0	2	4	**3**
4	EC1914	VLSI Testing and Design For Testability	PE	3	0	0	3	**3**
5	EC1915	Mixed Signal IC Design Testing	PE	2	0	2	4	**3**
6	EC1916	Analog IC Design	PE	2	0	2	4	**3**

VERTICAL 2: SIGNAL PROCESSING

S.NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EC1921	Advanced Digital Signal Processing	PE	2	0	2	4	**3**
2	EC1922	Image Processing	PE	3	0	0	3	**3**
3	EC1923	Speech Processing	PE	2	0	2	4	**3**
4	EC1924	Software Defined Radio	PE	2	0	2	4	**3**
5	EC1925	DSP Architecture and Programming	PE	2	0	2	4	**3**
6	EC1926	Computer Vision	PE	2	0	2	4	**3**

VERTICAL 3: RF TECHNOLOGIES

S.NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EC1931	RF Transceivers	PE	2	0	2	4	**3**
2	EC1932	Signal Integrity	PE	2	0	2	4	**3**
3	EC1933	Antenna Design	PE	2	0	2	4	**3**
4	EC1934	MICs and RF System Design	PE	2	0	2	4	**3**
5	EC1935	EMI/EMC Pre Compliance Testing	PE	2	0	2	4	**3**
6	EC1936	RFID System Design and Testing	PE	2	0	2	4	**3**

VERTICAL 4: BIO MEDICAL TECHNOLOGIES

S.NO	COURS ECODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EC1941	Wearable Devices	PE	3	0	0	3	**3**
2	EC1942	Human Assist Devices	PE	3	0	0	3	**3**
3	EC1943	Therapeutic Equipment	PE	3	0	0	3	**3**
4	EC1944	Medical Imaging Systems	PE	3	0	0	3	**3**
5	EC1945	Brain ComputerInterface and Applications	PE	3	0	0	3	**3**
6	EC1946	Body Area Networks	PE	3	0	0	3	**3**

VERTICAL 5: SENSOR TECHNOLOGIES AND IOT

S.NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EC1951	IoT Processors	PE	2	0	2	4	**3**
2	EC1952	IoT Based Systems Design	PE	3	0	0	3	**3**
3	EC1953	Wireless Sensor Network Design	PE	3	0	0	3	**3**
4	EC1954	Industrial IoT and Industry 4.0	PE	2	0	2	4	**3**
5	EC1955	MEMS Design	PE	2	0	2	4	**3**
6	EC1956	Fundamentals of Nanoelectronics	PE	2	0	2	4	**3**

VERTICAL 6: HIGH SPEED COMMUNICATIONS

S.NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EC1961	Optical Communication & Networks	PE	3	0	0	3	**3**
2	EC1962	Wireless Broad Band Networks	PE	3	0	0	3	**3**
3	EC1963	4G/5G Communication Networks	PE	2	0	2	4	**3**
4	EC1964	Software Defined Networks	PE	2	0	2	4	**3**
5	EC1965	Massive MIMO Networks	PE	2	0	2	4	**3**
6	EC1966	Advanced Wireless Communication Techniques	PE	3	0	0	3	**3**

OPEN ELECTIVES

(Students shall choose the open elective courses, such that the course contents are not similar to any other course contents/title under other course categories).

OPEN ELECTIVES – I

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	ME1701	Introduction to Industrial Engineering	OE	3	0	0	3	**3**
2	CE1701	Environmental and Social Impact Assessment	OE	3	0	0	3	**3**
3	EE1701	Renewable Energy System	OE	3	0	0	3	**3**
4	EE1702	Introduction to Industrial Instrumentation and Control	OE	3	0	0	3	**3**
5	MA1701	Graph Theory	OE	3	0	0	3	**3**
6	CS1701	Neural Networks and Deep Learning	OE	2	0	2	4	**3**
7	MG1701	Digital Marketing	OE	2	0	2	4	**3**

OPEN ELECTIVES – II

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	ME1702	Resource Management Techniques	OE	3	0	0	3	**3**
2	IT1701	IT in Agricultural System	OE	3	0	0	3	**3**
3	EE1703	Introduction to Control Engineering	OE	3	0	0	3	**3**
4	PH1701	Pharmaceutical Nanotechnology	OE	3	0	0	3	**3**
5	MG1702	Aviation Management	OE	3	0	0	3	**3**
6	CS1702	DevOps	OE	2	0	2	4	**3**
7	CS1703	Robotic Process Automation	OE	2	0	2	4	**3**

OPEN ELECTIVES – III

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	SH1701	English for Competitive Examinations	OEC	3	0	0	3	3
2	MG1703	NGOs and Sustainable Development	OEC	3	0	0	3	3
3	MG1704	Democracy and Good Governance	OEC	3	0	0	3	3
4	SH1702	Applied Design Thinking	OEC	3	0	0	3	3
5	ME1703	Reverse Engineering	OEC	3	0	0	3	3
6	ME1704	Sustainable Manufacturing	OEC	3	0	0	3	3
7	EE1704	Electric and Hybrid Vehicles	OEC	3	0	0	3	3
8	ME1705	Fire Safety Engineering	OEC	3	0	0	3	3
9	CE1702	Remote Sensing Concepts	OEC	3	0	0	3	3
10	ME1706	Introduction to non-destructive testing	OEC	3	0	0	3	3
11	EC1701	Foundation of Robotics	OEC	3	0	0	3	3
12	EC1702	Introduction to PLC Programming	OEC	3	0	0	3	3
13	ME1707	Nano Technology	OEC	3	0	0	3	3
14	ME1708	Functional Materials	OEC	3	0	0	3	3
15	EE1705	Energy Conservation and Management	OEC	3	0	0	3	3
16	EC1703	Signals and Systems	OEC	3	0	0	3	3
17	EC1704	Assistive Technology	OEC	3	0	0	3	3
18	MA1702	Operations Research	OEC	3	0	0	3	3

OPEN ELECTIVES IV

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	CE1703	Basics of Integrated Water Resources Management	OEC	3	0	0	3	3
2	SH1703	Project Report Writing	OEC	3	0	0	3	3
3	MA1703	Advanced Numerical Methods	OEC	3	0	0	3	3
4	MG1705	Production and Operations Management for Entrepreneurs	OEC	3	0	0	3	3
5	MA1704	Multivariate Data Analysis	OEC	3	0	0	3	3
6	ME1709	Micro and Precision Engineering	OEC	3	0	0	3	3
7	EE1706	Sensors and Actuators	OEC	3	0	0	3	3
8	ME1710	Nanomaterials and applications	OEC	3	0	0	3	3
9	EE1707	Sensors	OEC	3	0	0	3	3
10	EC1705	Concepts in Mobile Robots	OEC	3	0	0	3	3
11	EC1706	Drone Technologies	OEC	3	0	0	3	3
12	MG1706	Agriculture Entrepreneurship Development	OEC	3	0	0	3	3
13	EC1707	Wearable devices	OEC	3	0	0	3	3
14	EC1708	Medical Informatics	OEC	3	0	0	3	3
15	CE1704	Biotechnology for Waste Management	OEC	3	0	0	3	3
16	EC1709	Biotechnology in Health Care	OEC	3	0	0	3	3

SUMMARY

Name of the Programme: B.E. (Electronics and Communication Engineering)											
S.No	COURSE COMPONENTS	CREDITS PER SEMESTER								TOTAL CREDITS	PERCENTAGE
		I	II	III	IV	V	VI	VII/ VIII	VIII/VII		
1	HS	3	3					5		11	6.75
2	BS	8.5	8.5	4	2					23	14.11
3	ES	10.5	12.5	3			4			30	18.40
4	PC			19	21	12	4			56	34.36
5	PE					9	9			18	11.04
6	OE						3	9		12	7.36
7	EEC			1				2	10	13	7.98
8	Non-Credit /(Mandatory)					√	√				
	Total	22	24	27	23	21	20	16	10	163	100

ENROLLMENT FOR B.E. / B. TECH. (HONOURS) / MINOR DEGREE (OPTIONAL)

A student can also optionally register for additional courses (18 credits) and become eligible for the award of B.E. / B. Tech. (Honours) or Minor Degree.

For B.E. / B. Tech. (Honours), a student shall register for the additional courses (18 credits) from semester V onwards. These courses shall be from the same vertical or a combination of different verticals of the same programme of study only.

For minor degree, a student shall register for the additional courses (18 credits) from semester V onwards. All these courses have to be in a particular vertical from any one of the other programmes, Moreover, for minor degree the student can register for courses from any one of the following verticals also.

VERTICALS FOR MINOR DEGREE

(In addition to all the verticals of other programmes

Vertical I Fintech and Block Chain	Vertical II Entrepreneurship	Vertical III Public Administration	Vertical IV Business Data Analytics	Vertical V Environment and Sustainability
Financial Management	Foundations of Entrepreneurship	Principles of Public Administration	Statistics for Management	Sustainable infrastructure Development
Fundamentals ofInvestment	Team Building &Leadership Management forBusiness	Constitution of India	Datamining for Business Intelligence	Sustainable Agriculture and Environmental Management
Banking, Financial Servicesand Insurance	Creativity & Innovationin Entrepreneurship	Public Personnel Administration	Human Resource Analytics	Sustainable Bio Materials
Introduction to Blockchain and itsApplications	Principles of Marketing Management For Business	Administrative Theories	Marketing and Social Media Web Analytics	Materials for Energy Sustainability
Fintech Personal Finance and Payments	Human Resource Management for Entrepreneurs	Indian Administrative System	Operation and Supply Chain Analytics	Green Technology
Introduction toFintech	Financing New Business Ventures	Public Policy Administration	Financial Analytics	Environmental Quality Monitoring and Analysis
-	-	-	-	Integrated Energy Planning for Sustainable Development
-	-	-	-	Energy Efficiency for Sustainable Development

(Choice of courses for Minor degree is to be made from any one vertical of otherprogrammes or from anyone of the following verticals)

VERTICAL 1: FINTECH AND BLOCK CHAIN

S.NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	CMG01	Financial Management	PEC	3	0	0	3	**3**
2	CMG02	Fundamentals of Investment	PEC	3	0	0	3	**3**
3	CMG03	Banking, Financial Servicesand Insurance	PEC	3	0	0	3	**3**
4	CMG04	Introduction to Blockchainand its Applications	PEC	3	0	0	3	**3**
5	CMG05	Fintech Personal Financeand Payments	PEC	3	0	0	3	**3**
6	CMG06	Introduction to Fintech	PEC	3	0	0	3	**3**

VERTICAL 2: ENTREPRENEURSHIP

S.NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	CMG07	Foundations of Entrepreneurship	PEC	3	0	0	3	**3**
2	CMG08	Team Building & LeadershipManagement for Business	PEC	3	0	0	3	**3**
3	CMG09	Creativity & Innovation in Entrepreneurship	PEC	3	0	0	3	**3**
4	CMG10	Principles of Marketing Management For Business	PEC	3	0	0	3	**3**
5	CMG11	Human Resource Management for Entrepreneurs	PEC	3	0	0	3	**3**
6	CMG12	Financing New Business Ventures	PEC	3	0	0	3	**3**

VERTICAL 3: PUBLIC ADMINISTRATION

S.NO	COURSECODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	CMG13	Principles of Public Administration	PEC	3	0	0	3	**3**
2	CMG14	Constitution of India	PEC	3	0	0	3	**3**
3	CMG15	Public Personnel Administration	PEC	3	0	0	3	**3**
4	CMG16	Administrative Theories	PEC	3	0	0	3	**3**
5	CMG17	Indian Administrative System	PEC	3	0	0	3	**3**
6	CMG18	Public Policy Administration	PEC	3	0	0	3	**3**

VERTICAL 4: BUSINESS DATA ANALYTICS

S.NO	COURSECODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	CMG19	Statistics for Management	PEC	3	0	0	3	**3**
2	CMG20	Datamining for Business Intelligence	PEC	3	0	0	3	**3**
3	CMG21	Human Resource Analytics	PEC	3	0	0	3	**3**
4	CMG22	Marketing and Social Media Web Analytics	PEC	3	0	0	3	**3**
5	CMG23	Operation and Supply Chain Analytics	PEC	3	0	0	3	**3**
6	CMG24	Financial Analytics	PEC	3	0	0	3	**3**

VERTICAL 5: ENVIRONMENT AND SUSTAINABILITY

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	CES01	Sustainable infrastructure Development	PEC	3	0	0	3	**3**
2	CES02	Sustainable Agriculture and Environmental Management	PEC	3	0	0	3	**3**
3	CES03	Sustainable Bio Materials	PEC	3	0	0	3	**3**
4	CES04	Materials for Energy Sustainability	PEC	3	0	0	3	**3**
5	CES05	Green Technology	PEC	3	0	0	3	**3**
6	CES06	Environmental Quality Monitoring and Analysis	PEC	3	0	0	3	**3**
7	CES07	Integrated Energy Planning for Sustainable Development	PEC	3	0	0	3	**3**
8	CES08	Energy Efficiency for Sustainable Development	PEC	3	0	0	3	**3**

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