CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING

ACTION TAKEN TOWARDS STAKE HOLDERS' FEEDBACK ON THE CURRICULUM

2019-20

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

DEPARTMENT OF MECHANICAL ENGINEERING

Action taken report on Student Feedback

2019-20

S. No	Description	Rating Out of 5	Action Taken/Proposed	Proof Page No
1	Satisfaction level of students in association with CBIT	4.33	-	-
2	Addressing the grievances	4.3	-	-
3	How far the acquired knowledge of mathematics, science and engineering fundamentals helped you in solving complex mechanical engineering problems? (PO1)	4.33	-	-
4	How confident are you in identifying, formulating and analyzing complex engineering problems reaching to substantial conclusions by using first principles of mathematics and sciences? (PO2)	4.33	-	-
5	How adequate is the knowledge you gained, helped in providing solutions for complex engineering problems and design/develop systems to meet the societal needs as per standards? (PO3)	4.4	-	-
6	How competent are you in conducting investigations of complex problems using research-based knowledge/methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions?(PO4)	3.9	-	-
7	How acquainted are you in using modern IT tools in modeling of complex engineering problems? (PO5)	4.2	-	-
8	How informed are you with the contextual knowledge of the engineer and society relevant to the professional engineering practice? (PO6)	4.36	-	-

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

9	How well versed are you in understanding the impact of professional Engineering solutions in the context of environment and sustainable development? (PO7)	4.2	-	-
10	How equipped are you with the ethical principles and responsibilities in accordance with the Engineering practices? (PO8)	4.43	-	-
11	How managerial are you in effective functioning with the team?(PO9)	4.26	-	-
12	How effective are you in communicating for comprehension, documentation and presentation of engineering activities? (PO10)	4.13	-	-
13	How entrepreneurial are you in identifying, acquiring and allocating the finance and other resources for an effective project management? (PO11)	4	-	-
14	How adaptable are you to engage in lifelong learning approaches in the of context of technological changes?(PO12)	4.43	-	-
15	How do you rate the Curriculum/Syllabus that you have undergone?	4.43	-	-
16	As we got questions in Non destructive testing in campus selection written test. The topic should be introduced some where	-	The same is introduced in Material Science and Metallurgy in R-20	4-5

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

With Effect from the Academic Year 2021 – 2022

20MEC04

MATERIAL SCIENCE AND METALLURGY

Instruction	3 L Hours per Week
Duration of SEE	3 Hours
SEE	60 Marks
CIE	40 Marks
Credits	3

Objectives: Student will understand
1. Structure property relations, analyze the failures of metals and their prevention.
2. Fatigue, creep and diffusion mechanisms.
3. Classification of steels and their application .
4. Working principle of various heat treatment operations
5. Principles of extractive metallurgy.

Outcomes: At the end of the course a student will be able to
1. Understand the crystal structure and various imperfections of crystals.
2. Related material failure by fatigue and creep.
3. Interpret phase diagrams and TTT diagrams.
4. Understand the methods of improvement of mechanical properties by various heat treatment operations.
5. Differentiate the properties and applications of ceramics, polymers and composites.

UNIT - I

Plastic Deformation: Introduction to engineering materials, Imperfections in crystals, Dislocation in crystals, Types of dislocations, Effect of slip and twinning on plastic deformation, Strain hardening, Cold and hot working, Bauschinger effect, Recovery, Recrystallization, Grain growth and its effect on mechanical properties of metals.

Fracture: Types of fracture in metals, Ductile and brittle fracture, Griffith theory of brittle fracture, Crack propagation and ductile to brittle transition temperature.

UNIT - II

Diffusion: Fick's laws of diffusion, Application of diffusion theory in mechanical engineering.

Fatigue: S–N curve, Fatigue crack propagation, Effect of metallurgical variables on fatigue of metal, Low and high cycle fatigue, Experimental determination of fatigue strength (RR–Moore Test).

Creep: Creep strength, Creep curve, Creep deformation mechanisms, Creep test.

UNIT- III

Structure of Alloys: Study of Eutectic, Eutectoid, Peritectic and Peritectoid reactions

Iron–Iron Carbide Equilibrium Diagram: Construction and interpretation, Types of plain carbon steels, Cast irons and their properties and characteristics.

Alloy Steels: Effects of alloying elements like Nickel, Chromium, Manganese, Silicon, Tungsten and Titanium, Types of stainless steel, HSLA, TRIP, HSS, Brass, Bronze, Their

composition and properties.

UNIT - IV

Heat Treatment: Purpose of heat treatment, Annealing, Normalizing, Hardening, Tempering, Construction and interpretation of T–T–T diagram, Austempering and Martempering, Case hardening, Carburizing, Nitriding, Carbo–nitriding, Flame hardening, Induction hardening, Laser and Electron beam hardening.

Introduction to Non-Destructive Testing: Importance of Non-Destructive Testing, Types: Liquid Penetrant Testing, Ultrasonic Testing, Radiography Testing, Applications of Non-Destructive Testing.

UNIT - V

Introduction to Extractive Metallurgy: Method of production of pig iron by blast furnace, Cast iron by cupola furnace and method of production of steel by electric arc process.

Polymers and Ceramics: Polymerization, Thermoplastics and thermosetting plastics, Elastomers, Resins, Types, properties and applications of ceramics

Composites: Concept of composites, Matrix and reinforcement, Classification and Applications of composites.

Text Books:

1. V. Raghavan, Materials Science and Engineering, 4th edition, Prentice Hall of India Ltd., New Delhi, 2005.
2. S.H. Avner, Introduction to Physical Metallurgy, 2nd edition, Tata McGraw Hill Publishers, New Delhi, 2005.

Suggested Reading:

1. S.P. Nayak, Engineering Metallurgy and Material Science, 6th edition, Charotar Publishing House, Gujarat, 2005.
2. G. E. Dieter, Mechanical Metallurgy, 3rd edition, Tata McGraw Hill, New Delhi, 2005.
3. W.D. Callister (Adapted by R. Balasubramaniam), Materials Science and Engineering, 2nd edition, Wiley India, New Delhi, 2014.

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

6

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DEPARTMENT OF MECHANICAL ENGINEERING

Action taken report on Faculty Feedback

2019-20

S. No	Description	Action Taken/Proposed	Page Number
1	Mr Aditya TN suggested to include the concepts of Aerodynamics in Fluid Dynamics	Not included due to syllabus constraints	—
2	Dr VVS Seshagiri Rao suggested Boiling and Condensation to be included in ATD &HT	These concepts were included in the syllabus	8-9
3	Dr VVS Seshagiri Rao suggested Non Reactive ideal gases mixtures and third law of thermodynamics can be introduced in thermodynamics subject	The suggested topics are included	10-11
4.	DS Madhuri suggested electric and hybrid vehicles can be included in automobile engineering	Included in the syllabus	12-13
5.	Dr. B.V.S. Rao suggested production and operation management subject should be made as compulsory instead of elective	From R-16 onwards more electives were included in syllabus. Open electives are included in R-18. So there is no space for POM in core.	14
6.	Dr.G.Laxmaiah suggested engineering graphics and design can be converted to lab	It is converted to lab	15-16
7	P. Surendar Reddy, suggested coordinate measuring machine should included in Metrology & Instrumentation subject	It is included in R-20	17-18
8	Dr.T. Ratna Reddy, suggested TDMA algorithm can be included in CFD subject	Included in III unit	19-20
9	Ch. Sharath Reddy, suggested Additive manufacturing can be included in Workshop Manufacturing Practice	Will be considered in next revision	—
10	N.Venkateswara Rao suggested(i) Coordinate measuring machine should be included in Metrology & Instrumentation subject,	(i) Included. (ii) Included in V unit in R-20 (iii) The title is changed	(iv) 17-18 21-22 23

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

	(ii)Computer Aided Process Planning quality function deployment in quality engineering included in PDPP. (iii)CAMDA title should be changed to mechanical design and analysis		
11.	Dr P.Rama Lakshmi suggested to include fabrication of specimen for nano materials in Nano Materials and Technology	Will be considered in next revision	
12.	Dr R P Chowdary suggest to add concepts of boiling and condensation in ATD & HT.	These topics are included in the syllabus	
13.	Dr R P Chowdary suggest to Non Reactive Idea Gas Mixture may be introduced in Thermodynamics.	The suggested topics are included in the syllabus	10-11
15.	Mr Chandra Kanth suggested including advance topics like polyjet and LENS process in additive manufacturing.	This is production programme and there is no revision after R-18	
16.	Dr Aleem Pasha suggested adding electrical vehicles concepts in Automobile Engineering and Broading and Capping can be added in machine tool engineering and Shper Planer Milling Machine experiments in lab course.	This is production programme and there is no revision after R-18	

20ME C17

APPLIED THERMODYNAMICS AND HEAT TRANSFER

Instruction	3	Hours per week
Duration of SEE	3	Hours
SEE	60	Marks
CIE	40	Marks
Credits	3	

Objectives: To understand
1. The working principle of single stage and multi stage reciprocating air compressor.
2. The working principle of diesel and petrol engines.
3. The combustion phenomena in IC Engines, parameters leading to abnormal combustion; cooling, lubrication and ignition systems.
4. The principles of conductive and convective heat transfer.
5. The principles of heat exchanger, concepts of radiation, phase change heat transfer.

Outcomes: At the end of the course, the students will be able to
1. Estimate the power required and efficiency of reciprocating air compressor using the principles of thermodynamics.
2. Understand the working principle of I.C engines and evaluate the performance of I.C. engines.
3. Understand the concepts of normal, abnormal combustion and the functioning of engine systems like cooling, lubrication and ignition.
4. Estimate the heat transfer through composite slabs, composite cylinders and understand the dimensionless numbers used in convection.
5. Understand the basic principles of heat exchangers, radiation, boiling and condensation.

UNIT – I

Reciprocating Air Compressors: Classification of compressors, advantages of reciprocating compressors over rotary compressors, applications of compressed air, working principle of reciprocating compressors - single stage and multi stage compressors with and without clearance, concept of optimum pressure ratio, minimum work input, various efficiencies of multi stage compressors, simple problems on reciprocating compressors.

UNIT - II

Internal Combustion Engines: Classification, working principles of 2 stroke, 4 stroke SI and CI engines, valve and port timing diagrams, performance of IC engines, Morse test, various methods of determining frictional power, various efficiencies, heat balance sheet.

UNIT - III

Combustion Phenomena: Stages of combustion in SI and CI engines, factors affecting, normal and abnormal combustion phenomenon in SI and CI engines, methods to control the abnormal combustion, octane and cetane number, types of combustion chambers, cooling systems, lubrication systems, battery and magneto ignition systems of IC engines, working principle of simple carburetor and fuel injector.

UNIT - IV

Modes of Heat Transfer: Conduction-General 3-D conduction equation in cartesian and cylindrical coordinates, one dimensional steady state conduction through slabs, hollow cylinders without heat

generation, critical radius of insulation for cylinders.

Convection: Basic concepts of free and forced convection, dimensionless numbers and their physical significance, simple problems on free and forced convection.

UNIT - V

Radiation: Concept of black-body Laws of radiation – Planck's Law, Wien's displacement law, Stefan Boltzmann Law, Kirchoff's Law.

Heat Exchangers: Classification, concept of LMTD, effectiveness, simple problems.

Boiling and Condensation: Basic concepts of boiling and condensation, pool boiling curve.

Text Books:

1. Mahesh M. Rathore, Thermal Engineering, TMH, New Delhi, 2010
2. V. Ganeshan, Internal Combustion Engines, Tata McGraw Hill Publishing, New Delhi, 2015
3. J.P. Holman, Heat Transfer, McGraw Hill Publication, New Delhi,

Data Book:

1. C.P.Kothandaraman, Heat Transfer Data Book, TMH

Suggested Reading:

1. R.K. Rajput., Thermal Engineering, Laxmi Publishers, New Delhi, 2014
2. Ozisik, Heat Transfer, TMH, 2004

PROFESSOR & HEAD
epartment of Mechanical Engineering
haitanya Bharathi Institute of Technology (A)
ndipet, Hyderabad-500 075. Telangana

CBIT (A)
20MEC11

With Effect from the Academic Year 2021-22

THERMODYNAMICS

Instruction
Duration of SEE
SEE
CIE
Credits

3 L Hours per Week
3 Hours
60 Marks
40 Marks
3

Objectives: Students will understand

1. Basic definitions of thermodynamics and significance of Zeroth law of thermodynamics.
2. The importance and application of first law of thermodynamics.
3. The principles associated with second law of thermodynamics.
4. Properties of pure substances and use of Mollier diagram.
5. Various air standard cycles, vapour power cycles and their importance.

Outcomes: At the end of the course a student will be able to

1. Understand the concepts of system, thermodynamic properties, thermodynamic equilibrium and various methods of pressure and temperature measurements.
2. Apply the first law of thermodynamics to various thermodynamic processes along with the applications of steady flow energy equation.
3. Apply the Second law of thermodynamics to analyze heat pumps, refrigerators, heat engines and to evaluate entropy changes.
4. Evaluate the properties of pure substances and analyze the performance of steam power cycles.
5. Evaluate performance of air standard cycles and analyze the properties of gas mixtures.

UNIT - I

Introduction: Thermodynamics, Macroscopic and Microscopic approaches, Thermodynamic systems, Properties, Processes and cycles, Thermodynamic equilibrium, Quasi – static process, Measurement of pressure, Zeroth law of thermodynamics and its significance, Measurement of temperature, Reference points, Ideal gas equation.

UNIT - II

Energy Interactions and First Law of Thermodynamics: Concept of heat and work, First law of thermodynamics for closed system, Energy a property of the system, Application of first law to various thermodynamic processes like isobaric, Isochoric, Isothermal, Adiabatic and polytropic, Definition of enthalpy, PMM1, First law applied to flow processes, Application of SFEE to Nozzle, Diffuser, Throttling device, Turbine, Compressor and heat exchanger.

UNIT- III

Second Law of Thermodynamics: Limitations of first law of thermodynamics, Kelvin–Planck and Clausius statements of second law of thermodynamics, PMM2, Equivalence of Kelvin-Planck and Clausius statement, Reversible and irreversible processes, Carnot

theorem, Clausius inequality, Calculation of entropy change during various thermodynamic processes, Principle of entropy increase, T–s diagrams, Application of entropy principle for mixing of two fluids, Introduction to available and unavailable energy, Third law of thermodynamics, Helmholtz and Gibb's functions.

UNIT – IV

Pure Substances: Properties of pure substances, P–V diagram, P–T diagram, P-V-T surface, T–s diagram, h–s diagram, Dryness fraction, Use of steam tables, Maxwell relations, Clapeyron equation.

Vapour Power Cycles: Vapour power cycles - Carnot cycle, Simple Rankine cycle, Representation on p-v, T-s and h-s diagrams, Evaluation of performance parameters, Efficiency, Work ratio, Specific steam consumption and heat rate.

UNIT – V

Air Standard Cycles: Air standard cycles, Otto, Diesel, Dual combustion cycles, Working principle, Derivation of expression for air standard efficiency, Comparison of Otto, Diesel and dual cycles for the same compression ratio, For the same maximum pressure and temperature.

Non-reactive Ideal Gas Mixtures: Mole fraction, Mass fraction, Partial pressure, Dalton's law of partial pressures, Amagat-Leduc law of partial volumes, Relation between partial pressures, Mole fraction and volume fraction, Gas constant, Molecular mass, Specific heats of gas mixtures, Relation between volumetric and gravimetric analysis, Determination of theoretical air fuel ratio and equivalence ratio for various fuels,

Text Books:

1. P.K. Nag., Engineering Thermodynamics, 6th edition, Tata McGraw Hill Publishing, 2017
2. Yunus Cengel and Michael Boles., Thermodynamics: An Engineering Approach, 8th edition, McGraw Hill Education, 2017.

Suggested Reading:

1. R.K. Rajput., Engineering Thermodynamics, 4th Edition, Laxmi Publications, 2016.
2. Mahesh M Rathore., Thermal Engineering, Tata McGraw Hill Publishers, 2013.
3. D.S. Kumar., Engineering Thermodynamics, S.K. Kataria and Sons, 2014.

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

20MEE13

AUTOMOBILE ENGINEERING
(Professional Elective-IV)

Instruction	3	Hours per week
Duration of SEE	3	Hours
SEE	60	Marks
CIE	40	Marks
Credits	3	

Objectives:
1. To learn about the layout and arrangement of principal parts of an automobile.
2. To understand working of different types of Drive train and Transmission Systems
3. To learn about different types of Steering, Axle, Wheels and Tyres.
4. To understand different types of Suspension and braking systems.
5. To learn about Alternative Energy Sources for Automobiles.

Outcomes: Student will be able to:
1. Identify principal parts of an automobile and its layout.
2. Understand the various systems in automobile like engine cooling, lubrication, ignition, electrical and air conditioning systems with the principles of thermodynamics.
3. Understand the various suspension and steering systems.
4. Analyse the functioning of drive train, transmission and braking systems.
5. Understand the importance of alternative power trains for pollution control.

UNIT - I
Engine: Engine location and its components, chassis layout - parts of the automobile body, terminology, automobile frames ; crank shaft, firing order, piston and piston rings, cylinder liners, valves and operation mechanism, VVT , Carburetion, GDI Engines, MPFI, Compression Ignition engines - Fuel Injection System and Electronic Fuel Injection system
Maintenance: Trouble shooting and overhauling, engine tune up

UNIT - II
Lubricating Systems: Wet sump, dry sump and petroil systems
Cooling systems: Water pumps, radiators, thermostat control, anti-freezing compounds
Ignition Systems: Ignition Systems – Battery, Magneto and Electronic Ignition Systems.
Electrical Systems : Main electrical circuits, Batteries and charging systems, Starting circuit, lighting system, indicating devices, warning lights, speedometer, automobile air-conditioning

UNIT - III
Wheel and tyres: Tyre construction, specification, Tyre wear and causes.
Suspension systems: Types of Suspension systems, Independent suspension, coil and leaf springs, torsion bar, shock absorbers

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

Steering Systems: Linkage arrangements and its components, steering gear box types, Electronic power steering system, Davis & Ackerman Steering, Steering geometry: caster, camber, King Pin Inclination, Toe in, toe out, wheel balancing, wheel alignment

UNIT – IV

Power Train: Clutches – Single plate & Multiplate clutches, Gearbox – Manual, and automatic gearboxes. Torque converter, propeller shaft, universal coupling, differential, four-wheel drive system
Brakes Systems: Disc and Drum Brakes, Description and operation of hydraulic brake, hand brake linkage, ABS, EBD

UNIT – V

Pollution control: Pollution control techniques used for petrol and diesel engines, PCVS, EGR, SCRT, Thermal Reactors, Catalytic converters; Euro norms and Bharat Norms.
Alternative Power Trains: Electric Vehicles, Hybrid Vehicles, Batteries used in Electric and Hybrid Vehicles, Battery charging systems. Fuel cell Vehicles – Introduction

Text Books:
1. R. K. Rajput, A Textbook of Automobile Engineering, 2nd edition, Laxmi Publications Pvt Ltd, 2007
2. Kirpal Singh, Automobile Engineering, Vol I and II",12th edition, Standard Publishers, 2011
3. P.L. Kohli, Automotive Electrical Equipment, Tata McGraw Hill, 1985.

Suggested Reading:
1. S. Srinivasan, Automotive Mechanics, 2nd edition, Tata Mc Graw Hill, 2003
2. William H. Crouse, Donald L. Anglin, "Automotive Mechanics", 10th edition, Tata Mc Graw Hill, 2007.

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

With effect from academic year 2021-22

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (A)

R20 SCHEME

B.E. (MECHANICAL ENGINEERING)

SEMESTER – IV

S. No.	Course Code	Title of the Course	Scheme of instruction			Scheme of examination			Credits
			Hours per week			Duration in Hours	Maximum Marks		
			L	T	P/D		CIE	SEE	
THEORY									
1	20MEC10	Kinematics of Machines	3	1	--	3	40	60	4
2	20MEC11	Thermodynamics	3	--	--	3	40	60	3
3	20MEC12	Fluid Principles and Hydraulic Machines	3	1	--	3	40	60	4
4	20MEC13	Metal Cutting and Machine Tool Engineering	3	--	--	3	40	60	3
5	20EGM01	Indian Constitution and Fundamental Principles	2	--	--	2	--	50	*Non Credit
6	20EEM01	Indian Traditional Knowledge	2	--	--	2	--	50	*Non Credit
7		Professional Elective - I	3	--	--	3	40	60	3
PRACTICALS									
8	20MEC14	Fluid Principles and Hydraulic Machines Lab	--	--	2	3	50	50	1
9	20MEC15	Metal Cutting and Machine Tool Engineering Lab	--	--	2	3	50	50	1
		TOTAL	19	02	04	--	300	500	19

L: Lecture   T: Tutorial   D: Drawing   P: Practical
CIE - Continuous Internal Evaluation   SEE – Semester End Examination

Professional Elective – I (3/3)		
SNO	Subj. Code	Name of the Subject
1	20MEE01	Power Plant Engineering
2	20MEE02	Production and Operations Management
3	20MEE03	Entrepreneurship
4	20MEE04	Mechatronics and Automation

PROFESSOR & HEAD
Department of Mechanical Engineering
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CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (AUTONOMOUS)

Scheme of Instructions of II Semester of B.E. – Mechanical Engineering as per AICTE Model Curriculum 2020-21

DEPARTMENT OF MECHANICAL ENGINEERING

SEMESTER -II

S. No	Course Code	Title of the Course	Scheme of Instruction Hours per Week L	T	P/D	Scheme of Examination Duration of SEE in Hours	Maximum Marks CIE	SEE	Credits
THEORY									
1	20MT C06	Vector Calculus and Differential Equations	3	1	-	3	40	60	4
2	20EG C01	English	2	-	-	3	40	60	2
3	20PY C05	Mechanics and Materials Science	3	-	-	3	40	60	3
4	20EEC01	Basic Electrical Engineering	3	-	-	3	40	60	3
PRACTICAL									
5	20EG C02	English lab	-	-	2	3	50	50	1
6	20PY C08	Mechanics and Materials Science Lab	-	-	4	3	50	50	2
7	20EEC02	Basic Electrical Engineering Lab	-	-	2	3	50	50	1
8	20ME C01	CAD and Drafting	-	1	3	3	50	50	2.5
9	20MB C02	Community Engagement	30 field + 2P/W			-	50	-	1.5
		TOTAL	11	2	11	-	410	440	20

L: Lecture **T: Tutorial** **P: Practical**

CIE - Continuous Internal Evaluation

SEE - Semester End Examination

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Department of Mechanical Engineering
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20ME C01

CAD AND DRAFTING

Instruction	1 T + 3 D Hours per week
Duration of SEE	3Hours
SEE	50Marks
CIE	50Marks
Credits	2.5

Course Objectives:
1. To get exposure to a cad package and its utility.
2. Understanding orthographic projections.
3. To visualize different solids and their sections in orthographic projection
4. To prepare the student to communicate effectively by using isometric projection.
5. To prepare the student to use the techniques, skills, and modern tools necessary for practice.

Outcomes: At the end of the course, the Students are able to
1. Become conversant with appropriate use of CAD software for drafting. (BL-3)
2. Recognize BIS, ISO Standards and conventions in Engineering Drafting. (BL-2)
3. Construct the projections of points, lines, planes, solids (BL-3)
4. Analyse the internal details of solids through sectional views (BL-4)
5. Create an isometric projections and views (BL-6)

List of Exercises:
1. Introduction to CAD package: Settings, draw, modify tools, dimensioning and documentation
2. Construction of Conic Sections by General method
3. Orthographic projection: Principles, conventions, Projection of points
4. Projection of straight lines: Simple position, inclined to one plane
5. Projection of straight lines inclined to both the planes (without traces and mid-point)
6. Projection of planes: Perpendicular planes
7. Projection of planes: Oblique planes
8. Projection of solids: Simple position
9. Projection of solids: Inclined to one plane
10. Sections of solids: Prism, pyramid in simple position
11. Sections of solids: Cone and cylinder in simple position
12. Isometric projections and views
13. Conversion of isometric views to orthographic projections and vice versa.

Text Books:
1. N.D.Bhatt, "Elementary Engineering Drawing", Charotar Publishers, 2012.
2. K.Venugopal, "Engineering Drawing and Graphics + AutoCAD", New Age International Pvt. Ltd,2011.
3. Basanth Agrawal and C M Agrawal, "Engineering Drawing", 2/e, McGraw-Hill Education (India) Pvt. Ltd.

Suggested Reading:
1. Shaw M.B and Rana B.C., "Engineering Drawing", 2/e, Pearson, 2009.
2. K.L. Narayana and P.K. Kannaiah, "Text Book of Engineering Drawing", Scitech Publications, 2011.

PROFESSOR & HEAD
Department of Mechanical Engineering
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20MEC23

METROLOGY AND INSTRUMENTATION

Instruction	3	Hours per week
Duration of SEE	3	Hours
SEE	60	Marks
CIE	40	Marks
Credits	3	

Objectives:

1. To familiarize with limits, fits & tolerances and fundamental concepts of measurements.
2. To have adequate skill in the usage of various precision measuring instruments and the concepts of Limit gauges.
3. To learn the importance of Geometric form and how to measure form errors.
4. To have knowledge in the concepts of classification of instrument errors and their characteristics.
5. To understand the working principles of various instruments used for the measurement of displacement, pressure and temperature.

Outcomes: At the end of the course, students are able to

1. Understand the need, accuracy and associated concepts of linear and angular measurements.
2. Select appropriate gauges for inspection and design.
3. Calculate surface roughness by using appropriate instruments.
4. Analyze and interpret the types of errors, strain measurement and instrument characteristics.
5. Evaluate measuring methods and devices for displacement, pressure & temperature.

UNIT-I

Limits, Fits and Tolerances: nominal size, limits, tolerances, allowance, fundamental deviation, unilateral and bilateral tolerances, impact of tolerances on the manufacturing processes, types of fits, alpha numeric designation of limits/fits, hole and shaft basis systems, interchangeability and selective assembly
Linear and angular measurement: Line and end standards, slip gauges, Tomlinson gauges and sine bar, 3D Coordinate measuring machine

UNIT-II

Design of limit gauges: Taylor's Principle for plan limit gauges, design of GO and NO GO gauges, use of plug, ring and snap gauges.
Comparators: Introduction, dial indicator, sigma mechanical comparator, back pressure type pneumatic comparator.
Optical measuring instruments: Optical projector principle and its uses, tool maker's microscope principle and its uses, interferometry.

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UNIT-III

Straightness, Flatness and Roundness Measurement: Definitions, measurement by beam comparator, straight edge, spirit level, and bench centers.

Surface roughness measurements: Need for surface roughness measurement, Roughness and waviness, numerical assessment of surface roughness, surface roughness measurement by profilometer, Taylor Hobson Talysurf, ISI symbols for indication of surface finish.

UNIT-IV

Screw thread metrology: Basic terminology of screw thread, measurement of effective diameter by 2 wire and 3 wire methods, best wire size.

Gear tooth metrology: Spur gear nomenclature, gear tooth thickness measurement by gear tooth vernier.

Instrumentation: Static and dynamic characteristics of instruments, types of errors, strain measurement with strain gauges, gauge factor, rosette Gauges.

UNIT-V

Transducers: Displacement measurement by L.V.D.T, pressure measurement by bourdon pressure gauge, bulk modulus pressure gauge, pirani gauge, temperature measurement by thermo couples, laws of thermo electricity, types of materials used in thermocouples.

Text Books:

1. R.K. Jain, Engineering Metrology, Khanna Publications, 1996.
2. Doeblin, Measurement Systems Application and Design, TMH, 5th edition, 2004.
3. Beckwith, Buck, Lienhard, Mechanical Measurements, PEA, 3rd Indian Reprint, 2001.

Suggested Reading:

1. Rega Rajendra, Principles of Engineering Metrology, Jaico Publishing House, Mumbai, 2008.
2. B.C. Nakra& K.K. Chaudhary, Instrumentation Measurement and Analysis, 3rd edition, McGrawhill, 2014

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

20MEE09

COMPUTATIONAL FLUID DYNAMICS
(Professional Elective-III)

Instruction	3	Hours per week
Duration of SEE	3	Hours
SEE	60	Marks
CIE	40	Marks
Credits	3	

Objectives:
1. To understand governing equations of fluid flow
2. To understand turbulence and how to model them.
3. To know how to discretize governing equations of fluid flow by FDM and their stability.
4. To learn various iterative methods to solve N-S equation.
5. To understand FVM to solve fluid flow equations.

Outcomes: At the end of the course, the students are able to
1. Describe and develop mathematical models for flow phenomena.
2. Apply Finite Difference Method for fluid flow and heat transfer problems Classify PDE for fluid flow and heat transfer applications.
3. Use different solvers based on applications
4. Solve fluid flow and heat transfer problems using commercial CFD tools for turbulence models
5. Formulate numerical equations by Finite Volume Method for fluid flow and heat transfer problems

UNIT-I
Governing Equations of Fluid Dynamics and Heat Transfer:
Introduction to CFD, Models of Flow – Conservation and Non-conservation form - Continuity, Momentum and Energy Equation in conservation and non-conservation form (differential equations only)

UNIT-II
Classifications of Partial Differential Equations: Elliptic, parabolic and hyperbolic equations, Initial and boundary value problems.

Discretization and Finite Difference method: Forward, Backward and Central difference schemes, Transient one and two dimensional conduction - Explicit, implicit, semi-implicit and ADI methods - Stability analysis and error estimation.

UNIT-III
Elliptic Partial Differential Equations: Jacobi, Gauss Seidel methods, TDMA,
Viscous incompressible flow, Vorticity Stream function method.

UNIT-IV
Turbulence Modeling:
Types of Turbulence modeling-Reynolds and Favre averaged N-S equations, mixing length model, k-epsilon turbulence model.

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Department of Mechanical Engineering
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UNIT-V

Finite Volume Method: Finite volume formulation for diffusion equation, convection diffusion equation, Solution algorithm for pressure velocity coupling in steady flows, staggered grid, SIMPLE algorithm.

Text Books:

1. P.S. Ghoshdastidar, Computational Fluid Dynamics & Heat Transfer, Cengage Pub., 2018.
2. J.D. Anderson, Jr., Computational Fluid Dynamics: The Basic with Applications, McGraw Hill, Inc., 2012.
3. H. Versteeg and W. Malalasekra, An Introduction to Computational Fluid Dynamics : The Finite Volume Method, 3rd edition, Pearson, , 2016

Suggested Reading:

1. F. John Wendt (Editor), Computational Fluid Dynamics - An Introduction‖, Springer – Verlag, Berlin, 1992.
2. Charles Hirsch, Numerical Computation of Internal and External Flows‖, Vols. I and II. John Wiley & Sons, New York, 1988.

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

20ME E08

PRODUCT DESIGN AND PROCESS PLANNING
(Professional Elective-II)

Instruction	3	Hours per week
Duration of SEE	3	Hours
SEE	60	Marks
CIE	40	Marks
Credits	3	

Objectives:

1. The essence of innovation in product development.
2. The Human Machine Interactions (ergonomics).
3. The various Intellectual Property Rights.
4. The interaction between Design, Manufacturing, Quality and Marketing.
5. The awareness about overall view of Process Planning.

Outcomes: At the end of the course, the students are able to

1. Define the needs of the customer while designing a new product or modifying existing product in the competitive environment.
2. Understand creativity, brainstorming and ergonomic concepts.
3. Apply the concept of design for manufacture, assembly, maintenance, reliability and product life cycle in developing a product.
4. Implement the Intellectual Property Rights to a new product or a process.
5. Evaluate and recommend an effective Process Plan and principles of value engineering to new product development.

UNIT - I

Product Design and Process Design: Functions, Essential factors of product design, Selection of right product, Systematic procedure of product innovation, function of design, value of appearance, colors and laws of appearance, market research and identifying market opportunities.

UNIT - II

Product Selection and Evaluation: Need for creativity and innovation. Techniques of innovation like brainstorming and Delphi techniques, collection of ideas, Selection criteria - screening ideas for new products using evaluation techniques, Principles of ergonomics, Anthropometry, Design with Human Machine Interaction (HMI).

UNIT - III

New Product Planning and Development: Interaction between the functions of design, manufacture, and marketing, design and material selection, Steps for introducing new products after evaluation, Product life cycle, Research and new product development.

UNIT - IV

Intellectual Property Rights (IPR): Patents, definitions, Types of Patent, Patent search, Patent laws, Preparing patent disclosure. International code for patents, Trademark, Trade Secret and Copy Rights.

Process Planning: Need and significance of process planning, Process capability studies, Process sheets, Benefits and Types of Computer Aided process planning.

UNIT - V

Process Selection and Planning: Selection of manufacturing process, co selection of materials and processes, estimation of machining time in various cutting operations, Estimation of costs for manufacture, value engineering in product design, Group technology, and concepts of concurrent engineering, startups, innovation and its importance, quality function deployment and quality engineering.

Text Books:

1. B.W. Niebel & A.B.Draper, Production Design & Process Engg, McGraw Hill, 1974.
2. K. G. Swift & J. D. Booker, Process Selection: From Design to Manufacture, Butterworth-Heinemann Ltd; Revised 2nd edition, 2003.
3. Bhaskaran Gopalakrishnan, Product Design and Process Planning in CE (Design & Manufacturing, Chapman and Hall publishers, 1994.

Suggested Reading:

1. A.K. Chitale& R.C. Gupta, Product Design & Manufacturing, PHI, 1997.
2. Karl T. Ulrich, Stephen Eppinger, Product Design and Development, McGrawHill Publication,

PROFESSOR & HEAD
apartment of Mechanical Engineering
itanya Bharathi Institute of Technology (A)
alipet, Hyderabad-500 075. Telangana

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (A)
(AICTE Model Curriculum with Effect from the AY 2020 – 2021)
ME (CAD/CAM)

SEMESTER – II

S. No.	Course Code	Title of the Course	Scheme of instruction			Scheme of examination			Credits
			Hours per week			Duration of SEE in Hours	Maximum Marks		
			L	T	P		CIE	SEE	
THEORY									
1	20ME C106	Finite Element Techniques	3	--	--	3	40	60	3
2	20ME C107	Mechanical Design and Analysis	3	--	--	3	40	60	3
3		Programme Elective - III	3	--	--	3	40	60	3
4		Programme Elective - IV	3	--	--	3	40	60	3
5		Audit Course - 2	2	--	--	2	--	50	Non-Credit
PRACTICALS									
6	20ME C108	Computer Aided Engineering Lab	--	--	4	--	50	--	2
7	20ME C206	Computational Fluid Dynamics Lab	--	--	4	--	50	--	2
8	20ME C109	Mini Project with Seminar	--	--	4	--	50	--	2
		TOTAL	14	--	12		310	290	18

L: Lecture   D: Drawing   CIE - Continuous Internal Evaluation

T: Tutorial   P: Practical/Mini Project with Seminar/Dissertation Phase

SEE – Semester End Examination

Programme Elective – III (3/3)			Programme Elective – IV (3/3)		
SNO	Subject Code	Name of the Subject	SNO	Subject Code	Name of the Subject
1	20ME E206	Computational Fluid Dynamics	1	20ME E109	Multibody Dynamics
2	20ME E107	Mechanics of Composite Materials	2	20ME E110	Tribology in Design
3	20ME E108	Fracture Mechanics	3	20ME E111	Failure Analysis and Design

Audit Course – 2					
SNO	Subject Code	Name of the Subject	SNO	Subject Code	Name of the Subject
1	20CE A101	Disaster Mitigation and Management	5	20EG A101	English for Research Paper Writing
2	20EE A101	Sanskrit for Technical Knowledge	6	20EG A102	Indian Constitution and Fundamental Rights
3	20EC A101	Value Education	7	20EG A103	Stress Management by Yoga
4	20IT A101	Pedagogy Studies	8	20EG A104	Personality Development through Life Enlightenment Skills

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

Action taken report on Alumni, Recruiters and Industry feedback

2019-20

S. No	Description	Action Taken/Proposed	Page No
1	Maximum respondents rated performance POs & PSOs as good	-	—
2	Mr. V. Sindhuja Raj working with Infosys commented that CBIT has helped him to develop leadership qualities. He proposed to have more student interactions & discussions to help in over all development professionally and personally.	1. Every year a student interaction is being carried for the 3rd students with final year placed students to have doubts cleared and also provide the preparation strategies for campus placements. 2. Alumni interaction with current students is being carried out.	25-32
3	Ms. Meera Ayyagari, working with Technip FMC commented that there should be more access to software and other resources to cater industry requirements.	1. The softwares Solid works, ANSYS, MATLAB, Digimat are available in CAD/CAM lab. 2. Hexagon sponsored a lab worth of 6.6 crores with software package PVLite, Tank, Cesure 3. Students are given access to these labs at any time. 4. In addition to the above, value added courses are conducted for bright students.	33-38
4.	Mr Randeep felt that there should be more labs for more practical knowledge	In R-20 number of lab courses is increased.	—
5.	Ms. Keerthi Shravani suggested for introduction of more automation courses such as PLC, SCAD, Servo, Robotics etc.	Robotics & Drones is introduced in first year. There is Robotics course in the elective list	39-41
6.	Mr. M Saibhargav suggested to introduce Artificial Intelligence in curriculum	Introduced as elective.	42

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

CAREER DEVELOPMENT CENTRE

CBIT/CDC/FPC/2/2022　　　　　　**C I R C U L A R**　　　　　　10.10.2022

CDC is conducting orientation sessions for current prefinal year students of B.E./B.Tech with the below agenda:

a. Placement preparation
b. Building resume
c. Guidelines to Prepare Resume

Department wise schedule is as follows:

S.No	Dept for UG	Section	Team	Date	Time
1.	CSE	CSE-1	Team#1	13.10.2022	11:30AM to 01:00PM
		CSE-2		13.10.2022	01:30PM to 03:00PM
		CSE-3		13.10.2022	01:30PM to 03:00PM
		AIML		13.10.2022	11:30AM to 01:00PM
		IOTBC		13.10.2022	09:30AM to 11:00AM
2.	IT	IT-1	Team#2	13.10.2022	02.30PM to 04.00PM
		IT-2			11:00AM to 12:30PM
		IT-3			02.30PM to 04:00PM
		AI&DS			11:00AM to 12:30PM
3.	ECE	ECE-1	Team#3	12.10.2022	02.30PM to 04:00PM
		ECE-2			
		ECE-3			
4.	EEE	EEE-1	Team#4	12.10.2022	11:30AM to 01:00PM
		EEE-2			
5.	Mech	Mech-1	Team#5	14.10.2022	01:00PM to 02:30PM
		Mech-2			
6.	Civil	Civil-1	Team#6	13.10.2022	01:00PM to 02:00PM
		Civil-2			
7.	Biotech	Biotech	Team#7	20.10.2022	03:00PM to 04:00PM
8.	Chemical	Chemical	Team#8	20.10.2022	11:40AM to 01:10PM

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Department of Mechanical Engineering
Chaitanya Bharathi Institute of Technology
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Below are the points to be shared during your interaction with your juniors

- Prepare Resume
- Keep on updating your resume as you continue to improve your competencies and get it reviewed by your seniors
- Keep ready Aadhar, PAN, Driving License
- LinkedIn Profile
- Share sample resumes of yours
- Inputs on how to prepare for core if students are interested in CORE
- Specific inputs on CORE areas where projects need to be implemented
- Offcampus opportunities
  - ✓ https://unstop.com/
  - ✓ Respective career pages of the company websites

To get into 5-8 LPA job:
1. Coding in either C/Python/CPP - must practice on platforms like Hackerrank / CodeChef
2. Fundamentals of Data Structures, Database Systems, Object Oriented Programming
3. Must be confident in 3 to 4 program specific courses
4. Verbal + Quant + Aptitude + Reasoning
5. Soft Skills
6. Company specific preparation
7. Should be on LinkedIN with updated profile
8. Complete courses on Infosys SpringBoard

To get into Dream or Product Companies:
1. Competitive Coding- practice on platforms like Hackerrank / CodeChef / LeetCode
2. Object Oriented Programming Concepts based on Java or CPP
3. Fundamentals of Data Structures, Database Systems, Operating Systems, Software Engineering, Computer Networks - Scenario based questions not just FAQ's
4. Full Stack Development- Develop an App or Web app End to End
5. Verbal + Quant + Aptitude + Reasoning
6. Soft Skills
7. Company specific preparation
8. Should be on LinkedIN with updated profile
9. Must maintain GitHub profile
10. Participate in minimum 2 Hackathons
11. Atleast two Industry 4.0 certifications in cutting edge technologies

To get into Super Dream or Product Companies:
1. Competitive Coding- practice on platforms like Hackerrank / CodeChef / LeetCode
2. Fundamentals of Data Structures, Database Systems, Operating Systems, Software Engineering, Computer Networks - Scenario based questions not just FAQ's
3. Full Stack Development - Develop an App or Web app End to End
4. Handson working experience in SpringBoot
5. Two projects on any two emerging areas like Data Science / Artificial Intelligence / Machine Learning / IoT / Robotics / Cyber Security / Block Chain / etc
6. Verbal + Quant + Aptitude + Reasoning
7. Soft Skills
8. Atleast two Industry 4.0 certifications in cutting edge technologies
9. Should be on LinkedIN with updated profile
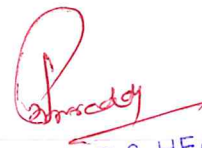
PROFESSOR & HEAD
Department of Mechanical Engineering
Chaitanya Bharathi Institute of Technology (A)
Gandipet, Hyderabad-500 075, Telangana

10. Must maintain GitHub profile
11. Participate in minimum 2 Hackathons
12. Publish / Present a Paper or work on Beyond the curriculum projects

Useful Resources to share with your juniors:
- Handbooks for preparing for interviews:
  - ✓ https://www.techinterviewhandbook.org/grind75
  - ✓ https://neetcode.io/practice
- Browse and check for Data Structures and Algorithms *Cheat Sheets*
  - ✓ https://www.geeksforgeeks.org/dsa-sheet-by-love-babbar/
  - ✓ https://takeuforward.org/interviews/strivers-sde-sheet-top-coding-interview-problems/
- Courses available on Infosys SpringBoard
- Text book: Verbal, Quant, Aptitude, Reasoning – by RS Agrawal
- Indiabix-Aptitude
- PREPINSTA-Company placement papers and hiring process
- InterviewBit
- StudytoNight-Coding online
- GeekforGeeks,Top Coder,Hacker Rank,Hacker Earth,Code Force,Code Chef,Leet Code-Programming, Data Structures, Algorithms
- Certifications-Coursera, Amazon Web Services, Google Android, Cisco Networking, Microsoft .Net, IBM Data Science, Oracle Java, Infosys SpringBoard
- coffee.io
- NxtWave
- Amcat, E-Litmus, Tech Gig, Eduthrill, LinkdIn
- Competitive coding you tube channels:
  - ✓ https://www.youtube.com/playlist?list=PL4PCksYQGLJOcaPLgeMFaxaHigPFjBuTG
  - ✓ https://www.youtube.com/channel/UCJskGeByzRRSvmOyZOz61ig
  - ✓ https://www.youtube.com/c/ApnaCollegeOfficial/playlists

Details of the teams are as given below:

Team No	Name of the Student	Section	Placed in	Mail Id	Phone No
1.	Kavya Kondi	IT	PC	Ugs19071 it.kavya@cbit.ac.in	8008096684
	Fariyal Ajrad	IT	Amazon	ugs19127 it.fariyal@cbit.ac.in	7702743777
	Arshia Parveen	CSE	Microsoft Engage	arshiaparveen1234@gmail.com	8179364392
	Akash Kanteti	IT	Delivaroo	ugs19042 it.naga@cbit.ac.in	9390845728
	Sravan Sai Lanka	IT	Delivaroo	ugs19113 it.sravan@cbit.ac.in	9390229549
	Bhavana Balimidi	CSE	Arcesium	ugs19065 cse.bhavana@cbit.org.in	9390054570
	Komma Shashank	CSE	Amazon	ugs19170 cse.shashank@cbit.org.in	9550169645
	Ravitej Rangineni	CSE	Amazon	ugs19160 cse.ravitej@cbit.org.in	7337545943
	Meghana Ponna	CSE	Darwin Box	ugs19009 cse.meghana@cbit.org.in	9390252992
	Vinay Kasala	CSE	Darwin Box	ugs19060 cse.vinay@cbit.org.in	9390149912
	Huma Hussain	IT	Goldman Sachs	ugs19067 it.huma@cbit.ac.in	9849322852
	Sai Bhargavi Mamidi	IT	Goldman Sachs	ugs19078 it.sai@cbit.ac.in	9347915984
	Likhitha Reddy S	CSE	Service Now	ugs19006 cse.likhitha@cbit.org.in	9866243410
	Thatipalli Naveen Kumar	CSE	Gainsight	ugs19098 cse.naveen@cbit.org.in	8688184070
	Reethika Tummeti	IT	Gainsight	ugs19011 it.reethika@cbit.ac.in	9390521949
	Vishnu Vardhan Reddy M	CSE	Service Now	ugs19120 cse.vishnu@cbit.org.in	9989712118
	Pavan Sai Pulluri	IT	InfyTQ	ugs19105 it.pavan@cbit.org.in	9573772497
	Sripranav Kumar Muktevi	CSE	Oracle	ugs19113 cse.sripranav@cbit.org.in	8333859758
	Bhavaraju Sai Srinivas Charan	CSE	Oracle	ugs19166 cse.sai@cbit.org.in	9866053448
	Manchikanti Pravalika	IT	JPMC	ugs19010 it.pravallika@cbit.org.in	8501843244
	Pasam Sreevani	IT	JPMC	ugs19019 it.sreevani@cbit.org.in	6303533073
	Bolli Srujana	IT	JPMC	ugs19022 it.srujana@cbit.org.in	7660891042
	Palakollu Varshini	IT	JPMC	ugs19026 it.varshini@cbit.org.in	8179187326
	Chinthareddy Harshitha	IT	JPMC	ugs19066 it.harshitha@cbit.org.in	9908646610
	Mamidi Sai Bhargavi	IT	JPMC	ugs19078 it.sai@cbit.org.in	9347915984
	Naidu Sudheer	CSE	Value Labs	ugs19051 cse.sudheer@cbit.org.in	8688389731
	Manasa Bedadha	IT	Value Labs	ugs19073 it.manasa@cbit.ac.in	9390410617
	Naidu Sudheer	CSE	Value Labs	ugs19051 cse.sudheer@cbit.org.in	8688389731
	Ritika Yarlagadda	IT	Service Now	ugs19076 it.ritika@cbit.ac.in	901742653
	K Surya	CSE	PC	ugs19053 cse.surya@cbit.org.in	7731003360
2.	Chandrakiranreddy Dakuri	IT	Service Now	ugs19155 it.chandra@cbit.ac.in	9390203127
	Bhavana Kodali	CSE	Microsoft Engage	bhavanakodali365@gmail.com	
	Dharma Teja. E	CSE	Amazon	ugs19088 cse.dharma@cbit.org.in	7095540936
	Sai Prasanna Karthik Yanamandra	CSE	Arcesium	ugs19165 cse.sai@cbit.org.in	9550899065
	Pranathi Kodicherla	CSE	Goldman Sachs	ugs19136 cse.pranathi@cbit.org.in	8309866741
	Sai Akhil Prodduturi	CSE	Service Now	ugs19044 cse.sai@cbit.org.in	6303795563

PROFESSOR & HEAD
Department of Mechanical Engineering
Chaitanya Bharathi Institute of Technology (
Accredited, Hyderabad-500 075, Telanga

Team No	Name of the Student	Section	Placed in	Mail Id	Phone No
	Srija Nayakam	CSE	Service Now	ugs19076 cse.srija@cbit.org.in	8096263463
	Akash Kanteti	IT	Darwin Box	ugs19042 it.naga@cbit.ac.in	9390845728
	Anuhya valpadas	IT	Gainsight	ugs19123 it.anuhya@cbit.ac.in	9390623690
	Aaditya Jupally	IT	Gainsight	ugs19090 it.aaditya@cbit.ac.in	9036466510
	Sai Sathwika Puri	IT	Gainsight	ugs19139 it.sai@cbit.ac.in	9346371388
	Maram Sainivedh Kumar	CSE	Oracle	ugs19301 cse.maram@cbit.org.in	6300696645
	Andugula Vamshi	IT	Oracle	ugs19056 it.vamshi@cbit.org.in	7729090401
	Maitreyi Vankayala	CSE	Darwin Box	ugs19008 cse.maitreyi@cbit.org.in	9390707267
	Ashritha Konagari	IT	Darwin Box	ugs19124 it.ashritha@cbit.ac.in	9014304997
	Sumadhura Gaddam	IT	Amazon	ugs19086 it.sumadhura@cbit.ac.in	8688996674
	Oruganti Shreya	IT	JPMC	ugs19081 it.shreya@cbit.ac.in	7702046039
	Aluvala Keerthi	IT	JPMC	ugs19134 it.keerthi@cbit.org.in	9515745431
	Aadish Sanghvi	IT	JPMC	ugs19147 it.aadish@cbit.org.in	7013256733
	D Baluchander Yadav	IT	JPMC	ugs19153 it.baluchander@cbit.org.in	8801136794
	Thutari Detha Anirudh	IT	JPMC	ugs19157 it.detha@cbit.org.in	9959596525
	Sai Krishna Chava	IT	InfyTQ	ugs19168 it.sai@cbit.org.in	9381204943
	Kritika Agarwal	IT	Oracle	ugs19072 it.kritika@cbit.org.in	7680812376
	Nishanth Puppla	IT	Oracle	ugs19101 it.nishanth@cbit.org.in	9515372115
	S K M Aqeel	IT	Oracle	ugs19151 it.aqeel@cbit.org.in	8919394771
	Thandava Krishna Pottacheru	CSE	Value Labs	ugs19055 cse.thandava@cbit.org.in	9381797588
	Thota Sai Chetan	CSE	Value Labs	ugs19164 cse.sai@cbit.org.in	9959971983
	Chaitanya Nagulapalli	CSE	Value Labs	Ugs19148 cse.chaitanya@cbit.org.in	7075604097
3.	Chandnani Gulshan	ECE	PC	ugs19088 ece.chandnani@cbit.org.in	7842255256
	Pratham M	ECE	PC	ugs19035 ece.pratham@cbit.ac.in	7730875727
	Sudheer kumar Pabbathi	ECE	PC	ugs19305 ece.sudheer@cbit.org.in	9502700564
	Shravani Koduru	ECE	PC	ugs19023 ece.shravani@cbit.ac.in	9398198345
	J.Ankitha	ECE	PC	ugs19063 ece.ankitha@cbit.org.in	7780242892
	C.Hrishikesh Reddy	ECE	PC	ugs19091 ece.hrishikesh@cbit.ac.in	9398128371
	P.V.S.Charan	ECE	PC	ugs19180 ece.venkata@cbit.ac.in	8367515189
	N.V.Sai.Charan	ECE	PC	ugs19179 ece.venkata@cbit.ac.in	8712747468
	Ranisetti SriHarshitha	ECE	PC	ugs19131 ece.sri@cbit.ac.in	8688180319
	Kandhi Keerthi	ECE	JPMC	ugs19317 ece.kandhi@cbit.org.in	8179221926
	Madhuri Duddula	ECE	Service Now	ugs19071 ece.madhuri@cbit.ac.in	9110719938
	Satya Sai Eeshwar Ganesh Ganisetti	ECE	Accenture	ugs19041 ece.satya@cbit.ac.in	7989081620
	Pallavi Pabbathi	ECE	Accenture	ugs19302 ece.pabbathi@cbit.ac.in	7671070094
	Dasari Esha Vaishnavi	ECE	Aveva	ugs19004 ece.esha@cbit.ac.in	9959658342
	Jagruthie Sadula	ECE	Aveva	sjagruthie2002@gmail.com	8688669566

Team No	Name of the Student	Section	Placed in	Mail Id	Phone No
	Sai Adithya Tirukkolluru	ECE	Aveva	saiadithya34076@gmail.com	9154934076
	Ponugupati Nitin	ECE	Aveva	ugs19158 ece.nitin@cbit.ac.in	9866705198
	Manideepak Rao Chitneni	ECE	Micron	ugs19032 ece.manideepak@cbit.ac.in	8688741667
	Prithvi Sandeep S	ECE	Micron	ugs19099 ece.prithvi@cbit.org.in	7330789283
	Harikrishna Nalumasu	ECE	Micron	ugs19145 ece.harikrishna@cbit.ac.in	6301447543
	Mahindra Chowdary	ECE	Micron	Ugs19152 ece.mahindra@cbit.ac.in	9100883864
	Chakilam Supriya	ECE	Silicon Labs	ugs19301 ece.chakilam@cbit.org.in	8096081581
	Md Ashfaq Ahmed	ECE	Silicon Labs	ugs19137 ece.ashfaq@cbit.org.in	9985312249
	Thanneeru Mahindra Chowdary	ECE	InfyTQ	ugs19152 ece.mahindra@cbit.org.in	7780353441
	Padige Kalyan Kumar	ECE	InfyTQ	ugs19147 ece.kalyan@cbit.org.in	9652864514
	Padige Shiva Sai	ECE	Cognizant	ugs19307 ece.padige@cbit.org.in	
4.	Gundu Niharika	EEE	PC	ugs19010 eee.niharika@cbit.org.in	9949688501
	Aduvala Arun	EEE	PC	ugs19026 eee.arun@cbit.org.in	8367360282
	Kalkuri Shiva Shanth	EEE	PC	ugs19052 eee.shiva@cbit.org.in	8688756457
	Vaishnavi kale	EEE	PC	Ugs19078 eee.vaishnavi@cbit.org.in	9676556859
	Y.Praneeth	EEE	PC	ugs19103 eee.praneeth@cbit.org.in	8309801702
	Patlolla Sandeep Kumar	EEE	Oracle	ugs19109 eee.sandeep@cbit.org.in	6303984543
	Lakshmi Sahitya Peddapalli	EEE	Value Labs	ugs19006 eee.lakshmi@cbit.org.in	9391493180
	Yamini Kusa	EEE	Value Labs	ugs19020 eee.yamini@cbit.org.in	9390915756
	Koushik Reddy Mushanolla	EEE	Value Labs	ugs19093 eee.koushik@cbit.org.in	9390564727
	Jayanth Nalla	EEE	Value Labs	ugs19032 eee.jayanth@cbit.org.in	7032012290
	Pavan Kumar Naraboina	EEE	Accenture	ugs19302 eee.naraboina@cbit.org.in	7993871909
	Shiva teja Daram	EEE	Accenture	Ugs19053 eee.shiva@cbit.org.in	6301870214
	Seggam Gnana Prasanna	EEE	Accenture	ugs19003 eee.prasanna@cbit.org.in	9390277522
	Firdous Anjum	EEE	Accenture	ugs19062 eee.anjum@cbit.org.in	8688736541
	Sai Vaishnavi Patil	EEE	IBM	saivaishnavi12002@gmail.com	9390566504
	Kalkuri Shiva Shanth	EEE	Deloitte	ugs19052 eee.shiva@cbit.org.in	8688756457
	Rishi Praneeth Meesala	EEE	Deloitte	Ugs19040 eee.rishi@cbit.org.in	8500109577
	Soumya Medan	EEE	Deloitte	Ugs19017 eee.soumya@cbit.org.in	8688141422
	Gaddam Bhargav	EEE	Deloitte	bhargavgaddam66@gmail.com	9347920879
	Akshay Marla	EEE	Deloitte	ugs19083 eee.akshay@cbit.org.in	9505932630
	Rahul Dhir	EEE	Deloitte	ugs19104 eee.rahul@cbit.org.in	8897464822
	Abhinav Varma Vathadi	EEE	Micron	ugs19021 eee.abhinav@cbit.org.in	6301297216
	Kethanapally Susena Reddy	EEE	Cognizant	ugs19058 eee.susena@cbit.org.in	7893151036
	Sharathdeepika Pasham	EEE	Cognizant	psdeepika08@gmail.com	7386992411
	Vinukula Sushma	EEE	Cognizant	ugs19076 eee.sushma@cbit.org.in	9390480383
	Dintakurthi Abhinay	EEE	Cognizant	abhinay.dintakurthi@gmail.com	9059686011

Team No	Name of the Student	Section	Placed in	Mail Id	Phone No
5.	Aravind reddy amudala	EEE	Cognizant	ugs19084_eee.aravind@cbit.org.in	9491152252
	Sruthi Shanker Pydimarry	Mech	PC	ugs19011_mech.sruthi@cbit.org.in	9701812808
	Etukala prema	Mech	PC	etukalapremasai@gmail.com	9390242590
	Dasari Hemamsu	Mech	PC	ugs19021_mech.hemamsu@cbit.org.in	7396364361
	Chinmay Krishna Peri	Mech	PC	ugs19075_mech.chinmay@cbit.org.in	9652228646
	Tarun Vishnu Vardhan Chirumella	Mech	PC	ugs19052_mech.tarun@cbit.org.in	9515711973
	Gottam Anvesh	Mech	Micron	gottamanvesh555@gmail.com	6302151211
	nikhil kumar nalla	Mech	Pepsi Co	nikhilkumar.nalla10@gmail.com	8074228697
	Gyajangi Sai Manishwar	Mech	Pepsi Co	manishwar.gyajangi@gmail.com	8886444651
	Sai Yasasvi Dutt Malladi	Mech	Pepsi Co	yasasvimalladi06@gmail.com	6309899630
	Shravya Sarugu	Mech	Accenture	ugs19071_mech.shravya@cbit.org.in	9908994607
	Ketan Kadali	Mech	Aveva	kadaliketan2001@gmail.com	7989658082
	Shravya Sarugu	Mech	Aveva	sarugushravyaanand03@gmail.com	9908994607
	Sai Vansi Nagamalla	Mech	Cognizant	vamsi.sai223@gmail.com	9121722443
	Ayaluri Sasi Kiran	Mech	Cognizant	ayalurisasikiran@gmail.com	9390584299
	Achanta Thandava Sai Rohith	Mech	Cognizant	rohithachanta14@gmail.com	9121346990
	Tamada Venkatesh	Mech	Cognizant	tamadavenkatesh999@gmail.com	7993754330
	Bogam Manoj Kumar	Mech	Cognizant	manojbunney820@gmail.com	9912878568
	Etukala Prema Sai	Mech	Cognizant	etukalapremasai@gmail.com	9390242590
	Yaddapally Sai Krishna	Mech	Cognizant	ugs19094_mech.sai@cbit.org.in	9346656029
6.	Vinay Muniganti	Civil	PC	ugs19060_civil.vinay@cbit.org.in	7893769477
	Sanyukta Chenna	Civil	PC	ugs19018_civil.sanyukta@cbit.org.in	7569132063
	Muthineni Prasanna	Civil	PC	ugs19066_civil.prasanna@cbit.org.in	9705099185
	Mohammed Fasi Ahmed	Civil	PC	ugs19097_civil.mohammed@cbit.org.in	9440992711
	Khyathi Vardhini Vangala	Civil	Pepsi Co	khyathivardhinivangala@gmail.com	8688533611
	Atufa Tanyeem	Civil	Pepsi Co	atufa1307@gmail.com	7386197042
	Pragna Kasarla	Civil	Deloitte	ugs19015_civil.pragna@cbit.org.in	8247735089
	Karnam Nikitha	Civil	Mind Tree	nikithakarnam08@gmail.com	9390283779
	Kontemukkula Chihnitha	Civil	Mind Tree	chihnithak@gmail.com	7989586825
	Rahul Gundoju	Civil	Mind Tree	rahulgundoju@gmail.com	7013679492
	Kamal Sai Arukala	Civil	Mind Tree	saikamal0078@gmail.com	8374743555
	Atufa Tanyeem	Civil	Mind Tree	atufa1307@gmail.com	7386197042
	Pragna Kasarla	Civil	Cognizant	pragnakasarla@gmail.com	8247735089
7.	Pachimatla Akhil Rajesh Goud	Civil	Cognizant	akeakhilrajeshgoud@gmail.com	9059742554
	Voddepally Vijay Kunnar	Civil	Cognizant	vijayvaddepally7@gmail.com	9866309891
	G Jaivanth Kumar	Civil	Cognizant	jaikumar.g96@gmail.com	9618258094
	K Akshara	Chem	PC	ugs19002_chem.akshara@cbit.ac.in	9603314668

Team No	Name of the Student	Section	Placed in	Mail Id	Phone No
	Pratham Jain	Chem	PC	ugs19035_chem.pratham@cbit.ac.in	8885499908
	Chirag Jain Godha	Chem	Mind Tree	jainc8684@gmail.com	630389373 8
	Anitha Islavath	Chem	Mind Tree	anithaeducation5@gmail.com	9390175948
	Shalinee Mallick	Chem	Mind Tree	shalineemallick1@gmail.com	8639312975
	Srija Chavali	Chem	Mind Tree	chsrija07@gmail.com	9154742550
	Pratham Jain	Chem	Mind Tree	prathamjain2806@gmail.com	8885499908
	Valivarthi Sri Chitra	Chem	Aveva	srichitravalivarthi10@gmail.com	9704423388
	Bhavesh	Chem	Aveva	Ugs19022_chem.bhavesh@cbit.ac.in	7995320843
	Amulya Pathuri	Chem	Accenture	ammupat30@gmail.com	8297926909
	Sadia Husaini	Chem	Deloitte	ugs19012_chem.sadia@cbit.ac.in	9701078477
	Abhitha Suggala	Chem	Deloitte	ugs19001_chem.abhitha@cbit.ac.in	7032119958
	Anshul Krishna Sonannagari	Chem	Cognizant	anshulkrishnas2020@gmail.com	8374845181
	Bhavesh Agarwal	Chem	Cognizant	bhaveshagarwal1234@gmail.com	7995320843
	Vamsi Chirravuri	Chem	Cognizant	ugs19027_chem.hima@cbit.ac.in	9390657539
	Yashraj Delhiwala	Chem	Cognizant	dyashraj25@gmail.com	7799267703
8.	Bhanu Shankar Dhulipalla	Biotech	PC	ugs19041_bio.bhanu@cbit.ac.in	9908809595
	KVS Satya Nagalakshmi Mounika	Biotech	PC	ugs19024_bio.satya@cbit.ac.in	9390824549
	Kavya Donga	BioTech	MindTree	kavyaraos9896@gmail.com	9502004703
	V S Satya Nagalakshmi Mounika Kavuri	BioTech	Mind Tree	dmounika317@gmail.com	9390824549
	Sravya Kunaparaju	BioTech	MindTree	sravyakraju@gmail.com	7032088933
	Jeremiah Paul Gorremuchu	BioTech	MindTree	g.jeremiahpaul20@gmail.com	7893462036
	Manisha Reddy Gavini	BioTech	MindTree	gavininimanishareddy@gmail.com	8919502901
	Sruthi Reddy Sompuram	BioTech	MindTree	sruthireddy2620014@gmail.com	9440048919
	Sri Harshini Kothamasu	Biotech	Accenture	ugs19030_bio.sri@cbit.ac.in	949054807 5
	Lahari Mekala	Biotech	Cognizant	mekalalahari18@gmail.com	9032181567

NOTE: FPC's are informed to take attendance, pictures, minutes of the meeting, feedback and submit the same to the below URL:
https://tinyurl.com/FPCChronology

CC to
- Principal for kind information
- FPC's,of all B.E./B.Tech programmes
- B.E./B.Tech all final year students selected and all UG 2024 graduating students
- HR for kind information

Advisor-CDC

PROFESSOR & HEAD
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STOCK REGISTER

NAME OF ARTICLES HP Z240 Work Stations

Date	Received from or Issue to	Inv. No. or Issue	Rate Rs.	Rate P.	Receipts	Issues	Balance	Remarks
4/9/17	Microcare Computers Private Limited							
	105, RATNA Complex,							
	Ameerpet, Hyd							
	040-23743254,							
	040-23739310/11							
	www.microcareindia.com				Qty		CGST SGST	
1.	HP Z240 Workstation	17010/149			10 580508-475		52245 5224	
	E3-1225/8GBDDR-4							
	/1TB/DVDRW/USB							
	keyboard & mouse /DP							
	To VGA /2 GB AMD							
	W2100 GFX /3-3-3							
	[L8T12AV-C]							
2.	HP V194 18.5-IN				10 39062-5		5771451 577145	
	monitor (V5E94A)							
		Sub Total —			6957095		577145 577145	
		Total			Rs 735000-00/—			

12-9-17

Scanned with CamScanner

STOCK REGISTER

NAME OF ARTICLES __Next Engine HD 3D Scanner.__ LOKPRIYA

Date	Received from or Issue to	Inv. No. or Issue	Rate Rs.	Rate P.	Receipts	Issues	Balance	Remarks
05/1/18	Adroitec information Systems Put. Ltd.	(Auto/17-18 A041)	7,41,525.00					Contact Person MOB. XX.
	Invoice No. AI/4DS/UP/ 17/76.							0971685873
	IGST @ 18%		1,33,475.00					Raj Kumar.
	Next Engine HD. 3D Scanner.		8,75,000.00					
							12/01/18	

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Available (POA)

POA

Date	Name of Articles — Received from or Issue to	Inv. No. of Issue	Rate Rs.	P.	Receipts	Issues	Balance	Rem.
8/8/2020	MECH ENGG Ansys Software for a period of one year from 1-4-2020 to 31/3/2020 Qty - 50 users phone: 9849921080	CBIT/ PSD/ MED/01 2020-21 Dated 6/4/2020 CGST SGST	₹ 4,22,881.36 1,059.32 1,059.32				↑ Software	
		Total ₹ 4,45,000/- Four Lakhs forty five thousand only						
8/8/2020	MECH ENGG #443&444, 3rd floor, Padmati Plaza, KPHB Main Road Bus Stop, Kukatpally, Hyd ph: 9849921080 Support & update of Ansys Software for a period of one year from 1/4/2020 to 31/3/2024 50 users	6 CBIT/ PSD/ MED/04/2020-21	₹ 50,000/- CGST 4500/- SGST 4500/-			Total ₹ 59,000-00 Fifty Nine thousand		

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(20-21)

BA

| 9 | CFD (or) CAD/CAM | | | | | | | |

STOCK REGISTER

NAME OF ARTICLES Solid Work-18, 500 users with 3 years AMC

Date	Received from or Issue to	Inv. No. or Issue	Rate		Receipts	Issues	Balance	Remarks
			Rs.	P.				
19/4/18	Logical Solutions limited, 1-6-41, Near Babu Complex, 3rd Bus stop, Chaittanyapuri, Hyd - 500 060.	LSL/ INV/2018 -19/11	10,87,370 9,21,900.00				(Support) R.T. Narsimha Reddy 9703879585 4024180015 Mailed narsimha reddy @ logicalsolutions.in	
	CGST @ 9% SGST @ 9% Grand Total.		82,935 82,935 10,87,370	00 00 DD			Venu Gopal.K (Sales) 9848004616 040-24180006 venu@logicalsolutions.in	

(Eight
(Rupees:- Ten lakhs eighty seven thousand three hundred and seventy only.)

POA

3 (18-19) CAD CAM

ANSYS-19 Academic Teaching (50) Users.

S.No	Date	Particulars	Amount
1	6/2/18	ANSYS Academic Teaching Mech & CFD (50 Tasks) Bundle	6,19,466.10
		Invoice no: TX2173600656	
		CGST @ 9% + SGST @ 9%	1,11,503.90
		ANSYS Academic Teaching Mech & CFD (50 tasks) TEC	58,500.-
		CGST @ 9%	5265.00
		SGST @ 9%	5265.00
		Amount Before Tax	677966.10
		Add CGST	61,016.95
		Add SGST	61,016.95
		Total Amount (GST)	1,22,033.90
		Total Amount after Tax	8,00,000.00

Software

Amount in Words: Eight lakhs only.

Supplier details:-
ARK info Solutions Pvt Ltd.
S.D. Road, Paradise Circle,
Secunderabad - 500003.
GST No: 36AAKCA7602H1ZP.
Contact No:-
Naveen Mr: 8309072617.

Transferred to English Stock Reg. No 10/18 Vol 1.

08/05/18

POA

STOCK REGISTER

G

NAME OF ARTICLES ADROITEC 3D. PRINTERS.

Date	Received from or Issue to	Inv. No. or Issue	Rate Rs.	P.	Receipts	Issues	Balance	Remarks
30/4/18	Adroitec Engineering Solutions Put Ltd. 298, RPS flats, Sheikh Saral, Phase-I New Delhi - 110 017. TEL: 0120-4864300.							Technical Support: Raj Kumar: 08920345041 09716858673
30/4/18	FORM lab SLA Base 3D Printer.	AE/18/ P/UP/S	4,30,000	00	Qty - 1No.			
30/4/18.	markforged onyx pro 3D Printer	"	7,25,000	00	Qty - 1No.			
	IGST @ 18%		2,07,900	00				
	Total Amount Payable		13,62,900	00	Equipment			

(Thirteen lakhs sixty two thousand nine hundred only).

19/05/18

POA
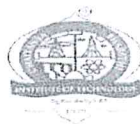
CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY
(AUTONOMOUS)
Scheme of Instructions of I Semester of B.E. – Mechanical Engineering
as per AICTE Model Curriculum 2022-23

DEPARTMENT OF MECHANICAL ENGINEERING

SEMESTER – I

S. No	Course Code	Title of the Course	Scheme of Instruction Hours per Week			Credits
			L	T	P/D	
THEORY						
1	22MTC02	Calculus	3	1	0	4
2	22CYC01	Chemistry	3	0	0	3
3	22EEC01	Basic Electrical Engineering	2	1	0	3
4	22CSC01	Problem Solving and Programming	2	1	0	3
PRACTICAL						
5	22CYC02	Chemistry Lab	0	0	3	1.5
6	22MBC02	Community Engagement	0	0	3	1.5
7	22CSC02	Problem Solving and Programming Lab	0	0	3	1.5
8	22MEC37	Robotics & Drones Lab	0	2	2	3
9	22EEC02	Basic Electrical Engineering Lab	0	0	2	1
TOTAL			10	5	13	21.5

L: Lecture   **T: Tutorial**   **D: Drawing**   **P: Practical**

CIE - Continuous Internal Evaluation   **SEE - Semester End Examination**

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With effect from the Academic Year 2022–23

22MEC37

ROBOTICS AND DRONES LAB
(Common to All Branches)

Instruction	2T + 2P Hours per week
CIE	100
Credits	3

Objectives: The objectives of this course are to:
1. To develop the students' knowledge in various robot and drone structures and their workspace.
2. To develop multidisciplinary robotics that have practical importance by participating in robotics competitions
3. To develop students' skills in performing spatial transformations associated with rigid body motions, kinematic and dynamitic analysis of robot systems.
4. Through projects done in lab, increase the true hands-on student learning experience and enhance their conceptual understanding, increase students' ability, competence and teamwork skills on dealing with real-life engineering problems

Outcomes: After completion of course, students would be able to:
1. Demonstrate knowledge of the relationship between mechanical structures of robotics and their operational workspace characteristics
2. Understand mechanical components, motors, sensors and electronic circuits of robots and build robots.
3. Demonstrate knowledge of robot controllers.
4. Use Linux environment for robotic programming.
5. Write Python scripts to control robots using Python and Open CV.

Lab Experiments:
1. Assembling of robot mechanical components, mounting of motors, sensors, electronic circuits to the chassis.
2. Connecting to electronic circuitry: motor drivers, incremental encoders proximity sensors, micro controller,
3. Different types of batteries, selection of suitable battery for application, safety precaution.
4. Introduction to Linux Command Line Interface: basic file and directory management and other useful commands
5. Controlling robot using Python: i) Move robot using Python code, ii) Make robot move in patterns using Python
6. Robot programming with Sensor inputs:i) Read sensor data using Python, ii) Visualize sensor data using Python, iii) Code robot to avoid obstacles by using sensor data
7. Open CV: i) Create an Image and display an image; ii) Read and change pixel values; iii) Create colored shapes and save image; iv) Extract the RGB values of a pixel; v) Reading and Writing Videos
8. Open CV: i) Extraction of Regions of Interest; ii) Extraction of RGB values of a pixel
9. Coding robot to work with colors, follow colored objects, identifying shape of the object-oriented
10. Projects: i)Making a line follower robot using a Camera; ii) Writing code for a complex function
11. Assembly of a drone

Suggested readings
1. https://www.geeksforgeeks.org/robotics-introduction/
2. https://www.ohio.edu/mechanical-faculty/williams/html/PDF/IntroRob.pdf
3. https://www.idtechex.com/en/research-report/new-robotics-and-drones-2018-2038-technologies-forecasts-players/584
4. https://dronebotworkshop.com/

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (A)

With effect from the academic year 2022-23

Scheme of Instruction as per R20 Curriculum

B.E. (MECHANICAL ENGINEERING)

SEMESTER – V

S. No.	Course Code	Title of the Course	Scheme of instruction Hours per week			Duration in Hours	Scheme of examination Maximum Marks		Credits
			L	T	P/D		CIE	SEE	
THEORY									
1	20MEC16	Dynamics of Machines	3	--	--	3	40	60	3
2	20MEC17	Applied Thermodynamics and Heat Transfer	3	--	--	3	40	60	3
3	20MEC18	Design of Machine Elements	3	1	--	3	40	60	4
4	20MEC19	CAD/CAM	3	--	--	3	40	60	3
5		Professional Elective - II	3	--	--	3	40	60	3
6		Open Elective - I	3	--	--	3	40	60	3
PRACTICALS									
7	20MEC20	Dynamics and Vibrations Lab	--	--	2	3	50	50	1
8	20MEC21	Applied Thermodynamics and Heat Transfer Lab	--	--	2	3	50	50	1
9	20MEC22	CAD/CAM Lab	--	--	2	3	50	50	1
	Industrial/Rural Internship		3-4 weeks / 175 hours						2
	TOTAL		18	01	06	--	390	510	22+2

L: Lecture   T: Tutorial   D: Drawing   P: Practical

CIE - Continuous Internal Evaluation   SEE – Semester End Examination

Professional Elective – II(3/3)		
S.No.	Subject Code	Name of the Subject
1	20MEE05	Refrigeration and Air Conditioning
2	20MEE06	Robotic Engineering
3	20MEE07	Research Methodology and Innovation
4	20MEE08	Product Design and Process Planning

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Open Elective-II (3/3)		
S. No.	Subject Code	Name of the Subject
1	20CSO05	Basics of Artificial Intelligence
2	20CH O06	Fundamentals of Fuel Cells
3	20CEO02	Disaster and Risk Reduction Management
4	20ECO05	System Automation and Control
5	20EGO01	Technical Writing Skills

Open Elective-III (3/3)		
S. No.	Subject Code	Name of the Subject
1	20ITO02	Principles of Internet of Things
2	20CSO02	Introduction to Web Technology
3	20ECO04	Principles of Embedded Systems
4	20PYO01	History of Science and Technology
5	20ADO01	Introduction to Python Programming

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