School Of Engineering & Technology
JAIN UNIVERSITY
Declared as Deemed-to-be University u/s 3 of the UGC Act,1956

HANDBOOK

ON

CHOICE BASED CREDIT SYSTEM (CBCS)

AS PER UGC GUIDELINES - DEC. 2016

IN

4-YEAR UNDERGRADUATE PROGRAMMES

2017

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Handbook on Choice Based Credit System(CBCS) - A Process

We are happy to state that we at School of Engineering and Technology (SET), Jain University have started to implement Choice Based Credit System (CBCS) starting from AY 2017-18 as per DO No: F1-1/2014(Secy) dt. 12-Nov-2014.

It was decided to implement CBCS at SET across all its constituent departments for its B.Tech programmes for students entering the University portal during Aug 2017, following the complete academic process as per JU Regulations; based on the mandate given by the office of Director (Academics & Planning).

1. It started with the initial discussion with the Director (Academics & Planning) and Director – SET, based on which an initial framework was arrived to implement the CBCS as per JU requirements
2. The customized CBCS guidelines as agreed upon (1) was shared with the Head of the Departments, and Sr. faculty involved in formulating a draft Scheme and Syllabus
3. Individual dept, under the leadership of HoD constituted a team of faculty to propose a draft scheme & syllabus
4. Individual departments proposed a scheme & syllabus as per CBCS framework, including the common scheme and syllabus for 1st year for discussion with the Director-SET. Based on multiple rounds of discussion the draft was revised to be presented to Standing Committee of the University.
5. The Director-SET presented the draft CBCS Scheme & Syllabus in Aug 2017, to Standing Committee chaired by Hon Vice Chancellor and its other members being Pro Vice Chancellor, Registrar, Director (Academics & Planning)
6. Based on the feedback received at the Standing Committee the Director and the respective HoDs within SET incorporated the valuable suggestions into the provisionally approved CBCS Scheme& Syllabus
7. The individual dept., took the provisionally approved Scheme & Syllabus as per CBCS framework to their respective Board of Studies (BoS)
8. Based on the detailed discussion the individual BoS approved the revised Scheme & Syllabus as per CBCS guidelines for approval.
9. As per JU academic process the revised Scheme & Syllabus was presented by the Director-SET, to the Planning and Monitoring Board (PMB) with infrastructure required to execute the revised Scheme & Syllabus as per CBCS guidelines. Few valuable comments that was received were -

a. Hon Vice Chancellor suggested to include English as compulsory subject, while Respected Registrar suggested to shift microcontroller subject to lower semester. Also Vice Chancellor suggested to give importance to design and analysis tools required.
b. In addition the committee discussed in details the budget for the implementation of the revised programmes

10. Finally the Director-SET post incorporation of the inputs, presented the finalized revised Scheme & Syllabus as per CBCS guidelines to the Academic Council, for approval. The Academic Council members appreciated the move to implement CBCS and approved the UG-CBCS scheme for all disciplines.

I take this opportunity to put on records the valuable support from the Hon Vice Chancellor, Registrar and the hand holding by Prof Jayagopal Uchil - Director (Academics & Planning), without their continued support and guidance it would not have been possible to be on the road to implement CBCS at SET.

Dr S A Hariprasad
Director
School of Engineering and Technology (SET),
Jain University

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Adoption of CBCS in UG Courses as per UGC Guidelines

Jain University has planned to implement the initiative of the University Grants Commission (UGC) to bring about a qualitative improvement in the national higher education system through Choice Based Credit System (CBCS) from the Academic Year 2017-18 in all 4-year Undergraduate (UG) B.Tech programmes.

The CBCS allows students to choose Discipline Specific Electives (intra disciplinary), Open Electives (interdisciplinary) and Skill Enhancement Courses along with Basic Science, Engineering Science, Mandatory, Human Social Science Courses and compulsory Core courses associated with B.Tech programme. The emphasis is shifted from teacher-centric education to the student-centric education and the CBCS makes education broad based and at par with global standards.

UGC Guidelines stipulates the following components for a 4-year UG B.Tech programme, each having a total of 180 credits (204 for the B.Tech (Hons)):

1. Basic Sciences [BS]	20 (32*) credits
2. Human Social Science [HSS]	12 credits
3. Core	75 (83*) credits
4. Engineering Sciences [ES]	18 credits
5. Mandatory Courses [MC]	09 credits
6. Department Specific Electives [DE]	18 (22*) credits
7. Open Electives [OE]	12 credits
8. Skill Enhancement course [SEC]	16 credits
Total	**180 (204*)Credits**

(* additional courses for B.Tech(Hons))

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List of Under Graduate (UG) Courses coming under Choice Based Credit System (CBCS) with Course Structure and Curriculum Matrix

Faculty of Engineering

1. Bachelor of Technology in Aerospace Engineering
2. Bachelor of Technology in Civil Engineering
3. Bachelor of Technology in Computer Science and Engineering
4. Bachelor of Technology in Computer Science and Engineering
   (with specialization in
   Cloud Technology and Information Security [CTIS] /
   Mobile Applications and Cloud Technology [MACT] /
   Internet of Things [IoT])
5. Bachelor of Technology(Hons) in Computer Science and Engineering (with specialization in Data science)
6. Bachelor of Technology in Electrical and Electronics Engineering
7. Bachelor of Technology in Electronics and Communication Engineering
8. Bachelor of Technology in Information Science and Engineering
9. Bachelor of Technology in Mechanical Engineering
10. Bachelor of Technology in Metallurgical Engineering

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B.Tech
Semester I and II
(Common for All Branches)

Course Matrix
B.TECH
I/II Semester –Physics Cycle

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Applied Engineering Mathematics -I	4	3-1-0	30		70	28	40
2	Sociology and Elements of Indian History for Engineers	3	3-0-0	30		70	28	40
3	Basics of Civil Engineering	2	2-0-0	30		70	28	40
4	Basics of Mechanical Engineering	2	2-0-0	30		70	28	40
5	Applied Physics	3	3-0-0	30		70	28	40
6	Engineering Graphics	4	4-0-0	30		70	28	40
7	Applied Physics Lab	1	0-0-2	100*				40
8	Workshop Practice	1	0-0-2	100*				40
9	Value Education Human Right and Legislative problems	3	3-0-0	30		70	28	40
	Total	23						

Course Matrix
B.TECH
I/II Semester – Chemistry Cycle

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester		Minimum Passing Marks
				Max. Marks	Min. Mark	Max. Mark	Min. Marks	
1	Applied Engineering Mathematics – II	4	3-1-0	30		70	28	40
2	Law for Engineers	3	3-0-0	30		70	28	40
3	Basics of Electrical Engineering	2	2-0-0	30		70	28	40
4	Basics of Electronics Engineering	2	2-0-0	30		70	28	40
5	Applied Chemistry	3	3-0-0	30		70	28	40
6	Problem Solving Through Programming	3	2-1-0	30		70	28	40
7	Applied Chemistry Lab	1	0-0-2	100*				40
8	Electrical and Electronics Lab	1	0-0-2	100*				40
9	Problem Solving Through Programming Lab	1	0-0-2	100*				40
10	Environmental Studies	3	3-0-0	30		70	28	40
	Total	23						

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B.Tech in AeroSpace Engineering

Course Matrix for

III to VIII Semesters

CBCS Structure

Sl N0	Type	No. of Theory Courses	No. of Lab Courses	credits
1	BS	05	02	**20**
2	HSS	04		**12**
3	Core	18	06	**75**
4	ES	07	03	**18**
5	MC	03		**09**
6	Dept Specific Electives	06		**18**
7	Open Electives	04		**12**
8	SEC			**16**
Total Credits				**180**

	Particulars								
Semester	**BS**	**HSS**	**Core**	**ES**	**MC**	**Dept. Elective**	**Open Elective**	**SEC**	**Total**
I	08	03	-	09	03	-	-	-	**23**
II	08	03	-	09	03	-	-	-	**23**
III	04	03	14	-	03	-	-	-	**24**
IV	-	03	21	-	-	-	-	-	**24**
V	-	-	24	-	-	-	-	-	**24**
VI	-	-	16	-	-	06	-	02	**24**
VII	-	-	-	-	-	12	06	02	**20**
VIII	-	-	-	-	-	-	06	12	**18**
Total	**20**	**12**	**75**	**18**	**09**	**18**	**12**	**16**	**180**

BS: Basic Science,

ES: Engineering Science

HSS: Humanity & Social Science

MC: Mandatory Course

SEC: Skill Enhancement Course

Course Matrix
III Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Engineering Mathematics - III	4	3-1-0	30		70	28	40
2	Economics for Engineers	3	3-0-0	30		70	28	40
3	Measurements and Instrumentation for Aerospace	4	4-0-0	30		70	28	40
4	Fluid Mechanics	3	3-0-0	30		70	28	40
5	Thermodynamics	3	3-0-0	30		70	28	40
6	Engineering Mechanics	3	3-0-0	30		70	28	40
7	Measurements and Instrumentation Lab	1	0-0-2	100*				40
8	Energy Studies	3	3-0-0	30		70	28	40

Course Matrix
IV Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Engineering Mathematics for Aerospace Engineers	4	3-1-0	30		70	28	40
2	Aerospace Vehicles and Systems	3	3-0-0	30		70	28	40
3	Machine Drawing	3	3-0-0	30		70	28	40
4	Aerodynamics – I	3	4-0-0	30		70	28	40
5	Aerospace Structures – I	3	4-0-0	30		70	28	40
6	Business Communication and Presentation skills	3	3-0-0	30		70	28	40
7	Engineering Materials and Manufacturing Processes	3	3-0-0	30		70	28	40
8	Aerospace Structures Lab	1	0-0-2	100*				40
9	Machine Shop and Presicion Engineering Lab	1	0-0-2	100*				40
	Total	24						

Course Matrix
V Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Propulsion – I	4	4-0-0	30		70	28	40
2	Aerodynamics – II	4	4-0-0	30		70	28	40
3	Aircraft Structures – II	4	4-0-0	30		70	28	40
4	Introduction to Space Technology	4	4-0-0	30		70	28	40
5	Heat and Mass Transfer	3	3-0-0	30		70	28	40
6	Composite Materials	3	3-0-0	30		70	28	40
7	Aerodynamics Lab	1	0-0-2	100*				40
8	Propulsion Lab	1	0-0-2	100*				40
	Total	24						

Course Matrix
VI Semester

I. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Aerospace Design – I	4	4-0-0	30		70	28	40
2	Flight Mechanics	4	4-0-0	30		70	28	40
3	Propulsion – II	4	4-0-0	30		70	28	40
4	Introduction to Finite Element Methods	4	4-0-0	30		70	28	40
5	Elective – I	3	3-0-0	30		70	28	40
6	Elective – II	3	3-0-0	30		70	28	40
7	Flight Lab Course (Mini Project)	2	---	100*				40
	Total	24						

Elective –I	
Sl. no	Subject Title
1	Aerospace Control Systems
2	Modern Control Theory
Elective –II	
Sl. no	Subject Title
1	Indroduction to Intellectual Property Rights
2	Operations Research

Course Matrix

VII Semester

Sl. No	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Elective –III	3	3-0-0	30		70	28	40
2	Elective –IV	3	3-0-0	30		70	28	40
3	Elective –V	3	3-0-0	30		70	28	40
4	Elective –VI	3	3-0-0	30		70	28	40
5	Open Elective-I	3	3-0-0	30		70	28	40
6	Open Elective-II	3	3-0-0	30		70	28	40
7	Project Work –I	2	--	50				20
	Total	20						

Elective – III	
Sl#	Subject Title
1	Aircraft Systems
2	Boundary Layer Theory

Elective – IV	
Sl#	Subject Title
1	Aerospace Avionics
2	Non-Destructive Tesing and Evaluation

Elective –V	
Sl#	Subject Title
1	Helicopter Aerodynamics and Vibrations
2	Vibration Control

Elective – VI	
Sl#	Subject Title
1	Aerospace Design - II
2	Vibrations of Elastic Systems

Open Elective - I

Sl #	Subject Title	Offering Department
1.	Green Technology	Civil Engineering
2.	Solid Waste Management	Civil Engineering
3.	Software Engineering	Computer Science & Engineering
4.	Data Structures and Algorithms	Computer Science & Engineering
5.	Automation and Control	Electronics and Communication Engineering
6.	Sensors and Actuators	Electronics and Communication Engineering
7.	Electrical Safety	Electrical and Electronics Engineering
8.	Management and Entrepreneurship	Electrical and Electronics Engineering
9.	Production Planning and Control	Mechanical Engineering
10.	Industrial Ergonomics	Mechanical Engineering
11.	Advanced Numerical Analysis	Mathematics

Open Elective - II

Sl #	Subject Title	Offering Department
1.	Construction Planning and Management	Civil Engineering
2.	Air Pollution	Civil Engineering
3.	Cloud Computing	Computer Science & Engineering
4.	Programming in Java	Computer Science & Engineering
5.	Embedded Controllers	Electronics and Communication Engineering
6.	Basics of Digital Signal Processing	Electronics and Communication Engineering
7.	Energy Management	Electrical and Electronics Engineering
8.	Sensors Technology	Electrical and Electronics Engineering
9.	Research methodology	Mechanical Engineering
10.	Automobile Engineering	Mechanical Engineering
11.	Advanced Physics for Engineers	Physics

Course Matrix
VIII Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Mark	Min. Marks	
1	Open Elective-III	3	3-0-0	30		70	28	40
2	Open Elective-IV	3	3-0-0	30		70	28	40
3	Internship/Project Work –II	12	--	100		100	40	80
	Total	18						

Open Elective - III

Sl #	Subject Title	Offering Department
1.	Operation Management	Aerospace Engineering
2.	Basics of Research and Development	Aerospace Engineering
3.	Environmental Impact Assessment	Civil Engineering
4.	Green Technology & Sustainability	Civil Engineering
5.	Web Technology	Computer Science & Engineering
6.	Software Testing	Computer Science & Engineering
7.	Information Security Basics	Computer Science & Engineering [IoT& Data Science]
8.	Big Data Analysis	Computer Science & Engineering [IoT& Data Science]
9.	Electronic Waste Management	Electronics and Communication Engineering
10.	Basics of Wireless Technologies	Electronics and Communication Engineering
11.	Solar and Wind Energy Systems	Electrical and Electronics Engineering
12.	Energy Conservation and Energy	Electrical and Electronics Engineering

	Storage	
13.	**Total Quality Management**	**Mechanical Engineering**
14.	**Statistical Quality Control**	**Mechanical Engineering**
15.	**Industrial Management**	**Metallurgical Engineering**
16.	**Design & Applications of Engineering Materials**	**Metallurgical Engineering**
17.	**Advanced Mathematical and Theoretical Statistics**	**Mathematics**

Open Elective - IV

Sl #	**Subject Title**	**Offering Department**
1.	**Engineering Management and Ethics**	**Aerospace Engineering**
2.	**Project Management**	**Aerospace Engineering**
3.	**Disaster Mitigation and Management**	**Civil Engineering**
4.	**Waste Water Engineering**	**Civil Engineering**
5.	**Internet of Things**	**Computer Science & Engineering**
6.	**Mobile Application Development**	**Computer Science & Engineering**
7.	**Sensor Technologies**	**Computer Science & Engineering [IoT& Data Science]**
8.	**Wireless Communication**	**Computer Science & Engineering [IoT& Data Science]**
9.	**Remote Sensing Applications**	**Electronics and Communication Engineering**
10	**Navigation Guidance and Control**	**Electronics and Communication Engineering**
11	**Emerging Technologies in Power Generation**	**Electrical and Electronics Engineering**
12	**Quality assurance and reliability**	**Electrical and Electronics Engineering**
13	**Supply Chain Management**	**Mechanical Engineering**
14	**Composite Materials**	**Metallurgical Engineering**
15	**Polymers(Rubbers & Plastic)**	**Metallurgical Engineering**
16	**Nano-material Sciences and Engineering Application**	**Chemistry**

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B.Tech in Civil Engineering

Course Matrix for

III to VIII Semesters

CBCS Structure

Sl N0	Type	No. of Theory Courses	No. of Lab Courses	credits
1	BS	05	02	**20**
2	HSS	04		**12**
3	Core	18	08	**75**
4	ES	07	03	**18**
5	MC	03		**09**
6	Dept Specific Electives	06		**18**
7	Open Electives	04		**12**
8	SEC			**16**
Total Credits				**180**

	Particulars								
Semester	**BS**	**HSS**	**Core**	**ES**	**MC**	**Dept. Elective**	**Open Elective**	**SEC**	**Total**
I	08	03	-	09	03	-	-	-	**23**
II	08	03	-	09	03	-	-	-	**23**
III	04	03	14	-	03	-	-	-	**24**
IV	-	03	21	-	-	-	-	-	**24**
V	-	-	24	-	-	-	-	-	**24**
VI	-	-	16	-	-	06	-	02	**24**
VII	-	-	-	-	-	12	06	02	**20**
VIII	-	-	-	-	-	-	06	12	**18**
Total	**20**	**12**	**75**	**18**	**09**	**18**	**12**	**16**	**180**

BS: Basic Science,

ES: Engineering Science

HSS: Humanity & Social Science

MC: Mandatory Course

SEC: Skill Enhancement Course

Course Matrix
III Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Engineering Mathematics –III	4	3-1-0	30	-	70	28	40
2	Economic for Engineers	3	3-0-0	30	-	70	28	40
3	Fluid Mechanics	4	4-0-0	30	-	70	28	40
4	Surveying Theory – I	4	4-0-0	30	-	70	28	40
5	Strength of Materials	4	4-0-0	30	-	70	28	40
6	Surveying Practice –I	1	0-0-2	100*	-	-	-	40
7	Basic materials Testing Lab	1	0-0-2	100*	-	-	-	40
8	Energy Study	3	3– 0 - 0	30	-	70	28	40
	Total	24						

Course Matrix
IV Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Building construction and concrete Technology	3	3-0-0	30	-	70	28	40
2	Soil Mechanics	4	4-0-0	30	-	70	28	40
3	Applied Hydraulics Engineering	4	4-0-0	30	-	70	28	40
4	Surveying Theory- II	4	4-0-0	30	-	70	28	40
5	Structural Analysis – I	4	4-0-0	30	-	70	28	40
6	Business Communication and Presentation skills	3	3-0-0	30	-	70	28	40
7	Surveying Practice-II	1	0-0-2	100*	-	-	-	40
8	Construction Materials and Testing Lab	1	0-0-2	100*	-	-	-	40
	Total	24						

Course Matrix
V Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Geology	3	3-0-0	30	-	70	28	40
2	Design of RCC Structure	4	4-0-0	30	-	70	28	40
3	Hydrology	4	4-0-0	30	-	70	28	40
4	Structural Analysis-II	4	4-0-0	30	-	70	28	40
5	Foundation Engineering	3	3-0-0	30	-	70	28	40
6	Transportation Engineering	3	3-0-0	30	-	70	28	40
7	Hydraulics & Hydraulics M/C Lab	1	0-0-2	100*	-	-	-	40
8	Computer Aided Building Drawing	1	0-0-2	30	-	70	28	40
	Total	23						

Course Matrix
VI Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Water Supply Engineering	3	3-0-0	30	-	70	28	40
2	Design of Steel Structures	4	4-0-0	30	-	70	28	40
3	Estimation and Costing	4	4-0-0	30	-	70	28	40
4	Irrigation Engineering	4	4-0-0	30	-	70	28	40
5	Elective I	3	3-0-0	30	-	70	28	40
6	Elective II	3	3-0-0	30	-	70	28	40
7	Extensive survey practice	1	0-0-2	100*	-	-	-	40
8	Soil Mechanics Lab	1	0-0-2	100*	-	-	-	40
	Total	23						

		Structural Engineering/ Construction Technology and management	Hydraulics/Environment Engineering	Highway/Geo-technical Engineering
Sl.No.	Subject Code	Name of the Subject	Name of the Subject	Name of the Subject
1	Elective I	Alternative Building materials	Air pollution and Control	Railway and Harbor engineering
2	Elective II	Design and Drawing of Reinforced cement concrete	Design and Drawing of Hydraulic Structures	Ground improvement techniques

Course Matrix
VII Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Elective III	3	3-0-0	30	-	70	28	40
2	Elective IV	3	3-0-0	30	-	70	28	40
3	Elective V	3	3-0-0	30	-	70	28	40
4	Elective VI	3	3-0-0	30	-	70	28	40
5	Open Elective I	3	3-0-0	30	-	70	28	40
6	Open Elective II	3	3-0-0	30	-	70	28	40
7	Project work- Phase 1	4	-	100 *	-	-	-	40
	Total	22						

		Structural Engineering/ Construction Technology and management	Hydraulics/Environment Engineering	Highway/Geo-technical Engineering
Sl.No.	Subject Code	Name of the Subject	Name of the Subject	Name of the Subject
1	Elective III	Advanced Concrete Technology	Remote Sensing and GIS	Urban transport planning
2	Elective IV	Pre-stressed concrete Structures	Waste water and Sanitation Engineering	Highway Geometric design
3	Elective V	Design and Drawing of Reinforced cement concrete structures	Open Channel flow	Pavement Design

Open Elective - I

Sl #	Subject Title	Offering Department
1.	Computational Fluid Dynamics and Aerodynamics	Aerospace Engineering
2.	Fracture Mechanics	Aerospace Engineering
3.	Software Engineering	Computer Science & Engineering
4.	Data Structures and Algorithms	Computer Science & Engineering
5.	Automation and Control	Electronics and Communication Engineering
6.	Sensors and Actuators	Electronics and Communication Engineering
7.	Electrical Safety	Electrical and Electronics Engineering
8.	Management and Entrepreneurship	Electrical and Electronics Engineering
9.	Production Planning and Control	Mechanical Engineering
10.	Industrial Ergonomics	Mechanical Engineering
11.	Advanced Numerical Analysis	Mathematics

Open Elective - II

Sl #	Subject Title	Offering Department
1.	Aircraft & Systems – Industry Perspective	Aerospace Engineering
2.	Micro Electro Mechanical Systems (MEMS)	Aerospace Engineering
3.	Cloud Computing	Computer Science & Engineering
4.	Programming in Java	Computer Science & Engineering
5.	Embedded Controllers	Electronics and Communication Engineering
6.	Basics of Digital Signal Processing	Electronics and Communication Engineering
7.	Energy Management	Electrical and Electronics Engineering

8.	Sensors Technology	Electrical and Electronics Engineering
9.	Research methodology	Mechanical Engineering
10.	Automobile Engineering	Mechanical Engineering
11.	Advanced Physics for Engineers	Physics

Course Matrix

VIII Semester

sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Open Elective III	3	3-0-0	30	-	70	28	40
2	Open Elective IV	3	3-0-0	30	-	70	28	40
3	Internship/ Project work –II (SEC)	12	-	100	-	100	40	80
	Total	18						

Open Elective - III

Sl #	Subject Title	Offering Department
1.	Operation Management	Aerospace Engineering
2.	Basics of Research and Development	Aerospace Engineering
3.	Web Technology	Computer Science & Engineering
4.	Software Testing	Computer Science & Engineering
5.	Information Security Basics	Computer Science & Engineering [IoT& Data Science]
6.	Big Data Analysis	Computer Science & Engineering [IoT& Data Science]
7.	Electronic Waste Management	Electronics and Communication Engineering
8.	Basics of Wireless Technologies	Electronics and Communication Engineering
9.	Solar and Wind Energy Systems	Electrical and Electronics Engineering
10.	Energy Conservation and Energy Storage	Electrical and Electronics Engineering
11.	Total Quality Management	Mechanical Engineering
12.	Statistical Quality Control	Mechanical Engineering
13.	Industrial Management	Metallurgical Engineering
14.	Design & Applications of Engineering Materials	Metallurgical Engineering
15.	Advanced Mathematical and Theoretical Statistics	Mathematics

Open Elective - IV

Sl #	Subject Title	Offering Department
1.	Engineering Management and Ethics	Aerospace Engineering
2.	Project Management	Aerospace Engineering
3.	Internet of Things	Computer Science & Engineering
4.	Mobile Application Development	Computer Science & Engineering
5.	Remote Sensing Applications	Electronics and Communication Engineering
6.	Navigation Guidance and Control	Electronics and Communication Engineering
7.	Emerging Technologies in Power	Electrical and Electronics Engineering

	Generation	
8.	**Quality assurance and reliability**	**Electrical and Electronics Engineering**
9.	**Supply Chain Management**	**Mechanical Engineering**
10.	**Composite Materials**	**Metallurgical Engineering**
11.	**Polymers(Rubbers & Plastic)**	**Metallurgical Engineering**
12.	**Nano-material Sciences and Engineering Application**	**Chemistry**

JAIN UNIVERSITY
Declared as Deemed-to-be University u/s 3 of the UGC Act 1956

B.Tech in Computer Science and Engineering

(Regular)

Course Matrix for

III to VIII Semesters

CBCS Structure

Sl N0	Type	No. of Theory Courses	No. of Lab Courses	credits
1	BS	05	02	**20**
2	HSS	04		**12**
3	Core	18	08	**75**
4	ES	07	03	**18**
5	MC	03		**09**
6	Dept Specific Electives	06		**18**
7	Open Electives	04		**12**
8	SEC			**16**
Total Credits				**180**

	Particulars								
Semester	**BS**	**HSS**	**Core**	**ES**	**MC**	**Dept. Elective**	**Open Elective**	**SEC**	**Total**
I	08	03	-	09	03	-	-	-	**23**
II	08	03	-	09	03	-	-	-	**23**
III	04	03	14	-	03	-	-	-	**24**
IV	-	03	21	-	-	-	-	-	**24**
V	-	-	24	-	-	-	-	-	**24**
VI	-	-	16	-	-	06	-	02	**24**
VII	-	-	-	-	-	12	06	02	**20**
VIII	-	-	-	-	-	-	06	12	**18**
Total	**20**	**12**	**75**	**18**	**09**	**18**	**12**	**16**	**180**

BS: Basic Science,

ES: Engineering Science

HSS: Humanity & Social Science

MC: Mandatory Course

SEC: Skill Enhancement Course

Course Matrix
III Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Mathematical Transforms	4	3-1-0	30		70	28	40
2	Economics for Engineers	3	3-0-0	30		70	28	40
3	Data Structures and Algorithms	4	4-0-0	30		70	28	40
4	Computer Organization and Architecture	3	3-0-0	30		70	28	40
5	Digital and Logic Design	4	3-1-0	30		70	28	40
6	Data Structures and Algorithms Lab	1	0-0-2	100*				40
7	Digital and Logic Design Lab	1	0-0-2	100*				40
8	Energy Studies	3	3-0-0	30		70	28	40
	Total	23						

Course Matrix
IV Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Discrete Mathematics and Graph Theory	3	3-0-0	30		70	28	40
2	Programming in JAVA	3	3-0-0	30		70	28	40
3	Automata Theory and Logic	4	4-0-0	30		70	28	40
4	Microcontroller and Embedded systems	4	4-0-0	30		70	28	40
5	Operating Systems	4	4-0-0	30		70	28	40
6	Business Communication and Presentation skills	3	3-0-0	30		70	28	40
7	Programming in JAVA Lab	1	0-0-2	100*				40
8	Microcontroller Lab	1	0-0-2	100*				40
	Total	23						

Course Matrix
V Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Probability, Statistics and Random Processes	3	3-0-0	30		70	28	40
2	Data Communication and Computer Networks	4	4-0-0	30		70	28	40
3	Database Systems	4	4-0-0	30		70	28	40
4	Software Engineering	4	4-0-0	30		70	28	40
5	Parallel Computing System	4	4-0-0	30		70	28	40
6	Web Technology	3	3-0-0	30		70	28	40
7	Database Systems Lab	1	0-0-2	100*				40
8	Parallel Computing Lab	1	0-0-2	100*				40
	Total	24						

Course Matrix
VI Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Advanced Computer Networks	4	4-0-0	30		70	28	40
2	Software Testing	4	4-0-0	30		70	28	40
3	Programming in .NET	4	4-0-0	30		70	28	40
4	Linux Internals	4	4-0-0	30		70	28	40
5	Elective – I	3	3-0-0	30		70	28	40
6	Elective – II	3	3-0-0	30		70	28	40
7	Computer Networks Lab	1	0-0-2	100*				40
8	Linux Internals Lab	1	0-0-2	100*				40
	Total	24						

Elective – I	
Sl#	Subject Title
1	Introduction to Wireless Networks
2	Introduction to Ad Hoc and Sensor Networks
3	Distributed Computing

Elective – II	
Sl#	Subject Title
1	Internet Security & Computer Forensics
2	Mobile Computing
3	Data warehousing and Mining

Course Matrix
VII Semester

Sl. No	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Elective –III	3	3-0-0	30		70	28	40
2	Elective –IV	3	3-0-0	30		70	28	40
3	Elective –V	3	3-0-0	30		70	28	40
4	Elective –VI	3	3-0-0	30		70	28	40
5	Open Elective-I	3	3-0-0	30		70	28	40
6	Open Elective-II	3	3-0-0	30		70	28	40
7	Project Work –I	4	--	100*				40
	Total	22						

Elective – III	
Sl#	Subject Title
1	Network Routing Algorithms
2	Foundation to Cryptography
3	Cloud Computing

Elective – IV	
Sl#	Subject Title
1	Network Management Systems
2	Big Data Analytics
3	Virtualization and Cloud Security

Elective – V	
Sl#	Subject Title
1	Information System Security Audit and Management
2	Web Semantics
3	Storage Area Networks

Elective – VI	
Sl#	Subject Title
1	Mobile Application Development
2	Internet of Things
3	Information Network Security

Open Elective - I

Sl #	Subject Title	Offering Department
1.	Computational Fuid Dynamics and Aerodynamics	Aerospace Engineering
2.	Fracture Mechanics	Aerospace Engineering
3.	Green Technology	Civil Engineering
4.	Solid Waste Management	Civil Engineering
5.	Automation and Control	Electronics and Communication Engineering
6.	Sensors and Actuators	Electronics and Communication Engineering
7.	Electrical Safety	Electrical and Electronics Engineering
8.	Management and Entrepreneurship	Electrical and Electronics Engineering
9.	Production Planning and Control	Mechanical Engineering
10.	Industrial Ergonomics	Mechanical Engineering
11.	Advanced Numerical Analysis	Mathematics

Open Elective - II

Sl #	Subject Title	Offering Department
1.	Aircraft & Systems – Industry Perspective	Aerospace Engineering
2.	Micro Electro Mechanical Systems (MEMS)	Aerospace Engineering
3.	Construction Planning and Management	Civil Engineering
4.	Air Pollution	Civil Engineering
5.	Embedded Controllers	Electronics and Communication Engineering
6.	Basics of Digital Signal Processing	Electronics and Communication Engineering
7.	Energy Management	Electrical and Electronics Engineering
8.	Sensors Technology	Electrical and Electronics Engineering
9.	Research methodology	Mechanical Engineering
10.	Automobile Engineering	Mechanical Engineering
11.	Advanced Physics for Engineers	Physics

Course Matrix
VIII Semester

Sl. No.	Name of the Subject Open Elective	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Mark	Min. Marks	Max. Mark	Min. Marks	
1	Open Elective-III	3	3-0-0	30		70	28	40
2	Open Elective-IV	3	3-0-0	30		70	28	40
3	Internship/Project work –II	12	--	100		100	40	80
	Total	18						

Open Elective - III

Sl #	Subject Title	Offering Department
1.	Operation Management	Aerospace Engineering
2.	Basics of Research and Development	Aerospace Engineering
3.	Environmental Impact Assessment	Civil Engineering
4.	Green Technology & Sustainability	Civil Engineering
5.	Web Technology	Computer Science & Engineering
6.	Software Testing	Computer Science & Engineering
7.	Information Security Basics	Computer Science & Engineering [IoT& Data Science]
8.	Big Data Analysis	Computer Science & Engineering [IoT& Data Science]
9.	Electronic Waste Management	Electronics and Communication Engineering
10.	Basics of Wireless Technologies	Electronics and Communication Engineering
11.	Solar and Wind Energy Systems	Electrical and Electronics Engineering
12.	Energy Conservation and Energy Storage	Electrical and Electronics Engineering
13.	Total Quality Management	Mechanical Engineering
14.	Statistical Quality Control	Mechanical Engineering
15.	Industrial Management	Metallurgical Engineering
16.	Design & Applications of Engineering Materials	Metallurgical Engineering
17.	Advanced Mathematical and Theoretical Statistics	Mathematics

Open Elective - IV

Sl #	Subject Title	Offering Department
1.	Engineering Management and Ethics	Aerospace Engineering
2.	Project Management	Aerospace Engineering
3.	Disaster Mitigation and Management	Civil Engineering
4.	Waste Water Engineering	Civil Engineering
5.	Internet of Things	Computer Science & Engineering
6.	Mobile Application Development	Computer Science & Engineering
7.	Sensor Technologies	Computer Science & Engineering [IoT& Data Science]
8.	Wireless Communication	Computer Science & Engineering [IoT& Data Science]
9.	Remote Sensing Applications	Electronics and Communication Engineering
10	Navigation Guidance and Control	Electronics and Communication Engineering
11	Emerging Technologies in Power Generation	Electrical and Electronics Engineering
12	Quality assurance and reliability	Electrical and Electronics Engineering
13	Supply Chain Management	Mechanical Engineering
14	Composite Materials	Metallurgical Engineering
15	Polymers(Rubbers & Plastic)	Metallurgical Engineering
16	Nano-material Sciences and Engineering Application	Chemistry

JAIN UNIVERSITY
Declared as Deemed-to-be University u/s 3 of the UGC Act 1956

B.Tech in Computer Science and Engineering[with specialization in Cloud Technology & Information Security (CTIS)]

Course Matrix for

III to VIII Semesters

CBCS Structure

Sl N0	Type	No. of Theory Courses	No. of Lab Courses	credits
1	BS	05	02	**20**
2	HSS	04		**12**
3	Core	18	08	**75**
4	ES	07	03	**18**
5	MC	03		**09**
6	Dept Specific Electives	06		**18**
7	Open Electives	04		**12**
8	SEC			**16**
Total Credits				**180**

	Particulars								
Semester	**BS**	**HSS**	**Core**	**ES**	**MC**	**Dept. Elective**	**Open Elective**	**SEC**	**Total**
I	08	03	-	09	03	-	-	-	**23**
II	08	03	-	09	03	-	-	-	**23**
III	04	03	14	-	03	-	-	-	**24**
IV	-	03	21	-	-	-	-	-	**24**
V	-	-	24	-	-	-	-	-	**24**
VI	-	-	16	-	-	06	-	02	**24**
VII	-	-	-	-	-	12	06	02	**20**
VIII	-	-	-	-	-	-	06	12	**18**
Total	**20**	**12**	**75**	**18**	**09**	**18**	**12**	**16**	**180**

BS: Basic Science,

ES: Engineering Science

HSS: Humanity & Social Science

MC: Mandatory Course

SEC: Skill Enhancement Course

Course Matrix
III Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Mathematical Transforms	4	4-0-0	30		70	28	40
2	Economics for Engineers	3	3-0-0	30		70	28	40
3	Data Structures and Algorithms	4	4-0-0	30		70	28	40
4	Computer Organization and Architecture	3	3-0-0	30		70	28	40
5	Software Engineering	4	4-0-0	30		70	28	40
6	Data Structures and Algorithms Lab	1	0-0-2	100*				40
7	Software Engineering Lab	1	0-0-2	100*				40
8	Energy Studies	3	3-0-0	30		70	28	40
	Total	23						

Course Matrix
IV Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Operating Systems Building Blocks	4	4-0-0	30		70	28	40
2	Object Oriented Programming with JAVA	3	3-0-0	30		70	28	40
3	Computer Networks	3	3-0-0	30		70	28	40
4	Introduction to Information Security (tool Based)	4	3-0-2	30		70	28	40
5	Relational Data Base Management System (tool based)	4	3-0-2	30		70	28	40
6	Business Communication and Presentation skills	3	3-0-0	30		70	28	40
7	Object Oriented Programming with JAVA Lab	1	0-0-2	100*				40
8	Operating Systems Building Block Lab (Linux)	1	0-0-2	100*				40
	Total	23						

Course Matrix
V Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Principles of Virtualization	3	3-0-0	30		70	28	40
2	Data Storage Management	3	3-0-0	30		70	28	40
3	Network Security (tool based)	4	3-0-2	30		70	28	40
4	Introduction to Cryptography	3	3-0-0	30		70	28	40
5	Installation & configuration of Server	3	3-0-0	30		70	28	40
6	Fundamentals of Datacentre	4	4-0-0	30		70	28	40
7	Principles of Virtualization Lab	2	0-0-4	100*				40
8	Installation & configuration of Server Lab	2	0-0-4	100*				40
	Total	24						

Course Matrix
VI Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Introduction to Cloud Technology	3	3-0-0	30		70	28	40
2	Enterprise Network Engineering	4	4-0-0	30		70	28	40
3	Database Security	3	3-0-0	30		70	28	40
4	Ethical Hacking	3	3-0-0	30		70	28	40
5	Elective I	3	3-0-0	30		70	28	40
6	Elective II	3	3-0-0	30		70	28	40
7	Enterprise Network Engineering Lab	1	0-0-2	100*				40
8	Ethical Hacking Lab	2	0-0-4	100*				40
	Total	22						

Elective – I	
Sl#	Subject Title
1	Big Data Analytics
2	Machine Learning
3	Data Mining

Elective – II	
Sl#	Subject Title
1	COBIT, VALIT & RISKIT
2	Hacktivism, Cyber warfare & Cyber Terrorism
3	Disaster Recovery & Business Continuity Management

Course Matrix
VII Semester

Sl. No	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Elective III	4	3-0-2	30		70	28	40
2	Elective IV	4	3-0-2	30		70	28	40
3	Elective V	3	3-0-0	30		70	28	40
4	Elective VI	3	3-0-0	30		70	28	40
5	Open Elective-I	3	3-0-0	30		70	28	40
6	Open Elective-II	3	3-0-0	30		70	28	40
7	Mini Project	4	--	100*				40
	Total	24						

Elective – III	
Sl#	Subject Title
1	Cloud Management System
2	Cloud Web Services
3	Cloud Solution Management

Elective – IV	
Sl#	Subject Title
1	Cyber Forensics
2	HTML5
3	Angular JS

Elective – V	
Sl#	Subject Title
1	Cloud Security
2	Mobile Data Management
3	Mobile Security

Elective – VI	
Sl#	Subject Title
1	Linux Administration
2	Windows Administration
3	Android Administration

Open Elective - I

Sl #	Subject Title	Offering Department
1.	Computational Fluid Dynamics and Aerodynamics	Aerospace Engineering
2.	Fracture Mechanics	Aerospace Engineering
3.	Green Technology	Civil Engineering
4.	Solid Waste Management	Civil Engineering
5.	Automation and Control	Electronics and Communication Engineering
6.	Sensors and Actuators	Electronics and Communication Engineering
7.	Electrical Safety	Electrical and Electronics Engineering
8.	Management and Entrepreneurship	Electrical and Electronics Engineering
9.	Production Planning and Control	Mechanical Engineering
10.	Industrial Ergonomics	Mechanical Engineering
11.	Advanced Numerical Analysis	Mathematics

Open Elective - II

Sl #	Subject Title	Offering Department
1.	Aircraft & Systems – Industry Perspective	Aerospace Engineering
2.	Micro Electro Mechanical Systems (MEMS)	Aerospace Engineering
3.	Construction Planning and Management	Civil Engineering
4.	Air Pollution	Civil Engineering
5.	Embedded Controllers	Electronics and Communication Engineering
6.	Basics of Digital Signal Processing	Electronics and Communication Engineering
7.	Energy Management	Electrical and Electronics Engineering
8.	Sensors Technology	Electrical and Electronics Engineering
9.	Research methodology	Mechanical Engineering
10.	Automobile Engineering	Mechanical Engineering
11.	Advanced Physics for Engineers	Physics

Course Matrix
VIII Semester

Sl. No.	Name of the Subject Open Elective	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing
				Max. Marks	Min. Mar	Max. Marks	Min. Mar	
1	Open Elective-III	3	3-0-0	30		70	28	40
2	Open Elective-IV	3	3-0-0	30		70	28	40
3	Internship/ Project work –II [SEC]	12	--	100		100	40	80
	Total	18						

Open Elective - III

Sl #	Subject Title	Offering Department
1.	Operation Management	Aerospace Engineering
2.	Basics of Research and Development	Aerospace Engineering
3.	Environmental Impact Assessment	Civil Engineering
4.	Green Technology & Sustainability	Civil Engineering
5.	Electronic Waste Management	Electronics and Communication Engineering
6.	Basics of Wireless Technologies	Electronics and Communication Engineering
7.	Solar and Wind Energy Systems	Electrical and Electronics Engineering
8.	Energy Conservation and Energy Storage	Electrical and Electronics Engineering
9.	Total Quality Management	Mechanical Engineering
10.	Statistical Quality Control	Mechanical Engineering
11.	Industrial Management	Metallurgical Engineering
12.	Design & Applications of Engineering Materials	Metallurgical Engineering
13.	Advanced Mathematical and Theoretical Statistics	Mathematics

Open Elective - IV

Sl #	Subject Title	Offering Department
1.	Engineering Management and Ethics	Aerospace Engineering
2.	Project Management	Aerospace Engineering
3.	Disaster Mitigation and Management	Civil Engineering
4.	Waste Water Engineering	Civil Engineering
5.	Remote Sensing Applications	Electronics and Communication Engineering
6.	Navigation Guidance and Control	Electronics and Communication Engineering
7.	Emerging Technologies in Power Generation	Electrical and Electronics Engineering
8.	Quality assurance and reliability	Electrical and Electronics Engineering
9.	Supply Chain Management	Mechanical Engineering
10.	Composite Materials	Metallurgical Engineering
11.	Polymers(Rubbers & Plastic)	Metallurgical Engineering
12.	Nano-material Sciences and Engineering Application	Chemistry

JAIN UNIVERSITY
Declared as Deemed-to-be University u/s 3 of the UGC Act 1956

B.Tech in Computer Science and Engineering [with specialization in Mobile Application &Cloud Technology (MACT)]

Course Matrix for

III to VIII Semesters

CBCS Structure

Sl N0	Type	No. of Theory Courses	No. of Lab Courses	credits
1	BS	05	02	**20**
2	HSS	04		**12**
3	Core	18	08	**75**
4	ES	07	03	**18**
5	MC	03		**09**
6	Dept Specific Electives	06		**18**
7	Open Electives	04		**12**
8	SEC			**16**
Total Credits				**180**

	Particulars								
Semester	**BS**	**HSS**	**Core**	**ES**	**MC**	**Dept. Elective**	**Open Elective**	**SEC**	**Total**
I	08	03	-	09	03	-	-	-	**23**
II	08	03	-	09	03	-	-	-	**23**
III	04	03	14	-	03	-	-	-	**24**
IV	-	03	21	-	-	-	-	-	**24**
V	-	-	24	-	-	-	-	-	**24**
VI	-	-	16	-	-	06	-	02	**24**
VII	-	-	-	-	-	12	06	02	**20**
VIII	-	-	-	-	-	-	06	12	**18**
Total	**20**	**12**	**75**	**18**	**09**	**18**	**12**	**16**	**180**

BS: Basic Science,

ES: Engineering Science

HSS: Humanity & Social Science

MC: Mandatory Course

SEC: Skill Enhancement Course

Course Matrix
III Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Mathematical Transforms	4	4-0-0	30		70	28	40
2	Economics for Engineers	3	3-0-0	30		70	28	40
3	Data Structures and Algorithms	4	4-0-0	30		70	28	40
4	Computer Organization and Architecture	3	3-0-0	30		70	28	40
5	Object Oriented Programming with C++	4	4-0-0	30		70	28	40
6	Data Structures and Algorithms Lab	1	0-0-2	100*				40
7	Object Oriented Programming with C++ Lab	1	0-0-2	100*				40
8	Energy Studies	3	3-0-0	30		70	28	40
	Total	23						

Course Matrix
IV Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Operating Systems Building Blocks	4	4-0-0	30		70	28	40
2	Mobile Architecture & App Development	3	3-0-0	30		70	28	40
3	Computer Networks	3	3-0-0	30		70	28	40
4	Basic Android Development	4	4-0-0	30		70	28	40
5	Relational Data Base Management System (tool based)	4	3-0-2	30		70	28	40
6	Business Communication and Presentation skills	3	3-0-0	30		70	28	40
7	Basic Android Development Lab	1	0-0-2	100*				40
8	Operating Systems Building Block Lab (Linux)	1	0-0-2	100*				40
	Total	23						

Course Matrix
V Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Principles of Virtualization	3	3-0-0	30		70	28	40
2	Data Storage Management	3	3-0-0	30		70	28	40
3	Enterprise Application Development	4	3-0-2	30		70	28	40
4	Basic iOS Development (tool based)	4	3-0-2	30		70	28	40
5	Installation & configuration of Server	3	3-0-0	30		70	28	40
6	Fundamentals of Datacenter	3	3-0-0	30		70	28	40
7	Principles of Virtualization Lab	2	0-0-4	100*				40
8	Installation & configuration of Server Lab	2	0-0-4	100*				40
	Total	24						

Course Matrix
VI Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Introduction to Cloud Technology	3	3-0-0	30		70	28	40
2	Enterprise Network Engineering	4	4-0-0	30		70	28	40
3	Advanced Android Programming	3	3-0-0	30		70	28	40
4	Advanced iOS Programming (Tool based)	4	3-0-2	30		70	28	40
5	Elective I	3	3-0-0	30		70	28	40
6	Elective II	3	3-0-0	30		70	28	40
7	Enterprise Network Engineering Lab	1	0-0-2	100*				40
8	Advanced Android Programming Lab	1	0-0-2	100*				40
	Total	22						

Elective – I	
Sl#	Subject Title
1	Big Data Analytics
2	Machine Learning
3	Data Mining

Elective – II	
Sl#	Subject Title
1	COBIT, VALIT & RISKIT
2	Hacktivism, Cyber warfare & Cyber Terrorism
3	Disaster Recovery & Business Continuity Management

Course Matrix
VII Semester

Sl. No	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Elective III	4	3-0-2	30		70	28	40
2	Elective IV	4	3-0-2	30		70	28	40
3	Elective V	3	3-0-0	30		70	28	40
4	Elective VI	3	3-0-0	30		70	28	40
5	Open Elective-I	3	3-0-0	30		70	28	40
6	Open Elective-II	3	3-0-0	30		70	28	40
7	Mini Project	4	--	100*				40
	Total	24						

Elective – III	
Sl#	Subject Title
1	Cloud Management System
2	Cloud Web Services
3	Cloud Solution Management

Elective – IV	
Sl#	Subject Title
1	Introduction to UI / UX
2	HTML5
3	Angular JS

Elective – V	
Sl#	Subject Title
1	Mobile Testing
2	Mobile Data Management
3	Mobile Security

Elective – VI	
Sl#	Subject Title
1	Linux Administration
2	Windows Administration
3	Android Administration

Open Elective - I

Sl #	Subject Title	Offering Department
1.	Computational Fluid Dynamics and Aerodynamics	Aerospace Engineering
2.	Fracture Mechanics	Aerospace Engineering
3.	Green Technology	Civil Engineering
4.	Solid Waste Management	Civil Engineering
5.	Automation and Control	Electronics and Communication Engineering
6.	Sensors and Actuators	Electronics and Communication Engineering
7.	Electrical Safety	Electrical and Electronics Engineering
8.	Management and Entrepreneurship	Electrical and Electronics Engineering
9.	Production Planning and Control	Mechanical Engineering
10.	Industrial Ergonomics	Mechanical Engineering
11.	Advanced Numerical Analysis	Mathematics

Open Elective - II

Sl #	Subject Title	Offering Department
1.	Aircraft & Systems – Industry Perspective	Aerospace Engineering
2.	Micro Electro Mechanical Systems (MEMS)	Aerospace Engineering
3.	Construction Planning and Management	Civil Engineering
4.	Air Pollution	Civil Engineering
5.	Embedded Controllers	Electronics and Communication Engineering
6.	Basics of Digital Signal Processing	Electronics and Communication Engineering
7.	Energy Management	Electrical and Electronics Engineering
8.	Sensors Technology	Electrical and Electronics Engineering
9.	Research methodology	Mechanical Engineering
10.	Automobile Engineering	Mechanical Engineering
11.	Advanced Physics for Engineers	Physics

Course Matrix
VIII Semester

Sl. No.	Name of the Subject Open Elective	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Mark	Min. Mark	Max. Mark	Min. Mark	
1	Open Elective-III	3	3-0-0	30		70	28	40
2	Open Elective-IV	3	3-0-0	30		70	28	40
3	Internship/ Project work –II [SEC]	12	--	100		100	40	80
	Total	18						

Open Elective - III

Sl #	Subject Title	Offering Department
1.	Operation Management	Aerospace Engineering
2.	Basics of Research and Development	Aerospace Engineering
3.	Environmental Impact Assessment	Civil Engineering
4.	Green Technology & Sustainability	Civil Engineering
5.	Electronic Waste Management	Electronics and Communication Engineering
6.	Basics of Wireless Technologies	Electronics and Communication Engineering
7.	Solar and Wind Energy Systems	Electrical and Electronics Engineering
8.	Energy Conservation and Energy Storage	Electrical and Electronics Engineering
9.	Total Quality Management	Mechanical Engineering
10.	Statistical Quality Control	Mechanical Engineering
11.	Industrial Management	Metallurgical Engineering
12.	Design & Applications of Engineering Materials	Metallurgical Engineering
13.	Advanced Mathematical and Theoretical Statistics	Mathematics

Open Elective - IV

Sl #	Subject Title	Offering Department
1.	Engineering Management and Ethics	Aerospace Engineering
2.	Project Management	Aerospace Engineering
3.	Disaster Mitigation and Management	Civil Engineering
4.	Waste Water Engineering	Civil Engineering
5.	Remote Sensing Applications	Electronics and Communication Engineering
6.	Navigation Guidance and Control	Electronics and Communication Engineering
7.	Emerging Technologies in Power Generation	Electrical and Electronics Engineering
8.	Quality assurance and reliability	Electrical and Electronics Engineering
9.	Supply Chain Management	Mechanical Engineering
10.	Composite Materials	Metallurgical Engineering
11.	Polymers(Rubbers & Plastic)	Metallurgical Engineering
12.	Nano-material Sciences and Engineering Application	Chemistry

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B.Tech in Computer Science and Engineering [with specialization in Internet of Things (IoT)]

Course Matrix for

III to VIII Semesters

CBCS Structure

Sl N0	Type	No. of Theory Courses	No. of Lab Courses	credits
1	BS	05	02	**20**
2	HSS	04		**12**
3	Core	18	08	**75**
4	ES	07	03	**18**
5	MC	03		**09**
6	Dept Specific Electives	06		**18**
7	Open Electives	04		**12**
8	SEC			**16**
Total Credits				**180**

	Particulars								
Semester	**BS**	**HSS**	**Core**	**ES**	**MC**	**Dept. Elective**	**Open Elective**	**SEC**	**Total**
I	08	03	-	09	03	-	-	-	**23**
II	08	03	-	09	03	-	-	-	**23**
III	04	03	14	-	03	-	-	-	**24**
IV	-	03	21	-	-	-	-	-	**24**
V	-	-	24	-	-	-	-	-	**24**
VI	-	-	16	-	-	06	-	02	**24**
VII	-	-	-	-	-	12	06	02	**20**
VIII	-	-	-	-	-	-	06	12	**18**
Total	**20**	**12**	**75**	**18**	**09**	**18**	**12**	**16**	**180**

BS: Basic Science,

ES: Engineering Science

HSS: Humanity & Social Science

MC: Mandatory Course

SEC: Skill Enhancement Course

Course Matrix
III Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Mathematical Transforms	4	3-1-0	30		70	28	40
2	Economics for Engineers	3	3-0-0	30		70	28	40
3	Data Structures and Algorithms	4	4-0-0	30		70	28	40
4	Computer Organization and Architecture	3	3-0-0	30		70	28	40
5	Object Oriented Programming with Java	4	3-1-0	30		70	28	40
6	Data Structures and Algorithms Lab	1	0-0-2	100*				40
7	Object Oriented Programming with Java	1	0-0-2	100*				40
8	Energy Studies	3	3-0-0	30		70	28	40
	Total	23						

Course Matrix
IV Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Operating System	3	3-0-0	30		70	28	40
2	Introduction to IoT, Cloud and Big Data	3	3-0-0	30		70	28	40
3	Computer Networks	4	4-0-0	30		70	28	40
4	Database Management System (Relational & NoSQL)	4	4-0-0	30		70	28	40
5	Information Security Basics	4	4-0-0	30		70	28	40
6	Business Communication and Presentation skills	3	3-0-0	30		70	28	40
7	Linux Lab	1	0-0-2	100*				40
8	Database Management System (Relational &	1	0-0-2	100*				40
	Total	23						

Course Matrix
V Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Sensor Technologies	3	3-0-0	30		70	28	40
2	Design and Analysis of Algorithm	4	4-0-0	30		70	28	40
3	Big Data Analysis	4	4-0-0	30		70	28	40
4	Communication Systems	4	4-0-0	30		70	28	40
5	Microprocessors and Microcontrollers	4	4-0-0	30		70	28	40
6	Digital Signal Processing	3	3-0-0	30		70	28	40
7	Sensor Technologies – Lab	1	0-0-2	100*				40
8	Communication Systems Lab	1	0-0-2	100*				40
	Total	24						

Course Matrix
VI Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Wireless Communication	4	4-0-0	30		70	28	40
2	Mobile Application Development	4	4-0-0	30		70	28	40
3	Database and Network Security	4	4-0-0	30		70	28	40
4	Machine Learning	4	4-0-0	30		70	28	40
5	Elective – I	3	3-0-0	30		70	28	40
6	Elective – II	3	3-0-0	30		70	28	40
7	Wireless Communication Lab	1	0-0-2	100*				40
8	Database and Network Security Lab	1	0-0-2	100*				40
	Total	24						

Elective – I	
Sl#	Subject Title
1	Cloud Management System
2	Cloud Web Services
3	Cloud Solution Management

Elective – II	
Sl#	Subject Title
1	Natural Language Processing
2	Neural Networks
3	Recommender System

Course Matrix

VII Semester

Sl. No	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	**Elective III**	**3**	**3-0-0**	**30**		**70**	**28**	**40**
2	**Elective IV**	**3**	**3-0-0**	**30**		**70**	**28**	**40**
3	**Elective V**	**3**	**3-0-0**	**30**		**70**	**28**	**40**
4	**Elective VI**	**3**	**3-0-0**	**30**		**70**	**28**	**40**
5	**Open Elective-I**	**3**	**3-0-0**	**30**		**70**	**28**	**40**
6	**Open Elective-II**	**3**	**3-0-0**	**30**		**70**	**28**	**40**
7	**Project Work –I**	4	**--**	**100***				**40**
	Total	**22**						

Elective – III	
Sl#	Subject Title
1	IoT Platforms
2	Cyber Security
3	Mobile Security

Elective – IV	
Sl#	Subject Title
1	IoT System Design
2	Agile methodology
3	Software Engineering

Elective – V	
Sl#	Subject Title
1	Time Series Analysis
2	Real Time Data Processing
3	Advance Machine Learning

Elective – VI	
Sl#	Subject Title
1	Data Visualization for Business
2	Python Programming
3	Latest Trends in IoT

Open Elective - I

Sl #	Subject Title	Offering Department
1.	Computational Fluid Dynamics and Aerodynamics	Aerospace Engineering
2.	Fracture Mechanics	Aerospace Engineering
3.	Green Technology	Civil Engineering
4.	Solid Waste Management	Civil Engineering
5.	Automation and Control	Electronics and Communication Engineering
6.	Sensors and Actuators	Electronics and Communication Engineering
7.	Electrical Safety	Electrical and Electronics Engineering
8.	Management and Entrepreneurship	Electrical and Electronics Engineering
9.	Production Planning and Control	Mechanical Engineering
10.	Industrial Ergonomics	Mechanical Engineering
11.	Advanced Numerical Analysis	Mathematics

Open Elective - II

Sl #	Subject Title	Offering Department
1.	Aircraft & Systems – Industry Perspective	Aerospace Engineering
2.	Micro Electro Mechanical Systems (MEMS)	Aerospace Engineering
3.	Construction Planning and Management	Civil Engineering
4.	Air Pollution	Civil Engineering
5.	Embedded Controllers	Electronics and Communication Engineering
6.	Basics of Digital Signal Processing	Electronics and Communication Engineering
7.	Energy Management	Electrical and Electronics Engineering
8.	Sensors Technology	Electrical and Electronics Engineering
9.	Research methodology	Mechanical Engineering
10.	Automobile Engineering	Mechanical Engineering
11.	Advanced Physics for Engineers	Physics

Course Matrix
VIII Semester

Sl. No.	Name of the Subject Open Elective	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Mark
				Max. Mark	Min. Marks	Max. Mark	Min. Marks	
1	Open Elective-III[OE]	3	3-0-0	30		70	28	40
2	Open Elective-IV[OE]	3	3-0-0	30		70	28	40
3	Internship/Project work –II[SEC]	12	--	100		100	40	80
	Total	18						

Open Elective - III

Sl #	Subject Title	Offering Department
1.	Operation Management	Aerospace Engineering
2.	Basics of Research and Development	Aerospace Engineering
3.	Environmental Impact Assessment	Civil Engineering
4.	Green Technology & Sustainability	Civil Engineering
5.	Electronic Waste Management	Electronics and Communication Engineering
6.	Basics of Wireless Technologies	Electronics and Communication Engineering
7.	Solar and Wind Energy Systems	Electrical and Electronics Engineering
8.	Energy Conservation and Energy Storage	Electrical and Electronics Engineering
9.	Total Quality Management	Mechanical Engineering
10.	Statistical Quality Control	Mechanical Engineering
11.	Industrial Management	Metallurgical Engineering
12.	Design & Applications of Engineering Materials	Metallurgical Engineering
13.	Advanced Mathematical and Theoretical Statistics	Mathematics

Open Elective - IV

Sl #	Subject Title	Offering Department
1.	Engineering Management and Ethics	Aerospace Engineering
2.	Project Management	Aerospace Engineering
3.	Disaster Mitigation and Management	Civil Engineering
4.	Waste Water Engineering	Civil Engineering
5.	Remote Sensing Applications	Electronics and Communication Engineering
6.	Navigation Guidance and Control	Electronics and Communication Engineering
7.	Emerging Technologies in Power Generation	Electrical and Electronics Engineering
8.	Quality assurance and reliability	Electrical and Electronics Engineering
9.	Supply Chain Management	Mechanical Engineering
10.	Composite Materials	Metallurgical Engineering
11.	Polymers(Rubbers & Plastic)	Metallurgical Engineering
12.	Nano-material Sciences and Engineering Application	Chemistry

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B Tech (Hons.) – Computer Science & Engineering (in Data Science)

Course Matrix for

III to VIII Semesters

CBCS Structure

Sl N0	Type	No. of Theory Courses	No. of Lab Courses	credits
1	BS	09	02	**32**
2	HSS	04		**12**
3	Core	20	09	**83**
4	ES	07	03	**18**
5	MC	03		**09**
6	Dept Specific Electives	06	01	**22**
7	Open Electives	04		**12**
8	SEC			**16**
Total Credits				**204**

	Particulars								
Semester	**BS**	**HSS**	**Core**	**ES**	**MC**	**Dept. Elective**	**Open Elective**	**SEC**	**Total**
I	08	03	-	09	03	-	-	-	**23**
II	08	03	-	09	03	-	-	-	**23**
III	04	03	17	-	03	-	-	-	**27**
IV	08	03	16	-	-	-	-	-	**27**
V	04	-	26	-	-	--	-	-	**30**
VI	-	-	20	-	-	07	-	-	**27**
VII	-	-	04	-	-	15	06	04	**29**
VIII	-	-	-	-	-	-	06	12	**18**
Total	**32**	**12**	**83**	**18**	**09**	**22**	**12**	**16**	**204**

BS: Basic Science,

ES: Engineering Science

HSS: Humanity & Social Science

MC: Mandatory Course

SEC: Skill Enhancement Course

Course Matrix
III Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Statistics and Probability – I	4	3-1-0	30		70	28	40
2	Economics for Engineers	3	3-0-0	30		70	28	40
3	Data Structures	4	3-0-2	30		70	28	40
4	Object Oriented Programming with Java	4	3-1-0	30		70	28	40
5	RDBMS	4	4-0-0	30		70	28	40
6	Analysis & design of algorithms	3	3-0-0	100*				40
7	Object Oriented Programming with Java Lab	1	0-0-2	100*				40
8	RDBMS Lab	1	0-0-2	100*				40
9	Energy Studies	3	3-0-0	30		70	28	40
	Total	27						

Course Matrix
IV Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Operating System	3	3-0-0	30		70	28	40
2	Statistics and Probability - II	4	3-1-0	30		70	28	40
3	Data Visualization (Tool Based)	4	3-0-2	30		70	28	40
4	Data Analytics using SQL (Tool Based)	4	3-0-2	30		70	28	40
5	Linear Algebra	4	3-1-0	30		70	28	40
6	NoSQL Databases (Tool Based)	3	3-0-0	30		70	28	40
7	Business Communication and Presentation skills	3	3-0-0	30		70	28	40
8	Scientific Programming using R Lab	1	0-0-2	100*				40
9	Linux Lab	1	0-0-2	100*				40
	Total	27						

Course Matrix
V Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Inferential Statistics	4	4-0-0	30		70	28	40
2	Advance Data Analytics using SQL	4	4-0-0	30		70	28	40
3	Big Data Analysis - I	4	4-0-0	30		70	28	40
4	Machine Learning Algorithms - I	4	4-0-0	30		70	28	40
5	Optimization Techniques	4	4-0-0	30		70	28	40
6	Python Programming for Data Scientist (Tool Based)	4	3-0-2	30		70	28	40
7	Data Analytics using MS Excel (Tool Based)	3	3-0-0	30		70	28	40
8	Advance Data Analytics using SQL Lab	1	0-0-2	100*				40
9	Machine Learning Algorithms - I Lab	1	0-0-2	100*				40
10	Big Data Analysis - I Lab	1	0-0-2	100*				40
	Total	30						

Course Matrix
VI Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Exploratory Data Analysis	4	4-0-0	30		70	28	40
2	Big Data Analysis - II	3	3-0-0	30		70	28	40
3	Machine Learning Algorithms - II	3	3-0-0	30		70	28	40
4	Time Series Analysis (Tool Based)	4	3-0-2	30		70	28	40
5	Artificial Intelligence	4	4-0-0	30		70	28	40
6	Elective - I	3	3-0-0	30		70	28	40
7	Elective - II	3	3-0-0	30		70	28	40
8	Elective - I Lab	1	0-0-2	100*				40
9	Big Data Analysis - II Lab	1	0-0-2	100*				40
10	Machine Learning Algorithms - II Lab	1	0-0-2	100*				40
	Total	27						

Elective – I	
Sl#	Subject Title
1	Cloud Computing
2	Mobile Computing
3	Internet of Things

Elective – II	
Sl#	Subject Title
1	Natural Language Processing
2	Neural Networks
3	Recommender System

Course Matrix
VII Semester

Sl. No	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Dimensionality Reduction and Model Validation	4	3-0-2	30		70	28	40
2	Elective III	4	3-0-2	30		70	28	40
3	Elective IV	4	3-0-2	30		70	28	40
4	Elective V	4	3-0-2	30		70	28	40
5	Elective VI	3	3-0-0	30		70	28	40
6	Open Elective-I	3	3-0-0	30		70	28	40
7	Open Elective-II	3	3-0-0	30		70	28	40
8	Project Work –I	4	--	100*				40
	Total	29						

Elective – III	
Sl#	Subject Title
1	Deep Learning
2	Advance Optimization Techniques
3	Big Data Analytics on Cloud

Elective – IV	
Sl#	Subject Title
1	Advance Machine Learning Algorithms
2	Artificial Intelligence Algorithms
3	Advance Data Visualization

Elective – V	
Sl#	Subject Title
1	Data Science Project Management
2	Software Engineering
3	Agile Methodology

Elective – VI	
Sl#	Subject Title
1	Latest Trends in Data Science
2	Advance Statistical Modeling
3	Real time Data Processing

Open Elective - I

Sl #	Subject Title	Offering Department
1.	Computational Fluid Dynamics and Aerodynamics	Aerospace Engineering
2.	Fracture Mechanics	Aerospace Engineering
3.	Green Technology	Civil Engineering
4.	Solid Waste Management	Civil Engineering
5.	Automation and Control	Electronics and Communication Engineering
6.	Sensors and Actuators	Electronics and Communication Engineering
7.	Electrical Safety	Electrical and Electronics Engineering

8.	Management and Entrepreneurship	Electrical and Electronics Engineering
9.	Production Planning and Control	Mechanical Engineering
10.	Industrial Ergonomics	Mechanical Engineering
11.	Advanced Numerical Analysis	Mathematics

Open Elective - II

Sl #	Subject Title	Offering Department
1.	Aircraft & Systems – Industry Perspective	Aerospace Engineering
2.	Micro Electro Mechanical Systems (MEMS)	Aerospace Engineering
3.	Construction Planning and Management	Civil Engineering
4.	Air Pollution	Civil Engineering
5.	Embedded Controllers	Electronics and Communication Engineering
6.	Basics of Digital Signal Processing	Electronics and Communication Engineering
7.	Energy Management	Electrical and Electronics Engineering
8.	Sensors Technology	Electrical and Electronics Engineering
9.	Research methodology	Mechanical Engineering
10.	Automobile Engineering	Mechanical Engineering
11.	Advanced Physics for Engineers	Physics

Course Matrix
VIII Semester

Sl. No.	Name of the Subject Open Elective	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Mark
				Max. Mark	Min. Marks	Max. Mark	Min. Marks	
1	Open Elective-III	3	3-0-0	30		70	28	40
2	Open Elective-IV	3	3-0-0	30		70	28	40
3	Internship/Project work –II[SEC]	12	--	100		100	40	80
	Total	18						

Open Elective - III

Sl #	Subject Title	Offering Department
1.	Operation Management	Aerospace Engineering
2.	Basics of Research and Development	Aerospace Engineering
3.	Environmental Impact Assessment	Civil Engineering
4.	Green Technology & Sustainability	Civil Engineering
5.	Electronic Waste Management	Electronics and Communication Engineering
6.	Basics of Wireless Technologies	Electronics and Communication Engineering
7.	Solar and Wind Energy Systems	Electrical and Electronics Engineering
8.	Energy Conservation and Energy Storage	Electrical and Electronics Engineering
9.	Total Quality Management	Mechanical Engineering
10.	Statistical Quality Control	Mechanical Engineering
11.	Industrial Management	Metallurgical Engineering
12.	Design & Applications of Engineering Materials	Metallurgical Engineering
13.	Advanced Mathematical and Theoretical Statistics	Mathematics

Open Elective - IV

Sl #	Subject Title	Offering Department
1.	Engineering Management and Ethics	Aerospace Engineering
2.	Project Management	Aerospace Engineering
3.	Disaster Mitigation and Management	Civil Engineering
4.	Waste Water Engineering	Civil Engineering
5.	Remote Sensing Applications	Electronics and Communication Engineering
6.	Navigation Guidance and Control	Electronics and Communication Engineering
7.	Emerging Technologies in Power Generation	Electrical and Electronics Engineering
8.	Quality assurance and reliability	Electrical and Electronics Engineering
9.	Supply Chain Management	Mechanical Engineering
10.	Composite Materials	Metallurgical Engineering
11.	Polymers(Rubbers & Plastic)	Metallurgical Engineering
12.	Nano-material Sciences and Engineering Application	Chemistry

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B.Tech in Electronics and Communication Engineering
Course Matrix for
III to VIII Semesters

CBCS Structure

Sl N0	Type	No. of Theory Courses	No. of Lab Courses	credits
1	BS	05	02	**20**
2	HSS	04		**12**
3	Core	18	08	**75**
4	ES	07	03	**18**
5	MC	03		**09**
6	Dept Specific Electives	06		**18**
7	Open Electives	04		**12**
8	SEC			**16**
Total Credits				**180**

	Particulars								
Semester	**BS**	**HSS**	**Core**	**ES**	**MC**	**Dept. Elective**	**Open Elective**	**SEC**	**Total**
I	08	03	-	09	03	-	-	-	**23**
II	08	03	-	09	03	-	-	-	**23**
III	04	03	14	-	03	-	-	-	**24**
IV	-	03	21	-	-	-	-	-	**24**
V	-	-	24	-	-	-	-	-	**24**
VI	-	-	16	-	-	06	-	02	**24**
VII	-	-	-	-	-	12	06	02	**20**
VIII	-	-	-	-	-	-	06	12	**18**
Total	**20**	**12**	**75**	**18**	**09**	**18**	**12**	**16**	**180**

BS: Basic Science,

ES: Engineering Science

HSS: Humanity & Social Science

MC: Mandatory Course

SEC: Skill Enhancement Course

Course Matrix
III Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Mathematical Transforms	4	3–1-0	30		70	28	40
2	Economics for Engineers	3	3–0–0	30		70	28	40
3	Analog Electronic Circuit Design–I	4	3–1-0	30		70	28	40
4	Digital System Design	3	3–0-0	30		70	28	40
5	Electromagnetic Field Theory	4	3–1-0	30		70	28	40
6	Analog System Design Lab	1	0–0–2	100*				40
7	Digital System Design	1	0–0-2	100*				40
8	Energy Studies	3	3–0-0	30		70	28	40
	Total	23						

Course Matrix
IV Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Information Theory and coding	3	3–0-0	30		70	28	40
2	Nano Electronics	3	3–0-0	30		70	28	40
3	Signals and Systems	4	3–1-0	30		70	28	40
4	Analog Electronic Circuit Design–II	4	3–1-0	30		70	28	40
5	Analog Communication	4	3–1-0	30		70	28	40
6	Business Communication and Presentation skills	3	3–0-0	30		70	28	40
7	Analog Communication Lab	1	0–0–2	100*				40
8	Analog Electronics Circuits –II Lab	1	0–0-2	100*				40
	Total	23						

Course Matrix
V Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Discrete Mathematics	3	3–0-0	30		70	28	40
2	Network Analysis	4	3–1-0	30		70	28	40
3	ARM Controller	4	3–1-0	30		70	28	40
4	Digital Signal Processing	4	3–1-0	30		70	28	40
5	R F Engineering - I	3	3–0-0	30		70	28	40
6	Control System	4	3–1-0	30		70	28	40
7	Processor Based Lab	1	0–0–2	100*				40
8	RF Lab	1	0–0-2	100*				40
	Total	24						

Course Matrix
VI Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	R F Engineering - II	4	3–1-0	30		70	28	40
2	Digital Communication	4	3–1-0	30		70	28	40
3	System Verilog	4	3–1-0	30		70	28	40
4	VLSI Design	4	3–1-0	30		70	28	40
5	Elective –I	3	3–0–0	30		70	28	40
6	Elective –II	3	3–0-0	30		70	28	40
7	Digital Communication Lab	1	0–0–2	100*				40
8	SoC Lab	1	0–0-2	100*				40
	Total	24						

Elective –I	
Communication	**Embedded**
Power Electronics	**Advanced Microcontrollers**
Computer communication Networks	**Fundamentals of Microelectronics**
Digital Switching System	**DSP Architecture**
Wireless Communication	**HDL Programming**

Elective II	
Communication	**Embedded**
Optical Fiber Communication	**Data structure & Algorithms**
Spread Spectrum Techniques OR Secure Communication	**Advanced Computer Architecture**
Introduction to Radar Systems	**FPGA & SOC Design**
Elements of Remote Sensing	**Embedded System Design**

Course Matrix
VII Semester

Sl. No	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	**Elective – III**	**3**	**3–0-0**	**30**		**70**	**28**	**40**
2	**Elective – IV**	**3**	**3–0-0**	**30**		**70**	**28**	**40**
3	**Elective – V**	**3**	**3–0-0**	**30**		**70**	**28**	**40**
4	**Elective – VI**	**3**	**3–0–0**	**30**		**70**	**28**	**40**
5	**Open Elective-I**	**3**	**3–0-0**	**30**		**70**	**28**	**40**
6	**Open Elective-II**	**3**	**3–0-0**	**30**		**70**	**28**	**40**
7	**Project Work -I**	**4**	**---------**	**100***				**40**
	Total	**22**						

Elective – III	
Communication	**Embedded**
Radar Signal Processing	**CAD for VLSI**
Image Processing	**Real Time Embedded System Design**
Remote Sensing Applications	**ASIC Design and Its Issues**
Statistical Signal Processing	**Linux Shell Script and Perl**

Elective – IV	
Communication	**Embedded**
Synthetic Structure Radar	**Low Power VLSI Design**
Satellite Communication	**Programming using Embedded C**
Digital Compression	**Verification using System Verilog**
Medical Imaging Systems	**Embedded System Programming using JAVA**

Elective – V	
Communication	**Embedded**
Introduction to Photonics	CMOS Analog IC Design
Navigation Systems	Cryptography & Network Security
Error Control coding	Electronics Testing
Introduction to Non linear Optics	Embedded system in Bio Medical

Elective – VI	
Communication	**Embedded**
Software Defined Radio	Data Converters
Multirate Signal Processing	Sensors and Transducers
Wireless Information Theory	Real time Operating System
Advanced signal reception techniques	Internet of Things

Open Elective - I

Sl #	Subject Title	Offering Department
1.	Computational Fluid Dynamics and Aerodynamics	Aerospace Engineering
2.	Fracture Mechanics	Aerospace Engineering
3.	Green Technology	Civil Engineering
4.	Solid Waste Management	Civil Engineering
5.	Software Engineering	Computer Science & Engineering
6.	Data Structures and Algorithms	Computer Science & Engineering
7.	Electrical Safety	Electrical and Electronics Engineering
8.	Management and Entrepreneurship	Electrical and Electronics Engineering
9.	Production Planning and Control	Mechanical Engineering
10.	Industrial Ergonomics	Mechanical Engineering
11.	Advanced Numerical Analysis	Mathematics

Open Elective - II

Sl #	Subject Title	Offering Department
1.	Aircraft & Systems – Industry Perspective	Aerospace Engineering
2.	Micro Electro Mechanical Systems (MEMS)	Aerospace Engineering
3.	Construction Planning and Management	Civil Engineering
4.	Air Pollution	Civil Engineering
5.	Cloud Computing	Computer Science & Engineering
6.	Programming in Java	Computer Science & Engineering
7.	Energy Management	Electrical and Electronics Engineering
8.	Sensors Technology	Electrical and Electronics Engineering
9.	Research methodology	Mechanical Engineering
10.	Automobile Engineering	Mechanical Engineering
11.	Advanced Physics for Engineers	Physics

Course Matrix

VIII Semester

Sl. No.	Name of the Subject Open Elective	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Mark	Min. Marks	
1	**Open Elective-III**	**3**	**3– 0 - 0**	**30**		**70**	**28**	**40**
2	**Open Elective-IV**	**3**	**3– 0 - 0**	**30**		**70**	**28**	**40**
	Internship/ Project work -II	**12**	**---------**	**100**		**100**	**40**	**80**
	Total	**18**						

Open Elective - III

Sl #	Subject Title	Offering Department
1.	Operation Management	Aerospace Engineering
2.	Basics of Research and Development	Aerospace Engineering
3.	Environmental Impact Assessment	Civil Engineering
4.	Green Technology & Sustainability	Civil Engineering
5.	Web Technology	Computer Science & Engineering
6.	Software Testing	Computer Science & Engineering
7.	Information Security Basics	Computer Science & Engineering [IoT& Data Science]
8.	Big Data Analysis	Computer Science & Engineering [IoT& Data Science]
9.	Solar and Wind Energy Systems	Electrical and Electronics Engineering
10.	Energy Conservation and Energy Storage	Electrical and Electronics Engineering
11.	Total Quality Management	Mechanical Engineering
12.	Statistical Quality Control	Mechanical Engineering
13.	Industrial Management	Metallurgical Engineering
14.	Design & Applications of Engineering Materials	Metallurgical Engineering
15.	Advanced Mathematical and Theoretical Statistics	Mathematics

Open Elective - IV

Sl #	Subject Title	Offering Department
1.	Engineering Management and Ethics	Aerospace Engineering
2.	Project Management	Aerospace Engineering
3.	Disaster Mitigation and Management	Civil Engineering
4.	Waste Water Engineering	Civil Engineering
5.	Internet of Things	Computer Science & Engineering
6.	Mobile Application Development	Computer Science & Engineering
7.	Sensor Technologies	Computer Science & Engineering [IoT& Data Science]
8.	Wireless Communication	Computer Science & Engineering [IoT& Data Science]
9.	Emerging Technologies in Power Generation	Electrical and Electronics Engineering

10.	**Quality assurance and reliability**	**Electrical and Electronics Engineering**
11.	**Supply Chain Management**	**Mechanical Engineering**
12.	**Composite Materials**	**Metallurgical Engineering**
13.	**Polymers(Rubbers & Plastic)**	**Metallurgical Engineering**
14.	**Nano-material Sciences and Engineering Application**	**Chemistry**

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B.Tech in Electrical & Electronics Engineering

Course Matrix for

III to VIII Semesters

CBCS Structure

Sl N0	Type	No. of Theory Courses	No. of Lab Courses	Credits
1	BS	05	02	**20**
2	HSS	04		**12**
3	Core	20	09	**81**
4	ES	07	03	**18**
5	MC	03		**09**
6	Dept Specific Electives	04		**12**
7	Open Electives	04		**12**
8	SEC			**16**
Total Credits				**180**

	Particulars								
Semester	**BS**	**HSS**	**Core**	**ES**	**MC**	**Dept. Elective**	**Open Elective**	**SEC**	**Total**
I	**08**	**03**	**-**	**09**	**03**	**-**	**-**	**-**	**23**
II	**08**	**03**	**-**	**09**	**03**	**-**	**-**	**-**	**23**
III	**04**	**03**	**14**	**-**	**03**	**-**	**-**	**-**	**24**
IV	**-**	**03**	**21**	**-**	**-**	**-**	**-**	**-**	**24**
V	**-**	**-**	**23**	**-**	**-**	**-**	**-**	**-**	**23**
VI	**-**	**-**	**14**	**-**	**-**	**09**	**-**	**-**	**23**
VII	**-**	**-**	**09**	**-**	**-**	**03**	**06**	**04**	**22**
VIII	**-**	**-**	**-**	**-**	**-**	**-**	**06**	**12**	**18**
Total	**20**	**12**	**81**	**18**	**09**	**12**	**12**	**16**	**180**

BS: Basic Science,

ES: Engineering Science

HSS: Humanity & Social Science

MC: Mandatory Course

SEC: Skill Enhancement Course

Course Matrix
III Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Mathematics for Engineering III	4	4–0-0	30	----	70	28	40
2	Economics for Engineers	3	3–0–0	30	----	70	28	40
3	Analog Electronic Circuits	3	3–0-0	30	----	70	28	40
4	Digital Electronic Circuits	3	3–0-0	30	----	70	28	40
5	Electric Circuit Analysis	3	3–0-0	30	----	70	28	40
6	Electrical and Electronics Measurements	3	3–0-0	30	----	70	28	40
7	Analog and Digital Electronic Circuits Lab	1	0–0-2	100*	----	----	----	40
8	Electrical Circuits and Measurements Lab	1	0–0-2	100*	----	----	----	40
9	Energy Studies	3	3–0–0	30	----	70	28	40
	Total	24						

Course Matrix
IV Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Electromagnetic Field Theory	3	3–0-0	30	----	70	28	40
2	Microcontrollers	4	4–0-0	30	----	70	28	40
3	Control Systems	4	4–0-0	30	----	70	28	40
4	Power Generation and Utilization of Electrical Power	4	4–0-0	30	----	70	28	40
5	Transformer and Induction Machines	4	4–0-0	30	----	70	28	40
6	Business Communication and Presentation skills	3	3–0-0	30	----	70	28	40
7	Microcontrollers&Control Systems Lab	1	0–0-2	100*	----	----	----	40
8	Transformer and Induction Machines Lab	1	0–0-2	100*	----	----	----	40
	Total	24						

Course Matrix
V Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Signals and Systems	3	3–0-0	30	----	70	28	40
2	Advanced Control Systems	3	3–0-0	30	----	70	28	40
3	DC and Synchronous Machines	4	4–0-0	30	----	70	28	40
4	Transmission and Distribution of Electrical Energy	4	4–0-0	30	----	70	28	40
5	Switchgear and Protection	3	3–0-0	30	----	70	28	40
6	Electrical Machine Design	4	4–0-0	30	----	70	28	40
7	DC and Synchronous machines Lab	1	0–0-2	100*	----	----	----	40
8	Electrical Drawing using CAD Lab	1	0–0-2	30	----	70	28	40
	Total	23						

Course Matrix
VI Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Power System Analysis and Stability	4	4–0-0	30	----	70	28	40
2	HV Engineering and Insulation Engineering	4	4–0-0	30	----	70	28	40
3	Power Electronics	4	4–0-0	30	----	70	28	40
4	Elective – I	3	3–0-0	30	----	70	28	40
5	Elective – II	3	3–0–0	30	----	70	28	40
6	Elective – III	3	3–0-0	30	----	70	28	40
7	Power Electronics Lab	1	0–0-2	100*	----	----	----	40
8	HV and Relay Lab	1	0–0-2	100*	----	----	----	40
	Total	23						

Elective –I	
Power Engineering	**Industrial automation**
Modern Power system Protection	**Computer Organization**
Electrical Asset Management	**Object Oriented Programming using C++**
Electrical Distribution Systems	**Data Base Management Systems**

Elective –II	
Power Engineering	**Industrial automation**
FACTS	**PLC & SCADA**
Reactive Power Management	**Fuzzy systems & ANN**
HVDC Transmission	**Digital Signal Processing**

Elective –III	
Power Engineering	**Industrial automation**
Smart grids	**Electrical Drives and Applications**
Distribution Systems Automation	**Special Electrical Machines**
Electrical Power Quality	**MEMS**

Course Matrix
VII Semester

Sl. No	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Computer Techniques in Power Systems	4	4–0-0	30	----	70	28	40
2	Power System Operation and Control	4	4–0-0	30	----	70	28	40
3	Elective – IV	3	3–0-0	30	----	70	28	40
4	Open Elective-I	3	3–0–0	30	----	70	28	40
5	Open Elective-II	3	3–0-0	30	----	70	28	40
6	Power System Simulation Lab	1	0–0-2	30	----	70	28	40
7	Project Work –I	4	----	100	----	----	----	40
	Total	22						

Elective –IV	
Power Engineering	**Industrial automation**
Energy Conservation, Storage and Audit	**Operation Research**
Electrical Estimation & Economics	**VLSI & Embedded Systems**
Project Management	**MECHATRONICS**

Open Elective - I

Sl #	Subject Title	Offering Department
1.	Computational Fluid Dynamics and Aerodynamics	Aerospace Engineering
2.	Fracture Mechanics	Aerospace Engineering
3.	Green Technology	Civil Engineering
4.	Solid Waste Management	Civil Engineering
5.	Software Engineering	Computer Science & Engineering
6.	Data Structures and Algorithms	Computer Science & Engineering
7.	Automation and Control	Electronics and Communication Engineering
8.	Sensors and Actuators	Electronics and Communication Engineering
9.	Production Planning and Control	Mechanical Engineering
10.	Industrial Ergonomics	Mechanical Engineering
11.	Advanced Numerical Analysis	Mathematics

pen Elective - II

Sl #	Subject Title	Offering Department
1.	Aircraft & Systems – Industry Perspective	Aerospace Engineering
2.	Micro Electro Mechanical Systems (MEMS)	Aerospace Engineering
3.	Construction Planning and Management	Civil Engineering
4.	Air Pollution	Civil Engineering
5.	Cloud Computing	Computer Science & Engineering
6.	Programming in Java	Computer Science & Engineering
7.	Embedded Controllers	Electronics and Communication Engineering
8.	Basics of Digital Signal Processing	Electronics and Communication Engineering
9.	Research methodology	Mechanical Engineering
10.	Automobile Engineering	Mechanical Engineering
11.	Advanced Physics for Engineers	Physics

Course Matrix

VIII Semester

Sl. No.	Name of the Subject Open Elective	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Mark	Min. Marks	Max. Mark	Min. Mark	
1	Open Elective-III	3	3–0-0	30	----	70	28	40
2	Open Elective-IV	3	3–0-0	30	----	70	28	40
3	Technical Seminar	2	----	50*	----	----	----	20
4	Internship/ Project work -II	10	----	100*		100	40	80
	Total	18						

Open Elective - III

Sl #	Subject Title	Offering Department
1.	Operation Management	Aerospace Engineering
2.	Basics of Research and Development	Aerospace Engineering
3.	Environmental Impact Assessment	Civil Engineering
4.	Green Technology & Sustainability	Civil Engineering
5.	Web Technology	Computer Science & Engineering
6.	Software Testing	Computer Science & Engineering
7.	Information Security Basics	Computer Science & Engineering [IoT& Data Science]
8.	Big Data Analysis	Computer Science & Engineering [IoT& Data Science]
9.	Electronic Waste Management	Electronics and Communication Engineering
10.	Basics of Wireless Technologies	Electronics and Communication Engineering
11.	Total Quality Management	Mechanical Engineering
12.	Statistical Quality Control	Mechanical Engineering
13.	Industrial Management	Metallurgical Engineering
14.	Design & Applications of Engineering Materials	Metallurgical Engineering
15.	Advanced Mathematical and Theoretical Statistics	Mathematics

Open Elective - IV

Sl #	Subject Title	Offering Department
1.	Engineering Management and Ethics	Aerospace Engineering
2.	Project Management	Aerospace Engineering
3.	Disaster Mitigation and Management	Civil Engineering
4.	Waste Water Engineering	Civil Engineering
5.	Internet of Things	Computer Science & Engineering
6.	Mobile Application Development	Computer Science & Engineering
7.	Sensor Technologies	Computer Science & Engineering [IoT& Data Science]
8.	Wireless Communication	Computer Science & Engineering [IoT& Data Science]
9.	Remote Sensing Applications	Electronics and Communication Engineering
10.	Navigation Guidance and Control	Electronics and Communication Engineering

11.	**Supply Chain Management**	**Mechanical Engineering**
12.	**Composite Materials**	**Metallurgical Engineering**
13.	**Polymers(Rubbers & Plastic)**	**Metallurgical Engineering**
14.	**Nano-material Sciences and Engineering Application**	**Chemistry**

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B.Tech in Information Science and Engineering

Course Matrix for

III to VIII Semesters

CBCS Structure

Sl N0	Type	No. of Theory Courses	No. of Lab Courses	credits
1	BS	05	02	**20**
2	HSS	04		**12**
3	Core	18	08	**75**
4	ES	07	03	**18**
5	MC	03		**09**
6	Dept Specific Electives	06		**18**
7	Open Electives	04		**12**
8	SEC			**16**
Total Credits				**180**

	Particulars								
Semester	**BS**	**HSS**	**Core**	**ES**	**MC**	**Dept. Elective**	**Open Elective**	**SEC**	**Total**
I	08	03	-	09	03	-	-	-	**23**
II	08	03	-	09	03	-	-	-	**23**
III	04	03	14	-	03	-	-	-	**24**
IV	-	03	21	-	-	-	-	-	**24**
V	-	-	24	-	-	-	-	-	**24**
VI	-	-	16	-	-	06	-	02	**24**
VII	-	-	-	-	-	12	06	02	**20**
VIII	-	-	-	-	-	-	06	12	**18**
Total	**20**	**12**	**75**	**18**	**09**	**18**	**12**	**16**	**180**

BS: Basic Science,

ES: Engineering Science

HSS: Humanity & Social Science

MC: Mandatory Course

SEC: Skill Enhancement Course

Course Matrix
III Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Mathematical Transforms	4	3-1-0	30		70	28	40
2	Economics for Engineers	3	3-0-0	30		70	28	40
3	Data Structures and Algorithms	4	4-0-0	30		70	28	40
4	Computer Organization and Architecture	3	3-0-0	30		70	28	40
5	Object Oriented Programming with C++	4	4-0-0	30		70	28	40
6	Data Structures and Algorithms Lab	1	0-0-2	100*				40
7	Object Oriented Programming with C++Lab	1	0-0-2	100*				40
8	Energy Studies	3	3-0-0	30		70	28	40
	Total	23						

Course Matrix
IV Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Discrete Mathematics and Graph Theory	3	3-0-0	30		70	28	40
2	Programming in JAVA	3	3-0-0	30		70	28	40
3	Automata Theory and Logic	4	4-0-0	30		70	28	40
4	Programming Paradigms	4	4-0-0	30		70	28	40
5	Operating Systems	4	4-0-0	30		70	28	40
6	Business Communication and Presentation skills	3	3-0-0	30		70	28	40
7	Programming in JAVA Lab	1	0-0-2	100*				40
8	Operating Systems Lab	1	0-0-2	100*				40
	Total	23						

Course Matrix
V Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Probability, Statistics and Random Processes	3	3-0-0	30		70	28	40
2	Data Communication and Computer Networks	4	4-0-0	30		70	28	40
3	Database Systems	4	4-0-0	30		70	28	40
4	Software Engineering	4	4-0-0	30		70	28	40
5	Parallel Computing System	4	4-0-0	30		70	28	40
6	Web Technology	3	3-0-0	30		70	28	40
7	Database Systems Lab	1	0-0-2	100*				40
8	Parallel Computing Lab	1	0-0-2	100*				40
	Total	24						

Course Matrix
VI Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Advanced Computer Networks	4	4-0-0	30		70	28	40
2	Software Testing	4	4-0-0	30		70	28	40
3	Programming in .NET	4	4-0-0	30		70	28	40
4	Data Mining	4	4-0-0	30		70	28	40
5	Elective – I	3	3-0-0	30		70	28	40
6	Elective – II	3	3-0-0	30		70	28	40
7	Computer Networks Lab	1	0-0-2	100*				40
8	Data Mining Lab	1	0-0-2	100*				40
	Total	24						

Elective – I	
Sl#	Subject Title
1	Digital Image Processing
2	Embedded Systems
3	Parallel and Distributed Computing

Elective – II	
Sl#	Subject Title
1	Soft Computing
2	Genetic Engineering
3	Neural Networks

Course Matrix
VII Semester

Sl. No	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Elective –III	3	3-0-0	30		70	28	40
2	Elective –IV	3	3-0-0	30		70	28	40
3	Elective –V	3	3-0-0	30		70	28	40
4	Elective –VI	3	3-0-0	30		70	28	40
5	Open Elective-I	3	3-0-0	30		70	28	40
6	Open Elective-II	3	3-0-0	30		70	28	40
7	Project Work –I	4	--	100*				40
	Total	22						

Elective – III	
Sl#	Subject Title
1	Network Routing Algorithms
2	Foundation to Cryptography
3	Network Protocol Design

Elective – IV	
Sl#	Subject Title
1	Internet of Things
2	Big Data Analytics
3	Virtualization and Cloud Security

Elective – V	
Sl#	Subject Title
1	Information System Security Audit and Management
2	Web Semantics
3	Storage Area Networks

Elective – VI	
Sl#	Subject Title
1	Mobile Application Development
2	Distributed Operating Systems
3	Real Time Operating Systems

Open Elective - I

Sl #	Subject Title	Offering Department
1.	Computational Fluid Dynamics and Aerodynamics	Aerospace Engineering
2.	Fracture Mechanics	Aerospace Engineering
3.	Green Technology	Civil Engineering
4.	Solid Waste Management	Civil Engineering
5.	Automation and Control	Electronics and Communication Engineering
6.	Sensors and Actuators	Electronics and Communication Engineering
7.	Electrical Safety	Electrical and Electronics Engineering
8.	Management and Entrepreneurship	Electrical and Electronics Engineering
9.	Production Planning and Control	Mechanical Engineering
10.	Industrial Ergonomics	Mechanical Engineering
11.	Advanced Numerical Analysis	Mathematics

Open Elective - II

Sl #	Subject Title	Offering Department
1.	Aircraft & Systems – Industry Perspective	Aerospace Engineering
2.	Micro Electro Mechanical Systems (MEMS)	Aerospace Engineering
3.	Construction Planning and Management	Civil Engineering
4.	Air Pollution	Civil Engineering
5.	Embedded Controllers	Electronics and Communication Engineering
6.	Basics of Digital Signal Processing	Electronics and Communication Engineering
7.	Energy Management	Electrical and Electronics Engineering
8.	Sensors Technology	Electrical and Electronics Engineering
9.	Research methodology	Mechanical Engineering
10.	Automobile Engineering	Mechanical Engineering
11.	Advanced Physics for Engineers	Physics

Course Matrix

VIII Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Mark	Max. Mark	Min. Mark	
1	Open Elective-III	3	3-0-0	30		70	28	40
2	Open Elective-IV	3	3-0-0	30		70	28	40
3	Internship/ Project work –II	12	--	100		100	40	80
	Total	18						

Open Elective - III

Sl #	Subject Title	Offering Department
1.	Operation Management	Aerospace Engineering
2.	Basics of Research and Development	Aerospace Engineering
3.	Environmental Impact Assessment	Civil Engineering
4.	Green Technology & Sustainability	Civil Engineering
5.	Electronic Waste Management	Electronics and Communication Engineering
6.	Basics of Wireless Technologies	Electronics and Communication Engineering
7.	Solar and Wind Energy Systems	Electrical and Electronics Engineering
8.	Energy Conservation and Energy Storage	Electrical and Electronics Engineering
9.	Total Quality Management	Mechanical Engineering
10.	Statistical Quality Control	Mechanical Engineering
11.	Industrial Management	Metallurgical Engineering
12.	Design & Applications of Engineering Materials	Metallurgical Engineering
13.	Advanced Mathematical and Theoretical Statistics	Mathematics

Open Elective - IV

Sl #	Subject Title	Offering Department
1.	Engineering Management and Ethics	Aerospace Engineering
2.	Project Management	Aerospace Engineering

3.	**Disaster Mitigation and Management**	**Civil Engineering**
4.	**Waste Water Engineering**	**Civil Engineering**
5.	**Remote Sensing Applications**	**Electronics and Communication Engineering**
6.	**Navigation Guidance and Control**	**Electronics and Communication Engineering**
7.	**Emerging Technologies in Power Generation**	**Electrical and Electronics Engineering**
8.	**Quality assurance and reliability**	**Electrical and Electronics Engineering**
9.	**Supply Chain Management**	**Mechanical Engineering**
10.	**Composite Materials**	**Metallurgical Engineering**
11.	**Polymers(Rubbers & Plastic)**	**Metallurgical Engineering**
12.	**Nano-material Sciences and Engineering Application**	**Chemistry**

JAIN UNIVERSITY
Declared as Deemed-to-be University u/s 3 of the UGC Act 1956

B.Tech in Mechanical Engineering

Course Matrix for

III to VIII Semesters

CBCS Structure

Sl N0	Type	No. of Theory Courses	No. of Lab Courses	credits
1	BS	05	02	**20**
2	HSS	04		**12**
3	Core			**75**
4	ES	07	03	**18**
5	MC	03		**09**
6	Dept Specific Electives	06		**18**
7	Open Electives	04		**12**
8	SEC			**16**
Total Credits				**180**

	Particulars								
Semester	**BS**	**HSS**	**Core**	**ES**	**MC**	**Dept. Elective**	**Open Elective**	**SEC**	**Total**
I	08	03	-	09	03	-	-	-	**23**
II	08	03	-	09	03	-	-	-	**23**
III	04	03	14	-	03	-	-	-	**24**
IV	-	03	21	-	-	-	-	-	**24**
V	-	-	24	-	-	-	-	-	**24**
VI	-	-	16	-	-	06	-	02	**24**
VII	-	-	-	-	-	12	06	02	**20**
VIII	-	-	-	-	-	-	06	12	**18**
Total	**20**	**12**	**75**	**18**	**09**	**18**	**12**	**16**	**180**

BS: Basic Science,

ES: Engineering Science

HSS: Humanity & Social Science

MC: Mandatory Course

SEC: Skill Enhancement Course

Course Matrix
III Semester

Sl. No.	Name of the Course	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Applied Mathematics	4	3–1-0	30		70	28	40
2	Economics for Engineers	3	3–0–0	30		70	28	40
3	Engineering Materials	3	3–0-0	30		70	28	40
4	Solid Mechanics	4	3–1-0	30		70	28	40
5	Fluid Mechanics	4	4–0-0	30		70	28	40
6	Fluid Mechanics and machinery Lab	1	0–0–2	100*				40
7	Materials Testing Lab	1	0–0-2	100*				40
8	Energy Studies	3	3–0-0	30		70	28	40
	Total	23						

Course Matrix
IV Semester

Sl. No.	Name of the Course	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Mechanisms and Machines	4	4–0-0	30		70	28	40
2	Basic Thermodynamics	3	3–0–0	30		70	28	40
3	Manufacturing Technology	3	3–0-0	30		70	28	40
4	Design of Machine Elements – 1	4	3–1-0	30		70	28	40
5	Machine Drawing	4	3–0-2	30		70	28	40
6	Business Communication and Presentation skills	3	3–0-0	30		70	28	40
7	Foundry Practice	1	0–0–2	100*				40
8	Workshop – II	1	0–0–2	100*				40
	Total	23						

Course Matrix
V Semester

Sl. No.	Name of the Course	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Advanced Manufacturing Process	3	3–0–0	30		70	28	40
2	Applied Thermodynamics and Heat Transfer	4	3–1-0	30		70	28	40
3	Design of Machine Elements – 2	4	3–1-0	30		70	28	40
4	Control Engineering	4	3–1-0	30		70	28	40
5	CAD/CAM	3	3–0-0	30		70	28	40
6	Metrology and Measurements	4	4–0-0	30		70	28	40
7	Energy Conversion and Heat transfer Lab	1	0–0–2	100*				40
8	Design and Metrology Lab	1	0–0-2	100*				40
	Total	24						

Course Matrix
VI Semester

Sl. No.	Name of the Course	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Turbo machinery	4	3–1-0	30		70	28	40
2	Finite Element Methods	4	3–1-0	30		70	28	40
3	Maintenance and Reliability Engineering	4	4–0-0	30		70	28	40
4	Mechanical Vibrations	4	4–0-0	30		70	28	40
5	Elective –I	3	3–0–0	30		70	28	40
6	Elective –II	3	3–0-0	30		70	28	40
7	Finite Element Analysis Lab	1	0–0–2	100*				40
8	Matlab (Simulation Lab)	1	0–0-2	100*				40
	Total	24						

Elective –I		
Design	Manufacturing	Thermal
Advanced Mechanics of Solids	Welding Technology	Non conventional energy systems
Tribology	Non-Destructive Testing	Refrigeration and Air – Conditioning
Product design and Life cycle management	Rapid Prototyping	Power Plant Engg.

Elective – II		
Design	**Manufacturing**	**Thermal**
Tool Design	**Fluid Power Systems**	**Computational Fluid Dynamics**
Mechatronics	**Flexible Manufacturing Systems**	**I C Engines**
Design of Transmission Systems	**Composite Materials**	**Cryogenic Engineering**

Course Matrix
VII Semester

Sl. No	Name of the Course	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	**Elective –III**	**3**	**3– 0 - 0**	**30**		**70**	**28**	**40**
2	**Elective –IV**	**3**	**3– 0 - 0**	**30**		**70**	**28**	**40**
3	**Elective –V**	**3**	**3– 0 - 0**	**30**		**70**	**28**	**40**
4	**Elective –VI**	**3**	**3– 0 – 0**	**30**		**70**	**28**	**40**
5	**Open Elective-I**	**3**	**3– 0 - 0**	**30**		**70**	**28**	**40**
6	**Open Elective-II**	**3**	**3– 0 - 0**	**30**		**70**	**28**	**40**
7	**Project Work –I**	**4**	**---------**	**100***				**40**
	Total	**22**						

Elective –III		
Design	**Manufacturing**	**Thermal**
Theory of Plasticity	**Nano materials**	**Fuels and Combustion (emission)**
Optimization Techniques	**Theory of Metal Cutting**	**Energy Management and Auditing**
Industrial Automation and Robotics	**Total Quality Management**	**Hydrogen and Fuel Cells**

Elective –IV		
Design	**Manufacturing**	**Thermal**
Fracture Mechanics	**Supply Chain Management**	**Jet and Rocket Propulsion**
MEMS	**Industrial Ergonomics**	**Heat exchangers**
Automobile Engg.	**Production Planning and Control**	**Petroleum Technology**

Elective –V		
Design	**Manufacturing**	**Thermal**
Research methodology	Statistical Quality Control	Advanced Fluid Mechanics
Advanced Vibration and Noise Control	Technology of Surface Coatings	Gas Dynamics
Automotive Electronics and Instrumentation Systems	Modeling and Simulation of Manufacturing Systems	Project Management

Elective –VI		
Design	**Manufacturing**	**Thermal**
Mechanical Measurements and Controls	Foundry Technology	Global Energy Economy
Advanced Comp. Graphics and solid Modeling	Materials Characterization	Alternative Fuels and Renewable Energy
Product Design	Smart materials	Solar Thermal Power Engineering

Open Elective - I

Sl #	Subject Title	Offering Department
1.	Computational Fluid Dynamics and Aerodynamics	Aerospace Engineering
2.	Fracture Mechanics	Aerospace Engineering
3.	Green Technology	Civil Engineering
4.	Solid Waste Management	Civil Engineering
5.	Software Engineering	Computer Science & Engineering
6.	Data Structures and Algorithms	Computer Science & Engineering
7.	Automation and Control	Electronics and Communication Engineering
8.	Sensors and Actuators	Electronics and Communication Engineering
9.	Electrical Safety	Electrical and Electronics Engineering
10.	Management and Entrepreneurship	Electrical and Electronics Engineering
11.	Advanced Numerical Analysis	Mathematics

Open Elective - II

Sl #	Subject Title	Offering Department
1.	Aircraft & Systems – Industry Perspective	Aerospace Engineering
2.	Micro Electro Mechanical Systems (MEMS)	Aerospace Engineering
3.	Construction Planning and Management	Civil Engineering
4.	Air Pollution	Civil Engineering
5.	Cloud Computing	Computer Science & Engineering
6.	Programming in Java	Computer Science & Engineering
7.	Embedded Controllers	Electronics and Communication Engineering
8.	Basics of Digital Signal Processing	Electronics and Communication Engineering
9.	Energy Management	Electrical and Electronics Engineering
10.	Sensors Technology	Electrical and Electronics Engineering
11.	Advanced Physics for Engineers	Physics

Course Matrix

VIII Semester

Sl. No.	Name of the Course Open Elective	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Mark	Min. Marks	
1	**Open Elective-III**	**3**	**3– 0 - 0**	**30**		**70**	**28**	**40**
2	**Open Elective-IV**	**3**	**3– 0 - 0**	**30**		**70**	**28**	**40**
3	**Internship/ Project work -II**	**12**	**---------**	**100**		**100**	**40**	**80**
	Total	**18**						

Open Elective - III

Sl #	Subject Title	Offering Department
1.	Operation Management	Aerospace Engineering
2.	Basics of Research and Development	Aerospace Engineering
3.	Environmental Impact Assessment	Civil Engineering
4.	Green Technology & Sustainability	Civil Engineering
5.	Web Technology	Computer Science & Engineering
6.	Software Testing	Computer Science & Engineering
7.	Information Security Basics	Computer Science & Engineering [IoT& Data Science]
8.	Big Data Analysis	Computer Science & Engineering [IoT& Data Science]
9.	Electronic Waste Management	Electronics and Communication Engineering
10.	Basics of Wireless Technologies	Electronics and Communication Engineering
11.	Solar and Wind Energy Systems	Electrical and Electronics Engineering
12.	Energy Conservation and Energy Storage	Electrical and Electronics Engineering
13.	Industrial Management	Metallurgical Engineering
14.	Design & Applications of Engineering Materials	Metallurgical Engineering
15.	Advanced Mathematical and Theoretical Statistics	Mathematics

Open Elective - IV

Sl #	Subject Title	Offering Department
1.	Engineering Management and Ethics	Aerospace Engineering
2.	Project Management	Aerospace Engineering
3.	Disaster Mitigation and Management	Civil Engineering
4.	Waste Water Engineering	Civil Engineering
5.	Internet of Things	Computer Science & Engineering
6.	Mobile Application Development	Computer Science & Engineering
7.	Sensor Technologies	Computer Science & Engineering [IoT& Data Science]
8.	Wireless Communication	Computer Science & Engineering [IoT& Data Science]
9.	Remote Sensing Applications	Electronics and Communication Engineering
10.	Navigation Guidance and Control	Electronics and Communication Engineering

11.	**Emerging Technologies in Power Generation**	**Electrical and Electronics Engineering**
12.	**Quality assurance and reliability**	**Electrical and Electronics Engineering**
13.	**Composite Materials**	**Metallurgical Engineering**
14.	**Polymers(Rubbers & Plastic)**	**Metallurgical Engineering**
15.	**Nano-material Sciences and Engineering Application**	**Chemistry**

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B.Tech in Metallurgical Engineering

Course Matrix for

III to VIII Semesters

CBCS Structure

Sl N0	Type	No. of Theory Courses	No. of Lab Courses	credits
1	BS	05	02	**20**
2	HSS	04		**12**
3	Core	19	08	**74**
4	ES	08	03	**21**
5	MC	03		**09**
6	Dept Specific Electives	06		**18**
7	Open Electives	04		**12**
8	SEC			**16**
Total Credits				**182**

	Particulars								
Semester	**BS**	**HSS**	**Core**	**ES**	**MC**	**Dept. Elective**	**Open Elective**	**SEC**	**Total**
I	08	03	-	09	03	-	-	-	**23**
II	08	03	-	09	03	-	-	-	**23**
III	04	03	14	-	03	-	-	-	**24**
IV	-	03	17	03	-	-	-	-	**23**
V	-	-	24	-	-	-	-	-	**24**
VI	-	-	19	-	-	06	-	-	**25**
VII	-	-	-	-	-	12	06	04	**22**
VIII	-	-	-	-	-	-	06	12	**18**
Total	**20**	**12**	**74**	**21**	**09**	**18**	**12**	**16**	**182**

BS: Basic Science,

ES: Engineering Science

HSS: Humanity & Social Science

MC: Mandatory Course

SEC: Skill Enhancement Course

Course Matrix
III Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester		Minimum Passing Marks
				Max. Mark	Min. Mark	Max. Mar	Min. Mark	
1	Engineering Mathematics III	4	3– 1- 0	30		70	28	40
2	Economics for Engineers	3	3– 0 – 0	30		70	28	40
3	Introduction to Metals & Alloys and its applications	2	2 - 0 - 0	30		70	28	40
4	Metallurgical Thermodynamics	3	3– 0- 0	30		70	28	40
5	Chemical Characterization of Materials	3	3– 0- 0	30		70	28	40
6	Introduction to material Science	4	3– 1- 0	30		70	28	40
7	Materials Characterization & Testing Lab	1	0 – 0 – 2	100*				40
8	Mechanical Metallurgy Lab	1	0 – 0 - 2	100*				40
9	Introduction to Physical metallurgy	3	3– 0 - 0	30		70	28	40
	Total	25						

Course Matrix
IV Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Testing of Materials	3	3– 0- 0	30		70	28	40
2	Minerals processing	3	3– 0 - 0	30		70	28	40
3	Fuels Furnaces & Refractories	4	3– 1- 0	30		70	28	40
4	Principles of Extractive Metallurgy-I	4	3– 1- 0	30		70	28	40
5	Iron Making	4	3– 1- 0	30		70	28	40
6	Business Communication and Presentation skill /	3	3– 0 -0	30		70	28	40
7	Metallography –Lab	1	0 – 0 – 2	100*				40
8	Ore Dressing Lab	1	0 – 0 - 2	100*				40
	Total	23						

Course Matrix
V Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Mechanical Working Processes	3	3– 0 - 0	30		70	28	40
2	Theory & technology of Heat treatment	4	3– 1- 0	30		70	28	40
3	Steel Making	4	3– 1- 0	30		70	28	40
4	Phase Diagrams & Phase Transformations	4	3– 1- 0	30		70	28	40
5	Metal Joining	3	3– 0- 0	30		70	28	40
6	Principles of Extractive Metallurgy-II	4	3– 1- 0	30		70	28	40
7	Mechanical Working Process Lab	1	0 – 0 – 2	100*				40
8	Heat Treatment Lab	1	0 – 0 - 2	100*				40
	Total	24						

Course Matrix
VI Semester

Sl. No.	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Foundry Technology	4	3– 1- 0	30		70	28	40
2	Corrosion Engineering	4	3– 1- 0	30		70	28	40
3	Deformation Behavior of Materials	4	3– 1- 0	30		70	28	40
4	Computer Programming and Applications in Metallurgical Industries	4	3– 1- 0	30		70	28	40
5	Pollution Control & Environmental Management in Metallurgical Industries	3	3-0-0	30		70	28	40
6	Elective – I-	3	3– 0 – 0	30		70	28	40
7	Elective – II	3	3– 0 - 0	30		70	28	40
8	Foundry Technology Lab	1	0 – 0 – 2	100*				40
9	Non Destructive Testing Lab	2	1 – 0 - 2	100*				40
	Total	25						

Elective-I		Elective -II	
1	Polymers(Rubbers & Plastic)	1	Composite Materials
2	Experimental Theory of Alloys & Alloy Design	2	Design & Applications of Engineering Materials
3	New & Emerging Manufacturing Technologies	3	Additive Manufacturing

Course Matrix
VII Semester

Sl. No	Name of the Subject	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Elective – III	3	3– 0 - 0	30		70	28	40
2	Elective – IV	3	3– 0 - 0	30		70	28	40
3	Elective – V	3	3– 0 - 0	30		70	28	40
4	Elective – VI	3	3– 0 – 0	30		70	28	40
5	Open Elective-I	3	3– 0 - 0	30		70	28	40
6	Open Elective-II	3	3– 0 - 0	30		70	28	40
7	Project Work -I	4	------	100*				40
	Total	22						

Elective -III		Elective-IV		Elective-V		Elective-VI	
1	Nano & Intelligent Materials	1	Ceramic Materials	1	Integrated Computational Material Science	1	Bio Materials
2	Nuclear Metallurgy	2	Metallurgical , Fracture & Failure Analysis	2	Materials for Extreme Environment	2	Transport Phenomenon in Metallurgical process
3	Advanced Welding Process	3	Industrial Management	3	Advances in Extractive Metallurgy	3	Surface Treatment & Finishing

Open Elective - I

Sl #	Subject Title	Offering Department
1.	Computational Fluid Dynamics and Aerodynamics	Aerospace Engineering
2.	Fracture Mechanics	Aerospace Engineering
3.	Green Technology	Civil Engineering
4.	Solid Waste Management	Civil Engineering
5.	Software Engineering	Computer Science & Engineering
6.	Data Structures and Algorithms	Computer Science & Engineering
7.	Automation and Control	Electronics and Communication Engineering
8.	Sensors and Actuators	Electronics and Communication Engineering
9.	Electrical Safety	Electrical and Electronics Engineering
10.	Management and Entrepreneurship	Electrical and Electronics Engineering
11.	Production Planning and Control	Mechanical Engineering
12.	Industrial Ergonomics	Mechanical Engineering
13.	Advanced Numerical Analysis	Mathematics

Open Elective - II

Sl #	Subject Title	Offering Department
1.	Aircraft & Systems – Industry Perspective	Aerospace Engineering
2.	Micro Electro Mechanical Systems (MEMS)	Aerospace Engineering
3.	Construction Planning and Management	Civil Engineering
4.	Air Pollution	Civil Engineering
5.	Cloud Computing	Computer Science & Engineering
6.	Programming in Java	Computer Science & Engineering
7.	Embedded Controllers	Electronics and Communication Engineering
8.	Basics of Digital Signal Processing	Electronics and Communication Engineering
9.	Energy Management	Electrical and Electronics Engineering
10.	Sensors Technology	Electrical and Electronics Engineering
11.	Research methodology	Mechanical Engineering
12.	Automobile Engineering	Mechanical Engineering
13.	Advanced Physics for Engineers	Physics

Course Matrix

VIII Semester

Sl. No.	Name of the Subject Open Elective	Credit	L–T–P	Internal Assessment		End Semester Examinations		Minimum Passing Marks
				Max. Marks	Min. Marks	Max. Marks	Min. Marks	
1	Open Elective-III	3	3– 0 - 0	30		70	28	40
2	Open Elective-IV	3	3– 0 - 0	30		70	28	40
3	Internship/Project work -II	12	---------	100		100	40	80
	Total	18						

Open Elective - III

Sl #	Subject Title	Offering Department
1.	Operation Management	Aerospace Engineering
2.	Basics of Research and Development	Aerospace Engineering
3.	Environmental Impact Assessment	Civil Engineering
4.	Green Technology & Sustainability	Civil Engineering
5.	Web Technology	Computer Science & Engineering
6.	Software Testing	Computer Science & Engineering
7.	Information Security Basics	Computer Science & Engineering [IoT& Data Science]
8.	Big Data Analysis	Computer Science & Engineering [IoT& Data Science]
9.	Electronic Waste Management	Electronics and Communication Engineering
10.	Basics of Wireless Technologies	Electronics and Communication Engineering

11.	Solar and Wind Energy Systems	Electrical and Electronics Engineering
12.	Energy Conservation and Energy Storage	Electrical and Electronics Engineering
13.	Total Quality Management	Mechanical Engineering
14.	Statistical Quality Control	Mechanical Engineering
15.	Advanced Mathematical and Theoretical Statistics	Mathematics

Open Elective - IV

Sl #	Subject Title	Offering Department
1.	Engineering Management and Ethics	Aerospace Engineering
2.	Project Management	Aerospace Engineering
3.	Disaster Mitigation and Management	Civil Engineering
4.	Waste Water Engineering	Civil Engineering
5.	Internet of Things	Computer Science & Engineering
6.	Mobile Application Development	Computer Science & Engineering
7.	Sensor Technologies	Computer Science & Engineering [IoT& Data Science]
8.	Wireless Communication	Computer Science & Engineering [IoT& Data Science]
9.	Remote Sensing Applications	Electronics and Communication Engineering
10.	Navigation Guidance and Control	Electronics and Communication Engineering
11.	Emerging Technologies in Power Generation	Electrical and Electronics Engineering
12.	Quality assurance and reliability	Electrical and Electronics Engineering
13.	Supply Chain Management	Mechanical Engineering
14.	Nano-material Sciences and Engineering Application	Chemistry