13. Courses of Study and Scheme of Assessment

BE MECHANICAL ENGINEERING (SANDWICH) **(2019 Regulations)**
(Minimum credits to be earned: 165)

Course Code	Course Title	Periods / week				Maximum Marks			
		Lecture	Tutorial	Practical	Credits	CA	FE	Total	CAT
SEMESTER 1									
19M101	Calculus and its Applications	3	1	0	4	50	50	100	BS
19M102	Physics	3	0	0	3	50	50	100	BS
19M103	Chemistry	3	0	0	3	50	50	100	BS
19G105	English Language Proficiency	2	1	0	3	50	50	100	HS
19M110	Engineering Graphics I	0	0	4	2	50	50	100	ES
19M111	Basic Sciences Laboratory	0	0	4	2	50	50	100	BS
19M112	C Programming Laboratory	0	0	4	2	50	50	100	ES
19M100	Industrial Training - I	0	0	10	5*	50	50	100	PC
19IP15	Induction Programme **	0	0	0	0	-	-	-	MC
	Total 25 periods	**11**	**2**	**12+10**	**19+5***	**400**	**400**	**800**	
SEMESTER 2									
19M201	Complex Variables and Transforms	3	1	0	4	50	50	100	BS
19M202	Materials Science	2	0	0	2	50	50	100	BS
19M203	Chemistry of Engineering Materials	2	0	0	2	50	50	100	BS
19M204	Engineering Mechanics	3	1	0	4	50	50	100	ES
19M210	Engineering Graphics II	0	0	4	2	50	50	100	ES
19M211	Engineering Practices and Manufacturing Processes Laboratory	0	0	4	2	50	50	100	ES
19____	Language Elective	0	0	4	2	50	50	100	HS
19M200	Industrial Training - II	0	0	10	5*	50	50	100	PC
19M215	Activity Point Programme $	-	-	-	Grade	-	-	-	MC
Semester 2- Summer Term									
19M212	Internship €	0	0	0	2£	100	0	100	EEC
	Total 24 periods	**10**	**2**	**12+10**	**20+5***	**500**	**400**	**900**	

* Will be counted for TGPA (Training Grade Point Average) computation
** As per norms
$ As per AICTE Norms; Total 60 hrs; Grade : Completed / Not Completed; Not Counted for CGPA
CA Continuous Assessment
FE Final Examination
€ This course will be conducted prior to the commencement of the third semester for a period of 3 weeks
£ For internship, one credit is equivalent to minimum 40 hours of work as per norms

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Course Code	Course Title	Periods / week				Maximum Marks			
		Lecture	Tutorial	Practical	Credits	CA	FE	Total	CAT
SEMESTER 3									
19M205	Manufacturing Processes I	3	0	0	3	50	50	100	PC
19M301	Numerical Methods	2	1	0	3	50	50	100	BS
19M303	Mechanics of Materials	3	0	0	3	50	50	100	ES
19M304	Kinematics of Machinery	3	1	0	4	50	50	100	PC
19M305	Engineering Thermodynamics	3	1	0	4	50	50	100	PC
19M410	Machine Drawing	0	0	4	2	50	50	100	PC
19M310	Manufacturing Processes Laboratory	0	0	2	1	50	50	100	PC
19M311	Materials Science and Mechanics of Materials Laboratory	0	0	2	1	50	50	100	ES
19M300	Industrial Training - III	0	0	10	5*	100	0	100	PC
19K312	Environmental Science **	2	0	0	0	-	-	-	MC
19M315	Activity Point Programme $	-	-	-	Grade	-	-	-	MC
	Total 27 periods	**16**	**3**	**8+10**	**21+5 ***	**500**	**400**	**900**	
SEMESTER 4									
19M302	Manufacturing Processes II	3	0	0	3	50	50	100	PC
19M401	Probability and Statistics	2	1	0	3	50	50	100	BS
19M402	Basics of Electrical and Electronics Engineering	3	0	0	3	50	50	100	ES
19M403	Fluid Mechanics	3	1	0	4	50	50	100	PC
19M404	Dynamics of Machinery	3	1	0	4	50	50	100	PC
19O412	Indian Constitution **	2	0	0	0	-	-	-	MC
19M411	Electrical and Electronics Engineering Laboratory	0	0	2	1	50	50	100	ES
19M510	Fluid Machinery Laboratory	0	0	2	1	50	50	100	PC
19Q413	Soft Skills Development	0	0	2	1	100	0	100	EEC
19M400	Industrial Training - IV	0	0	10	5*	50	50	100	PC
19M415	Activity Point Programme $	-	-	-	Grade	-	-	-	MC
	Total 25 periods	**16**	**3**	**6+10**	**20+5 ***	**500**	**400**	**900**	

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** As per norms
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Course Code	Course Title	Periods / week				Maximum Marks			
		Lecture	Tutorial	Practical	Credits	CA	FE	Total	CAT
SEMESTER 5									
19O306	Economics for Engineers	3	0	0	3	50	50	100	HS
19M405	Thermal Engineering I	3	0	0	3	50	50	100	PC
19M501	Design of Machine Elements	3	1	0	4	50	50	100	PC
19M504	Turbomachinery	3	1	0	4	50	50	100	PC
19M603	Metrology and Instrumentation	3	0	0	3	50	50	100	PC
19M511	Thermal Engineering Laboratory	0	0	2	1	50	50	100	PC
19M610	Metrology and Dynamics Laboratory	0	0	2	1	50	50	100	PC
19Q513	Business and Managerial Communications	0	0	2	1	100	0	100	EEC
19M500	Industrial Training - V	0	0	10	5*	100	0	100	PC
19M515	Activity Point Programme $	-	-	-	Grade	-	-	-	MC
	Total 23 periods	**15**	**2**	**6+10**	**20+5***	**550**	**350**	**900**	
SEMESTER 6									
19M406	Industrial Metallurgy	3	0	0	3	50	50	100	ES
19M502	Thermal Engineering II	3	1	0	4	50	50	100	PC
19M505	Manufacturing Automation	3	0	0	3	50	50	100	PC
19M601	Design of Transmission Elements	3	0	0	3	50	50	100	PC
19M604	Design for Manufacture and Assembly	3	1	0	4	50	50	100	PC
19____	Open Elective I	3	0	0	3	50	50	100	OE
19M512	Manufacturing Automation Laboratory	0	0	2	1	50	50	100	PC
19Q613	Quantitative and Reasoning Skills	0	0	2	1	100	0	100	EEC
19M600	Industrial Training - VI	0	0	10	5*	100	0	100	PC
19M615	Activity Point Programme $	-	-	-	Grade	-	-	-	MC
	Total 24 periods	**18**	**2**	**4+10**	**22+5 ***	**550**	**350**	**900**	

At the end of 6th semester, the students are required to earn the minimum number of activity points from the AICTE mandated ACTIVITY POINT PROGRAMME to qualify for the award of BE/BTech degree (Refer Section 4 (vii) (c) of 2019 Regulations)

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$ As per AICTE Norms; Total 60 hrs; Grade : Completed / Not Completed; Not Counted for CGPA
CA Continuous Assessment
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BE MECHANICAL ENGINEERING (SANDWICH) (2019 Regulations)

Course Code	Course Title	Periods / week				Maximum Marks			
		Lecture	Tutorial	Practical	Credits	CA	FE	Total	CAT
SEMESTER 7									
19M	Professional Elective - I	3	0	0	3	50	50	100	PE
19M	Professional Elective - II	3	0	0	3	50	50	100	PE
19M700	Industrial Training - VII***	0	0	10	5*	100	0	100	PC
	Total 6 periods	**6**	**0**	**0+10**	**6+5***	**200**	**100**	**300**	
SEMESTER 8									
19M503	Operations Research	3	1	0	4	50	50	100	HS
19M602	Heat and Mass Transfer	3	1	0	4	50	50	100	PC
19M701	Finite Element Analysis	3	0	0	3	50	50	100	PC
19M	Professional Elective - III	3	0	0	3	50	50	100	PE
19M611	Heat Transfer Laboratory	0	0	4	2	50	50	100	PC
19M612	Innovation Practices	0	0	4	2	50	50	100	EEC
19M710	Finite Element Analysis Laboratory	0	0	2	1	50	50	100	PC
19M800	Industrial Training - VIII	0	0	10	5*	100	0	100	PC
	Total 24 periods	**12**	**2**	**10+10**	**19+5***	**450**	**350**	**800**	

* Will be counted for TGPA (Training Grade Point Average) computation
*** Students will undergo training in an industry immediately after the 6th semester examinations for a period of 3 to 6 months
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Course Code	Course Title	Periods / week				Maximum Marks			
		Lecture	Tutorial	Practical	Credits	CA	FE	Total	CAT
SEMESTER 9									
19____	Open Elective II	3	0	0	3	50	50	100	OE
19M____	Professional Elective IV	3	0	0	3	50	50	100	PE
19M____	Professional Elective - V	3	0	0	3	50	50	100	PE
19M____	Professional Elective - VI	3	0	0	3	50	50	100	PE
19M720	Project Work - I	0	0	4	2	50	50	100	EEC
19M900	Industrial Training - IX	0	0	10	5*	100	0	100	PC
	Total 16 periods	**12**	**0**	**4+10**	**14+5***	**350**	**250**	**600**	
SEMESTER 10									
19M820	Project Work - II	0	0	8	4	50	50	100	EEC
	Total 8 periods	**0**	**0**	**8**	**4**	**50**	**50**	**100**	

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CA Continuous Assessment
FE Final Examination

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PROFESSIONAL ELECTIVES

Design Stream

19M001 Geometric Modeling
19M002 Advanced Strength of Materials
19M003 Advanced Finite Element Analysis
19M004 Failure Analysis and Design
19M005 Vibration and Noise Engineering
19M006 Mechanical Design of CNC Machine Tools
19M007 Theory of Elasticity and Plasticity
19M008 Mechanics of Composite Materials
19M009 Introduction to Aircraft Systems
19M010 System Modeling and Control
19M011 Foundation Skills in Integrated Product Development
19M012 Design of Automotive Systems
19M013 Automobile Engineering

Manufacturing Stream

19M026 Manufacture and Inspection of Gears
19M027 Pneumatic and Hydraulic Systems
19M028 Non-Traditional Machining
19M029 Additive Manufacturing
19M030 Flexible Manufacturing Systems
19M031 Artificial Intelligence and Deep Learning
19M032 Solid State Joining Processes
19M033 Internet of Things for Mechanical Applications
19M034 Production Tooling

Industrial Engineering Stream

19M051 Lean Manufacturing
19M052 Supply Chain Management
19M053 Quality Engineering
19M054 Engineering Economics
19M055 Enterprise Resource Planning
19M056 Six Sigma in Manufacture and Service
19M057 Statistical Process Analysis and Optimization
19M058 Value Analysis and Value Engineering

Thermal Stream

19M076 Computational Fluid Dynamics
19M077 Refrigeration and Air Conditioning
19M078 Renewable Energy
19M079 Solar Energy Conversion Systems
19M080 Energy Conservation and Management
19M081 Advanced Heat and Mass Transfer
19M082 Energy and Climate Change
19M083 Power Plant Engineering
19M084 Advanced Fluid Dynamics

ONE-CREDIT COURSES

MECHANICAL ENGINEERING

19MF01 Simulators for Integrated Products
19MF02 Corrosion Science and Engineering
19MF03 Non-Destructive Testing of Aircraft Structures
19MF04 Cooling of Electronic Equipment
19MF05 Experimental Methods in Thermal and Fluid Sciences
19MF06 Challenges in Implementing Lean Manufacturing
19MF07 Process Engineering and Costing
19MF08 Applications of Value Engineering
19MF09 Pressure Vessel and Piping
19MF10 Design Validation and Qualification: Testing and Evaluation
19MF11 High Temperature Materials for Energy Applications
19MF12 Nanotechnology for Clean Energy Applications

ENGLISH

19GF01 Interpersonal and Organizational Communication
19GF02 Human Values through Literature

HUMANITIES

19OFA1 Export – Import Practices
19OFA2 Insurance - Concepts and Practices
19OFA3 Public Finance
19OFA4 Security Analysis and Portfolio Management
19OFA5 Social Entrepreneurship

LANGUAGE ELECTIVES

19G001 Communication Skills for Engineers
19G002 German- Level A1.1
19G003 French Language Level 1
19G004 Basic Japanese

Summary of Credit Distribution

BE MECHANICAL ENGINEERING (SANDWICH)											
S. No	**Course Category**	**Credits Per Semester**									**Total Credits**
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	
1	HS	3	2	0	0	3	0	0	4	0	0	12
2	BS	12	8	3	3	0	0	0	0	0	0	26
3	ES	4	8	4	4	0	3	0	0	0	0	23
4	PC	0+5*	0+5*	14+5*	12+5*	16+5*	15+5*	0+5*	10+5*	0+5*	0	67
5	PE	0	0	0	0	0	0	6	3	9	0	18
6	OE	0	0	0	0	0	3	0	0	3	0	6
7	EEC	0	0+2£	0	1	1	1	0	2	2	4	13
8	MC	-	-	-	-	-	-	-	-	-	-	-
	TOTAL	**19+5***	**18+2 +5£***	**21+5***	**20+5***	**20+5***	**22+5***	**6+5***	**19+5***	**14+5***	**4**	**165**

£ Summer Term Course(s)
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