Chaitanya Bharathi Institute of Technology

Department of Mechanical Engineering

PO and PSO Attainment of 2017-21 Batch

B.E Production Engineering

S. No	Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	16MTC03	Engineering Mathematics-III	2.21	2.20	2.20		2.15						2.45	2.45	2.45		2.45
2	16MEC04	Material Science and Metallurgy	1.96	1.47	0.73		0.72	2.25	2.25	2.25	2.25	2.25	2.25	2.28	2.28	2.28	2.28
3	16MEC05	Mechanics of Materials	0.9	0.9	0.9	0.9	0.9	1.62				1.62		1.62	1.62	1.62	1.62
4	16MEC06	Fluid Dynamics	0.90	0.90	0.90	0.90	0.90	1.05	1.05	1.07	1.07			1.07	1.06	1.05	1.07
5	16MEC07	Machine Drawing	1.70	1.80	1.80	1.70	1.10	1.07	0.80				0.62	1.03	1.22	1.52	0.60
6	16MBC01	Engineering Economics and Accountancy	0.90	0.90	0.90	0.90	0.90	1.35	1.37	1.30	0.84	1.36	1.31	1.68	1.40	1.30	1.18
7	16MEC08	Material Science and Metallurgy Lab	0.90	0.90	0.90	0.90	0.90	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	
8	16MEC09	Mechanics of Materials Lab	0.90	0.90	0.90	0.90	0.90	3.00			3.00	3.00		3.00	3.00	3.00	3.00
9	16MEC10	Computer Drafting Lab	0.90	0.90	0.90	0.90	0.90	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
10	16MEC14	Kinematics of Machines	2.06	2.06	2.06	2.06	2.06		1.5					1.5	1.49		1.5

PROFESSOR & HEAD
Department of Mechanical Engineering
Chaitanya Bharathi Institute of Technology (A)
Gandipet, Hyderabad-500 075. Telangana

11	16ME C15	Thermodynamics	0.69	0.69	0.69	0.69	0.69	2.62	2.41			2.51		2.57	2.49	2.49	2.49
12	16PE C01	Metal Casting & Welding	2.70	2.70	1.80			2.26	2.26	2.26	2.26	2.23	2.26	2.25	2.26	2.26	
13	16PE C02	Metal Forming Technology	2.70	2.70	1.80			0.70	0.64		1.11	0.72	1.02	1.11	0.70	0.70	
14	16EE C14	Electrical Machines and Microcontroller Applications	2.70	2.70	1.80				1.29			1.20		1.07	1.09		1.07
15	16PE C03	Metal Casting & Welding Lab	2.70	2.70	1.80								2.93	2.93	2.93		2.93
16	16PE C04	Metal Forming Technology Lab	2.70	2.70	1.80			3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
17	16EG C03	Soft Skills and Employability Enhancement Lab	2.70	2.70	1.80			2.70		2.70	2.70	2.70	2.70	2.70	2.70		2.70
18	16ME C20	Dynamics of Machines	1.70	1.70	1.80	1.70	1.10	1.07	0.80				0.62	1.03	1.22	1.52	0.60
19	16ME C21	Applied Thermodynamics and Heat Transfer	1.75	1.6	0.9	0.91	1.1	1.4	1.2	0.94	1.2		1.7	2.4	2.08	2.4	0.92
20	16ME C22	Design of Machine Elements	1.8	1.9	1.6	1.1	1.4	1.4	0.8				0.5	1.5	1.5	1.7	0.6
21	16ME E01	Refrigeration and Air Conditioning	0.88	0.85	0.44	0.07	0.34	0.80	0.45		0.44	1.35	1.33	1.20	1.16	0.93	0.48
23	16PE E02	Product Design and Process Planning	1.12	2.70	1.80	1.80	1.80	2.00	0.00	0.00	0.00	0.00	0.00	1.00	2.00	2.00	0.00
25	16PE E03	Non Destructive Testing and Evaluation	1.75	1.6	0.9	0.91	1.1	1.4	1.2	0.94	1.2		1.7	2.4	2.08	2.4	0.92
26	16PE E04	Plastics, Ceramics and Composite Materials	0.24	0.48	0.24	0.40	0.32	0.64	0.58	0.00	0.00	0.34	0.48	0.45	1.14	1.37	1.01
28	16ME	Dynamics and	2.50	2.50	2.33	2.33	2.55	1.00	1.00	1.00	2.00	1.50	1.00	2.00	2.50	1.00	2.10

PROFESSOR & HEAD
Department of Mechanical Engineering
Chaitanya Bharathi Institute of Technology (A)
Hyderabad-500 075, Telangana

	C23	Vibrations Lab														
29	16ME C24	Applied Thermodynamics and Heat Transfer Lab	2.70	2.70	2.50	2.65	2.50	2.20	1.67	2.50	2.50	1.80	2.80	2.40	1.83	2.16	1.67
30	16EE C22	Electrical Machines and Microcontroller Applications Lab	0.756	2.7	2.7	2.7	2.7	0	1.8	1.8	1.8	1.8	0	0	2.7	2.7	1.8
31	16ME C26	CAD and CAM	0.69	0.69	0.69	0.69	0.69	2.62	2.41			2.51		2.57	2.49	2.49	2.49
32	16PE C06	Machine Tool Engineering	2.70	2.70	1.80			2.26	2.26	2.26	2.26	2.23	2.26	2.25	2.26	2.26	
33	16PE C07	Additive Manufacturing	1.64	1.70	1.76	1.80	1.56	1.56	1.74			1.81	1.70	1.70	1.72	1.73	1.67
34	16ME C29	Machine Design	2.83	2.83	2.83	2.83	2.80						2.83	2.83	2.83	2.83	
37	16ME E06	Automobile Engineering	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
40	16ME E09	Object Oriented Programming With C++	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
41	16PE E06	Modern Machining and Forming Methods	3.00	3.00	3.00	3.00	3.00				3.00			3.00			3.00
43	16ME C30	CAD and CAM Lab	2.49	2.49	2.53	2.49	2.49				2.49	2.53	2.49	2.49	2.49	2.49	2.49
44	16PE C08	Machine Tool Engineering Lab	1.2175	1.210	1.24	1.16	1.24	1.24	1.14	1.24	1.33	1.24	1.24	1.24	1.26	1.24	1.05
45	16PE C09	Additive Manufacturing Lab	1.44	1.62	1.05	1.35	2.25	0.9	0.9	0	0.9	0.9	1.2	1.5	1.8	2.1	1.08
46	16ME C33	Metrology & Instrumentation	1.62	1.62	1.65			1.62			1.62	1.62		1.64	1.52	1.62	1.68
47	16ME C34	Operations Research	2.83	2.83	2.83	2.83	2.80						2.83	2.83	2.83	2.83	

PROFESSOR & HEAD
Department of Mechanical Engineering
Chaitanya Bharathi Institute of Technology (A)
Gandipet, Hyderabad-500 075, Telangana

48	16PE C10	Production Drawing	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
49	16PE C11	Production and Operations Management	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
50	16PE C12	Tool Engineering	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
51	16ME E10	Renewable Energy Sources	0.97	1.36	0.72	1.09	0.96	1.16	0.97	0.89	0.76	0.763	0.843	1.25	1.21	1.82	0.97
52	16ME E11	Energy Conservation, Management and Audit	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
53	16ME E12	Engineering Research Methodology	1.2175	1.21066667	1.24615346	1.16	1.24	1.24	1.145	1.24	1.33333333	1.24	1.24	1.24	1.26153846 2	1.24	1.095
55	16ME C36	Metrology & Instrumentation Lab	1.84	1.81	1.91	1.81	1.91	1.99	1.88	1.88	1.80	1.93	1.88	1.80	1.74	2.04	1.87
56	16PE C13	Manufacturing Engineering Lab	1.62	1.62	1.65			1.62			1.62	1.62		1.64	1.52	1.62	1.68
57	16ME C38	Project Seminar	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
58	16ME E15	Power Plant Engineering	1.64	1.59	1.66	1.11	0.93	1.53	1.53	0.94	1.28	0.92	0.92	2.26	0.93	1.27	1.66
59	16ME E16	Principles of Entrepreneurship	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
60	16PE E11	Supply Chain Management	2.83	2.83	2.83	2.83	2.80						2.83	2.83	2.83	2.83	
61	16CE O02	Disaster Mitigation and Management	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
62	16EE O03	Energy Auditing	1.64	1.59	1.66	1.11	0.93	1.53	1.53	0.94	1.28	0.92	0.92	2.26	0.93	1.27	1.66
63	16EC O07	System Automation and Control	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
64	16CS	Basics of AI	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

PROFESSOR & HEAD
Department of Mechanical Engineering
Chaitanya Bharathi Institute of Technology (A)
Gandipet, Hyderabad-500 075, Telangana

	O09																
65	16PY O01	History of Science and Technology	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
66	16EE O05	Waste Management	0.88	0.85	0.44	0.07	0.34	0.80	0.45		0.44	1.35	1.33	1.20	1.16	0.93	0.48
67	16CS O07	Basics of Cyber Security	2.50	2.50	2.33	2.33	2.55	1.00	1.00	1.00	2.00	1.50	1.00	2.00	2.50	1.00	2.10
68	16ME C39	Seminar	1.96	1.47	0.73		0.72	2.25	2.25	2.25	2.25	2.25	2.25	2.28	2.28	2.28	2.28
69	16ME C40	Project	2.76	1.97	1.93	2.24	2.72	2.25	2.25	2.25	2.25	2.25	2.25	2.28	2.28	2.28	2.28
		Target	**1.87**	**1.78**	**1.66**	**2.04**	**1.69**	**1.53**	**2.01**	**2.21**	**1.54**	**1.65**	**1.41**	**1.69**	**1.69**	**1.68**	**1.56**
		Direct Attainment	2.07	2.11	1.93	1.96	1.72	2.05	1.95	2.19	2.19	2.15	2.10	2.19	2.21	2.20	2.06
		Indirect Attainment	2.31	2.28	2.29	2.32	2.28	2.26	2.26	2.30	1.51	2.29	2.33	2.29	2.28	2.21	2.28
		Total Attainment	**2.11**	**2.15**	**2.00**	**2.61**	**1.59**	**2.09**	**2.42**	**2.30**	**1.71**	**2.17**	**2.15**	**2.21**	**2.22**	**2.20**	**2.10**

PROFESSOR & HEAD
Department of Mechanical Engineering
Chaitanya Bharathi Institute of Technology (A)
Gandipet, Hyderabad-500 075. Telangana

PROFESSOR
Department of Mechanical Engineering
Chaitanya Bharathi Institute of Technology (A)
Gandipet, Hyderabad-500 075. Telangana

Department Mechanical Engineering **Program B.E Production Engineering**

CONTINUOUS IMPROVEMENTS

Actions taken based on the results of evaluation of each of the COs, POs & PSOs for the

POs Attainment Levels and Actions for Improvement- (2020-21)

Pos	Target Level	Attainment Level	Observations
PO 1: Engineering Knowledge			
PO1	**1.87**	**2.11**	The courses 16ME E01, 16ME C28, 16PE E01, 16ME E03 are identified for low attainment of PO1.Thestudents encountered the problems pertaining load calculations for Air conditioning system, designing of nozzles and diffusers used in rockets and aircrafts, designing of ducts & combustion chambers, calculation of power in steam turbines using velocity triangles, plotting control charts and apply quality control tools, estimation of the theoretical air fuel ratio
Students faced difficulty in solving the problems in load calculations for air conditioning systems due to lack of sufficient fundamental knowledge on steady state and unsteady state heat conduction. These fundamentals are proposed to be included in R-20 regulation in Applied Thermodynamics and Heat Transfer. More problems on load calculations for Air conditioning system are to be practiced and to be given as assignments Most of the students left the question on control charts and theoretical air fuel ratio in choice. So It is decided to give more problems on control charts and the assessment will be done through assignments. It was proposed to change the class test and SEE question paper pattern so that students are obvious to attempt questions related all the COs. The same is being implemented from R-18 curriculum onwards For better understanding of basic per-requisites related to air-fuel ratio calculation, it is proposed to add some topics on atomic and molecular structure in chemistry course of first year			

PROFESSOR & HEAD
Department of Mechanical Engineering
Chaitanya Bharathi Institute of Technology (A)
Gandipet, Hyderabad 500 075 Telengana

PO 2: Problem Analysis:			
PO 2	1.78	2.15	The courses 16ME E07, 16ME E03 are identified for low attainment Students faced difficulty in estimating theoretical Air fuel ratio, and design of heat exchangers.
Most of the students left the question on theoretical air fuel ratio and design of heat exchanger in choice. So It is decided to give more problems on theoretical air fuel ratio calculations and the assessment will be done through assignments. It was proposed to change the class test and SEE question paper pattern so that students are obvious to attempt questions related all the COs. The same is being implemented from R-18 curriculum onwards.			
PO 3: Design/ Development of Solutions			
PO 3	1.66	2.00	This PO Design/Development of Solutions is attained. However, students were not comfortable with regard to design aspects of gears used in power transmission and Pattern design for casting.
Students left the question on design of gears in CIE and in SEE in choice, because Gear design is lengthy compared to springs, bearings, curved beams etc. It was proposed to change the class test and SEE question paper pattern so that students are obvious to attempt questions related to all COs. The same is being implemented from R-18 curriculum onwards. It has been proposed to give more real time problems on design of gears for power transmission through assignments there by students can comfortably attempt the questions appearing on gears. It is proposed that the first assignment should necessarily contain questions on pattern design related to casting process. 2% increment in target is proposed for the next batch.			
PO 4: Conduct investigations of complex problems			
PO 4	2.04	2.61	This PO on Conduct investigations of Complex Problems is attained. However, the usage of design of experiments. scientific tools for analysis are limited in student projects
It is proposed that faculty should create awareness of the design of experiments and various statistical, computational, other relevant technical tools among the students during the project seminar course dealt in 7th semester, subsequently enabling the students to conceptualizing and defining their final year project.2% increment in target is proposed for the next batch.			

PROFESSOR & HEAD
Department of Mechanical Engineering
Chaitanya Bharathi Institute of Technology
Gandipet, Hyderabad-500 075, Telangana

PO 5: Modern Tool Usage			
PO 5	1.69	1.59	The course 16ME E06 identified for low attainment of PO5.The student's encountered problem related to application of different numerical methods for complex problems and boundary conditions in different situations
Students are not comfortable with analyzing and applying boundary conditions in different situations. It is proposed to have more emphasis on convection heat transfer. Introduction to Turbulent flows should be introduced in Fluid Mechanics course			
PO 6: The Engineer and Society			
PO 6	1.53	2.09	This PO on Engineer and Society is attained the curriculum contains courses like Human Rights and Legislative Procedure, Entrepreneurship, and IPR. However, the awareness regarding societal and environmental issues related to engineering solutions should be enhanced.
It is proposed to make internships mandatory in the course curriculum so that students can understand the technology from the perspective of society and the environment while pursuing academics. It is proposed to introduce a course related to Community Engagement. A course with the title Engineering Exploration consists of Engineer and Society as one complete unit is proposed. It is proposed to introduce a course "industrial safety" to imbibe safety issues and practices in the industrial environment. It is proposed that the faculty dealing with project seminars during the 7th semester, brings awareness about Engineer and society and encourages students to take up the projects catering to the needs of the society.2%increment in target is proposed for the next batch			
PO 7: Environment and Sustainability:			
PO 7	2.01	2.42	This PO on environment and sustainability is attained. the curriculum contains courses like Environmental Studies, Environmental pollution, Renewable energy sources, and Power plant Engineering. However, practical exposure needs to be provided to the students
The department encourages the students' participation in Government initiated programmes such as Haritha Haram (tree plantation in rural areas), Akshaya Urja Diwas (Renewable Energy Day) etc.2% increment in target is proposed for the next batch.			

PROFESSOR & HEAD
Department of Mechanical Engineering
Chaitanya Bharathi Institute of Technology (A)
Gandipet, Hyderabad 500 075 Telangana

PO 8: Ethics			
PO 8	**2.21**	**2.30**	This PO on Ethics is attained. The curriculum contains the courses like Human values and Professional Ethics. However, the practice of ethics should be assessed practically,
It is proposed to give due weightage in the rubrics prepared to evaluate the ethical behavior and practices in the lab and project courses 2% increment in target is proposed for the next batch.			
PO 9: Individual and Team Work			
PO 9	**1.54**	**1.71**	This PO on individual and teamwork is attained. However, in the present scenario teamwork is very important for the sustainable career growth of the students, more inputs and practice are required
It is proposed to introduce activity-based courses like Community Engagement, Engineering Exploration in the first-year level itself so that the spirit of individual and teamwork can be inculcated better. students are encouraged to work as teams for activities conducted by various clubs of CBIT during Sudhee (Annual Techno-fest) & Shruthi (Annual Sports and Cultural fest) conducted for 5 days. It is proposed to conduct "Research Day" on 23rd August oof every year in which series of lectures and exhibition based on research outcomes in various fields. the same is being planned, participated and executed by students under the mentorship of faculty. Student teams are encouraged to participate in various competitions conducted under SAE, ASME clubs. It is proposed to give due weightage in the rubrics prepared to evaluate CIE of laboratory courses, final year project. To encourage students to take part in project exhibitions, hackathons, MSME projects, and similar activities. To motivate students to work with multidisciplinary aspects in industry projects carried out as a part of institute activity2% increment in target is proposed for the next batch			
PO 11: Project Management and Finance			
PO 11	**1.41**	**2.15**	This PO on Project Management and Finance is attained. But students are facing difficulty in applying PERT and CPM techniques. Moreover, students should able to use project management tools efficiently during the execution of the projects as an employee and as an entrepreneur.
It is proposed that more assignments are planned on PERT and CPM techniques and more examples are to be given in the class room. To introduce the approach to project management in the first year itself, it is proposed to add project management as the curricular topic in the course Engineering			

PROFESSOR & HEAD
Department of Mechanical Engineering
Chaitanya Bharathi Institute of Technology (A)
Gandipet, Hyderabad-500 075. Telangana

Exploration. As part of the course, the student teams need to identify a small project of societal importance, carryout the same under the supervision of mentors. As the mission of the department is to drive the students to be the achievers in Consultancy and R&D, to become successful Entrepreneurs, and to serve the society & industry, it is proposed to identify the tracks in professional electives so that students will choose the track of his/her choice. One of the track proposed is Industrial Engineering in which project management and financial aspects are adequately covered in addition to regular core subjects. It is proposed to shift the course Engineering accountancy from III sem to VII semester so that the concepts covered will be useful in addressing financial aspects in the student projects. It is proposed to encourage the students to submit the ideas to MSME incubation center of CBIT so that students should learn the procedure of preparation of proposals, business plans, etc. A 2% increment in target is proposed for the next batch.

PO 12: Life Long Learning:

PO 12	**1.69**	**2.21**	This PO on Life-long Learning is attained. Whereas it is required to facilitate insightful introspections to nurture a lifelong learning attitude among the students.

It is proposed to introduce the credit transfer to the courses pursued via MOOCs (e.g. Swayam NPTEL, Coursera, etc.), to make the internships mandatory as part of the curriculum, to facilitate the honors and additional minor engineering degrees for the students who can acquire a minimum of 20 credits through MOOCs courses, to introduce the e-portfolio to promote students participation in Co-curricular and extracurricular activities which nurture the key interest towards lifelong learning, to invite more industry experts to take part in curriculum revision, delivery of lectures, project guidance and assessments. A 2% increment in target is proposed for the next batch.

PROFESSOR & HEAD
Department of Mechanical Engineering
Chaitanya Bharathi Institute of Technology (A)
Gandipet, Hyderabad-500 075. Telangana

PSOs Attainment Levels and Actions for Improvement- (2020-21)

PSOs	Target Level	Attainment Level	Observations
PSO 1: Fundamental knowledge of the theoretical background for the applied technologies and methods applied in Production Engineering, including conventional and CAD/CAM areas			
PSO 1	**1.68**	**2.22**	This PSO is attained. However, the students should be more acquainted with processes and practice them from arriving at design specification to the documentation stage. The lab courses and final year projects should be strengthened in this regard
It is proposed to introduce open-ended experiments in the lab courses and the rubrics devised for the labs and projects should address the above aspects. Tolerance design is proposed to be added in the course Metrology and instrumentation. It is proposed to increment the target by 2%.			
PSO 2: Ability to think and work in a problem oriented, project oriented and in an inter-disciplinary way			
PSO 2	**1.68**	**2.01**	Students have faced difficulty in summarizing the literature review, faced problems in drawing velocity and acceleration diagrams in kinematics, pattern design in casting, load calculations in metal forming. Calculation of efficiency and regulation of a transformer, programming with 8051 microcontrollers, psychometric calculations in RAC, plotting control charts, developing process plans, calculation of the air-fuel ratio, design of ducts & combustion chambers, calculation of the power of turbines with velocity diagrams, design of gears for power transmission, choosing a proper numerical technique for a given problem, design of heat exchangers, energy auditing, usage of PERT and CPM methods, Exception handling, multithreading, GUI applications and applications using collection framework in JAVA.
It is observed that most of the topics listed were not attempted by the students because of choice. It is proposed to change the question paper pattern so that no CO can be left out in choice. It is also proposed that more assignments are prepared and given to the students on the above topics			

PROFESSOR & HEAD
Department of Mechanical Engineering
Chaitanya Bharathi Institute of Technology (A)
Gandipet, Hyderabad-500 075. Telangana

PSO 3: Ability to work independently as well as in teams and get the opportunity to learn leadership and entrepreneurship qualities.			
PSO3	**1.56**	**2.10**	This PSO is attained. However, the department is striving with its best capability in line with the motto of the institute " Swayam Tejaswi Bhava" to create an entrepreneurship environment and culture in its academic endeavors
A lot of activities are proposed under Entrepreneurship Development Cell, IIC, incubation center. Apart from these students are encouraged to initiate and organize events with various clubs of CBIT to inculcate entrepreneurial traits among themselves			

PROFESSOR & HEAD
Department of Mechanical Engineering
Chaitanya Bharathi Institute of Technology (A)
Gandipet, Hyderabad-500 075. Telangana