Curriculum

For

B. Tech in Mechanical Engineering

(7th Semester)

2021

7th SEMESTER

Sl. No.	Course Category	Subject Code	Subject Title	L	T	P	Contact Hours/ week	Credit	Total Marks
1.	Program Elective-2	PE ME 701/1	1.Power Plant Engineering	3	0	0	3	3	100
		PE ME 701/2	2.Robotics	3	0	0			
		PE ME 701/3	3.Tribology	3	0	0			
2.	Program Elective-3	PE ME 702/1	1.Alternative Fuels	2	0	0	2	2	100
		PE ME 702/2	2.Energy Conservation and Management	2	0	0			
		PE ME 702/3	3 Advanced Casting Processes	2	0	0			
3.	Open Elective-1	OE ME 703	Refer Annexure-I	3	0	0	3	3	100
4.	Open Elective-2	OE ME 704	Refer Annexure-II	2	0	0	2	2	100
5.	Project - 2	PR ME 705	Project Work Intermediate	0	0	12	12	6	200
6.	Summer Internship-2	SI ME -706	Internship - II	0	0	0	0	1	100
7.	Seminar - 1	SE ME 707	Seminar on Contemporary Engineering Topics - I	0	0	2	2	1	100
Total :				10	0	14	24	**18**	**800**

Power Plant Engineering

Course Code	PE ME 701/1
Course Title	Power Plant Engineering
Number of Credits	3 (L: 3, T: 0, P: 0)
Prerequisites	Thermodynamics, Thermal Engineering
Course Category	Program Elective (PE)

Number of classes	38 hours

Course Outcome:

After completing this course, the students will be able to

CO Number	CO Description	K-level
CO-1	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.	K2
CO-2	Analyze the layout and working of the components inside a thermal, diesel and gas turbine power plants.	K4
CO-3	Apply the knowledge of nuclear engineering& hydro electric power plants to solve practical problems.	K3
CO-4	Explain the layout, construction and working of the components inside renewable energy power plants	K2

Course Content:

Module 1: Introduction, Economics &Environmental Issues of Power Plant: (09 hours)

Power plant-Introduction, Classification - Location of power plant- Choice of Power PlantTerminology used in power plant: Peak load, Base load, Load factor, Load curve, demand factor- Various factor affecting the operation of power plant- Load sharing- cost of powertariff methods-factors involved in fixing of a tariff,Pollution control technologies including Waste Disposal Options for Coal and Nuclear Power Plants.

Module 2: Thermal, Diesel & Gas Turbine Power Plant: (10 hours)

Rankine cycle – improvisations, Layout of modern coal power plant, Super Critical Boilers, FBC Boilers, Turbines, Condensers, Steam & Heat rate, Subsystems of thermal power plants – Fuel and ash handling, Draught system, Feed water treatment. Binary Cycles and Cogeneration systems.Diesel & Brayton Cycle – Analysis & Optimization. Components of Diesel and Gas Turbine power plants. Combined Cycle Power Plants.

Module 3: Nuclear & Hydro Electric Power Plant: (09hours)

Basics of Nuclear Engineering, Layout and subsystems of Nuclear Power Plants, Working of Nuclear Reactors : Boiling Water Reactor (BWR), Pressurized Water Reactor (PWR), safety measures for nuclear power plants, hydro electric power plants – classification, typical layout and associated components including turbines, working, mini and micro hydel plants.

Module 4: Power From Renewable Energy: (10hours)

Solar power plant-introduction-layout, Solar cell fundamentals & classification – maximum power point tracker (MPPT) and solar panel. Wind power plant: introduction, -Factors affecting distribution of Wind energy, Variation of wind speed with height and time-Horizontal axis wind turbine (HAWT)-types of rotors,Vertical axis wind turbine- types of rotors- Wind energy conversion system (WECS) advantages and disadvantages-limitations of Wind power plant, working of tidal, geo thermal, biogas and Fuel Cell power systems.

References / Suggested Learning Resources:

1. P. K. Nag, *Power plant engineering*, McGraw Hill.
2. A K Raja, Amit Prakash Srivastava and Manish Dwivedi, *Power Plant Engineering*, New age international Publishers.

3. M.M. EL-Wakil, *Power plant technology*, McGraw Hill.

4. R K Rajput, *A Text Book of Power Plant Engineering*, Laxmi Publications.
5. James H. Rust, *Nuclear Power Plant Engineering,* Haralson Publishing Company.
6. Bernhardt G A Sarotzki, William A Vopat, *Power Station Engineering and Economy*, Tata Mc Graw Hill.
7. Dr. P.C. Sharma, *Power Plant Engineering*, S.K. Kataria & Sons.
8. Paul Breeze, *Power Generation Technologies*, Elsevier Ltd., 2014.
9. Godfrey Boyle, *Renewable energy*, Open University, Oxford University Press in association withtheOpenUniversity, 2004.

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Robotics

Course Code	PE ME 701/2
Course Title	Robotics
Number of Credits	3 (L: 3, T: 0, P: 0)
Prerequisites	Engineering Mathematics
Course Category	Program Elective (PE)
Number of classes	36 hours

Course Outcome:

After successful completion of this course, the students will be able to

CO Number	CO Description	K-level
CO-1	Understand the fundamentals of robotics and robot	K2
CO-2	Demonstrate the classification & specifications of industrial robots	K4
CO-3	Explain robot anatomy & functions of different parts of industrial robot.	K4
CO-4	Evaluate the positions in space of manipulator by kinematic and dynamics of robot arm.	K5
CO -5	Explain the fundamentals of robot control system and programming languages	K4

Course Content:

Module 1: Fundamentalof Robotics: (9 hours)

Robotics- Fundamental and definition, Laws of robotics, Robot- definition and functions. History of robot development. Differences between a robot and an automated machine. Advantages and disadvantages of robots. Classification of industrial robots, Understanding the working principles of robot joints and basic motions, Modern industrial robots with examples and scope of work, Introduction to robot with artificial intelligence.

Module 2:Robot Anatomy: (9 hours)

Robot anatomy- Architecture of industrial robots, Robot actuators- Definition, classification, working principle and problems, Robot sensors - Definition, classification and working principle, Robot end effectors -Definition, classification and working principle, Robot specifications –Definition, applicationand problems.

Module 3: Robot Vision System: (9 hours)

Robot vision system- functions and industrial applications, Robot arm kinematics – fundamentals and problem analysis, Robot arm dynamics- fundamentals and problem analysis.

Module 4:Robot Control System &Languages:(9 hours)
Robotcontrol system – Fundamentals, classification, mathematical model, block diagram and application, Robot languages – Fundamentals, classification, features of some common robot languages.

Suggested Learning Resources- Text/ References

1. M.P. Groover, Industrial Robotics, Mc Graw Hill.
2. Robotic Engineering – An Integrated Approach, Richard D Klafter
3. Control System Engineering, I.J. Nagrath and Gopal
4. Saha, Introduction to Robotics, Mc Graw Hill
5. Tsuneo Yoshiklawa, Foundation of Robotics, MIT Press
6. Spong M.W. and Vidyasagar M., Robot dynamics and Control, John Wiley and Sons

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Engineering Tribology

Course Code	PC ME 701/3
Course Title	EngineeringTribology
Number of Credits	3 (L: 3, T: 0, P: 0)
Prerequisites	Nil
Course Category	Program Elective(PC)
Number of classes	36 hours

Course Outcome:-
After completion of the course, students will be able to:

CO No	CO Description	K-level
CO-1	Understand the fundamentals of tribology.	K2
CO-2	Explain the Role of friction and wear, mechanism.	K2
CO-3	Apply the knowledge of hydrostatic lubrication.	K3
CO-4	Analyze the requirements and design hydrodynamic journal bearings.	K4

Course Content:-

Module 1*:* Introduction to tribology:(9 hours)

Historical background, practical importance, and subsequent use in the field. Lubricants: Types and specific field of applications. Properties of lubricants, viscosity, its measurement, effect of temperature and pressure on viscosity, lubrication types, standard grades of lubricants, and selection of lubricants.

Module 2:Friction and wear: (9 hours)

Role of friction and laws of static friction, causes of friction, theories of friction, Laws of rolling friction; Friction of metals and non-metals; Friction measurements. Definition of wear, mechanism of wear, types and measurement of wear, friction affecting wear, Theories of wear; Wear of metals and non-metals.

Module 3:Hydrostatic lubrication:(9 hours)

Principle of hydrostatic lubrication, General requirements of bearing materials, types of bearing materials., Hydrostatic step bearing, application to pivoted pad thrust bearing and other applications, Hydrostatic lifts, hydrostatic squeeze films and its application to journal bearing, optimum design of hydrostatic step bearing.

Module 4:Hydrodynamic lubrication: (9 hours)

Principle of hydrodynamic lubrication, Various theories of lubrication, Petroff's equation, Reynold's equation in two dimensions -Effects of side leakage - Reynold's equation in three dimensions, Friction in sliding bearing, hydro dynamic theory applied to journal bearing, minimum oil film thickness, oil whip and whirl, anti –friction bearing, hydrodynamic thrust bearing

References/ Suggested Learning Resources: -

1. Introduction to Tribology, B. Bhushan, John Wiley & Sons, Inc., New York.
2. Engineering Tribology, PrasantaSahoo, PHI Learning Private Ltd, New Delhi.
3. Engineering Tribology, J. A. Williams, Oxford Univ. Press
4. Introduction to Tribology in bearings, B. C. Majumdar, Wheeler Publishing.
5. Tribology, Friction and Wear of Engineering Material, I. M.Hutchings, Edward Arnold, London.
6. Engineering Tribology, G. W. Stachowiak and A. W. Batchelor, Butterworth-Heinemann.
7. Friction and Wear of Materials, Ernest Rabinowicz, John Wiley & sons.
8. Basic Lubrication Theory, A. Cameron, Ellis Hardwoods Ltd., UK.
9. Handbook of tribology: materials, coatings and surface treatments, B.Bhushan, B.K. Gupta, McGraw-Hill.

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Alternative Fuels

Course Code	PE ME 702/1
Course Title	Alternative Fuels
Number of Credits	2 (L: 2, T: 0, P: 0)
Prerequisites	I C Engine
Course Category	Program Elective(PE)
Number of classes	24 hours

Course Outcome:-

After completion of the course, students will be able to:

CO No	CO Description	K-level
CO-1	Explain alcohols as IC engine fuels	K2
CO-2	Discuss vegetable oils asIC engine fuels.	K2
CO-3	DescribeHydrogen as Engine Fuel.	K2
CO-4	Compare natural gas and LPG as IC engine fuels.	K6

Course Content:-

Module 1*:* Alcohols as Fuels: (6 hours)

Introduction to alternative fuels, Need for alternative fuels, Availability of different alternative fuels for SI and CI engines. Alcohols as fuels. Properties of alcohols as fuels. Methods of using alcohols in CI and SI engines. Blending, dual fuel operation,Performance emission and combustion characteristics in CI and SI engines.

Module 2:Vegetable Oils as Fuels (6 hours)

Various vegetable oils and their important properties. Different methods of using vegetable oils engines, Blending, Transesterification of Vegetable oils,Biodiesel,Performance, Emission and Combustion.

Module 3:Hydrogen as Engine Fuel: (6 hours)

Combustive properties of hydrogen. Problems associated with hydrogen as fuel and solutions. Different methods of using hydrogen in SI and CI engines. Performance, emission and combustion analysis in engines. Hydrogen storage - safety aspects of hydrogen.

Module 4:Natural Gas and LPG as Fuels: (6 hours)

Natural gas and LPG. Properties studies. Modification required to use in SI and CI Engines- Performance and emission characteristics of NG and LPG in SI and CI engines.

References/ Suggested Learning Resources: -

1. Alternate Fuels by Dr. S. Thipse, Jaico Publications
2. "Automotive Emission Control" by Crouse and Anglin – McGraw Hill.
3. "Alternative Fuels Guidebook" by Bechtold R..
4. SAE Paper nos. 840367, 841333, 841334.
5. "Internal Combustion Engines" by Ganeshan – Tata McGraw Hill.
6. "Internal Combustion Engines" by Heywood John.
7. The properties and performance of modern alternative fuels" – SAE Paper no. 841210
8. The Biodiesel Handbook, Gerhard Knothe, Jon Van Gerpen, Jargon Krahl, AOCS Press Champaign, Illinois.
9. Alternative Fuels Guide book,Richard L Bechtold P.E., Society of Automotive Engineers, 1997 ISBN 0-76-80-0052-1.
10. Transactions of SAE on Biofuels (Alcohols, vegetable oils, CNG, LPG, Hydrogen, Biogas etc.).
11. Science direct Journals (Biomass & Bio energy, Fuels, Energy, Energy conversion Management, Hydrogen Energy, etc.) on biofuels.

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Energy Conservation and Management

Course Code	PEME 702/2
Course Title	Energy Conservation and Management
Number of Credits	2 (L: 2, T: 0, P: 0)
Prerequisites	NIL
Course Category	Program Elective (PE)
Number of classes	26 hours

Course Outcome:

After completing this course, the students will be able to

CO Number	CO Description	K-level
CO-1	Explain the energy auditing process with the help of energy auditing instruments.	K2
CO-2	Point out the scope of energy conservation in electrical systems.	K4
CO-3	Apply the energy conservation principle in thermal systems.	K3
CO-4	Analyze major utilities through energy conservation and management.	K4

Course Content:

Module 1: Introduction: (04 hours)

Introduction to energy & power scenario of world, National Energy consumption data,environmental aspects associated with energy utilization; Energy Auditing- need, types,methodology and barriers, role of energy managers, instruments of energy auditing.

Module 2: Electrical Systems: (08 hours)

Components of EB billing, HT and LT supply, transformers, cable sizing; Concept of capacitors,power factor improvement, harmonics; Electric motors- motor efficiency computation, energy efficient motors; Illumination- Lux, Lumens, types of lighting, efficacy, LED lighting and scope of energy conservation in lighting.

Module 3: Thermal Systems: (06 hours)

Boilers, Furnaces and Thermic Fluid heaters- efficiency computation and energyconservation measures; Steam distribution and usage, steam traps, condensate recovery, flash steam utilization; Insulation & Refractories

Module 4: Energy Conservation In Major Utilities & Energy Economics: (08 hours)

Pumps, Fans, Blowers, Compressed Air Systems, Refrigeration & Air Conditioning Systems, Cooling Towers, DG sets.

Discount Period, Payback Period, Internal Rate of Return, Net Present Value; Life Cycle Costing- ESCO concept.

References / Suggested Learning Resources:

1. Witte L.C. , Schmidt P.S. and Brown D.R., *Industrial Energy Management and Utilization*,Hemisphere Publ., Washington, 1988..
2. Callaghn P.W., *Design and Management for Energy Conservation*, Pergamon Press, Oxford, 1981.
3. Murphy W.R. and McKay G., *Energy Management*, Butterworths, London, 1987.
4. *Energy Manager Training Manual* , Bureau of Energy Efficiency (BEE) under Ministry of Power,GOI, 2004 (available at www.energymanager training.com).
5. Dryden. I.G.C., *The Efficient Use of Energy*, Butterworths, London, 1982

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Advanced Casting Processes

Course Code	PEME 702/3
Course Title	Advanced Casting Processes
Number of Credits	2(L: 2, T:0, P: 0)
Prerequisites	Nil
Course Category	Program Elective
Number of classes	26 hours

Course Outcome:

After completing this course, the students will be able to

CO Number	CO Description	K-level
CO-1	understand the principles of advanced casting techniques.	K2
CO-2	explain the recent development in casting techniques with their specific advantages & disadvantages.	K3
CO-3	design a gating system for a casting.	K5
CO-4	explain about the casting materials and testing procedures.	K3

Course Content:

Module 1: Solidification, Gating and Riser design & analysis(7 hours)

Equipment in foundry,Patterns, Materials used in moulds -Sands, Resins and other materials, Nucleation and grain growth, Solidification of pure metals,Rate of solidification,Gating system design - Pouring time, Choke Area, Sprue,Other gating elements. Risering design - Caine's Method, Modulus Method, Feeding distances,Chills, Feeding Aids.Related Numerical problems.

Module 2: Castings Materials, Melting and Quality Control(7 hours)

Ferrous-Steel Casting, Grey iron foundry practice, Ductile iron ,Malleable Iron etc. Non Ferrous-Considerations when casting materials are Aluminium, Copper, Magnesium and Zinc etc. Melting processesofferrous and non-ferrous alloys.Casting defects, fettling, heat treatment &inspection, and testing of castings.

Module 3: Centrifugal and Investment Casting (6 hours)

Principle of centrifugal casting process and its different types; different techniques and equipment used in centrifugal casting process; advantages and disadvantages of this process and Products applications. Principle of investment casting process and its different types; different techniques used in investment casting process; advantages, disadvantages and applications of this process.

Module 4: Die Casting and other Recent Developments (6 hours)

Principle of die casting process and its different types; different equipments used in die casting process and there operations and descriptions; advantages and disadvantages of this process. Low pressure And high pressure die casting, Squeeze casting, Rheocasting.

References / Suggested Learning Resources:

1. P.N.Rao, Manufacturing Technology, Tata McGraw Hill, 2008.
2. Heine, Loper and Rosenthal, Principles of Metal Casting, Tata McGraw Hill, 2001
3. A.K. Chakrabarti, Casting Technology and Cast Alloys, PHI, 2005
4. T.V.Rama Rao, Metal casting Principles and Practice, New Age International, 2010

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Thermal Engineering

Course Code	OEME 703
Course Title	Thermal Engineering
Number of Credits	3 (L: 3, T: 0, P: 0)
Prerequisites	NIL
Course Category	Open Elective (OE)
Number of classes	36 hours

Course Outcome:

After completing this course, the students will be able to

CO Number	CO Description	K-level
CO-1	Explain the basics of different modes of heat transfer	K2
CO-2	Summarize the principles of refrigeration &air conditioning.	K2
CO-3	Analyze the velocity diagram and compounding of steam turbine.	K4
CO-4	Compare gas turbine with intercooling, reheat & regeneration	K4

Course Content:

Module 1: Basics of Heat Transfer: (09 hours)

Conduction: Fourier's Law of heat conduction – Thermal Conductivity. Heat transfer through plane homogeneous wall, through composite wall and through hollow cylinder. **Convection:** Explanation of Convective heat transfer, Principle of heat exchanger, classification of heat exchangers, overall heat transfer coefficient and fouling factor. Concepts of LMTD and NTU methods and problems using these methods. **Radiation:** Explanation of heat transfer by radiation, definition of absorptivity, reflectivity, transmissivity, Black Body. Emission characteristics, and laws of black body radiation, Irradiation of total and monochromatic quantities, Heat exchange between two black bodies, concepts of shape factor

Module 2: Refrigeration &Air Conditioning: (09 hours)

Reversed Carnot Cycle, Bell-Coleman Cycle, deviation from actual cycle. Vapour Compression Refrigeration Cycle. Electrolux Refrigerator. Refrigerants - designation and trade name; Physical, Chemical & Thermodynamic properties of principal refrigerants. Effective temperature, comfort chart, ventilation requirements. Psychometrics chart, air humidity processes, humidification & dehumidification, By-pass factor.

Module 3: Steam Turbine: (09 hours)

Classification of Steam Turbine, Simple Impulse Turbine – Working Principle, Velocity Diagram, Parts of Steam Turbine (Location & Function), blade efficiency, optimum velocity ratio, multistaging & its

advantages, velocity compounded impulse turbine, reheat factor. Compounding of Turbine, Working Principle of Reaction Turbine, Concept of Reheating and Regenerating.

Module 4: Gas Turbine: (09 hours)

Open cycle gas turbine with intercooling, reheat & regeneration, Effect of intercooling to reheat & regeneration on efficiency, Effect of operating variable on thermal efficiency on Air Rate & on Work Ratio. Closed cycle gas turbine, Advantages of closed cycle gas turbine over the open cycle gas turbine. Advantages & disadvantages of gas turbine over steam turbine power plants**.**

References / Suggested Learning Resources:

1. Khurmi R.S. and Gupta J.K,*A Textbook of Thermal Engineering*, S. Chand.

2. R.K. Rajput, *Thermal Engineering* , Laxmi Publications.

3. P. N. Ananthanarayan, *Basic Refrigeration and Air Conditioning*, Tata McGraw Hill, ISBN- 9789383286560.

4. A.CenegelYunus, *Heat Transfer A Practical Approach*, Tata McGraw Hill

5. Soman, *Thermal Engineering*, PHI.

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Total Quality Management

Course Code	OEME 704
Course Title	Total Quality Management
Number of Credits	2 (L: 2, T:0, P: 0)
Prerequisites	NIL
Course Category	Open Elective (OE)
Number of classes	26 hours

Course Outcome:

CO Number	CO Description	K Level
CO 1	Understanding quality management philosophies, techniques, and frameworks	**K2**
CO 2	Analyzing the understanding of TQM principles and processes	**K4**
CO 3	Apply tools and techniques of TQM in manufacturing and service sectors	**K3**
CO 4	Expressing knowledge about various aspects of quality and TQM	**K3**

CourseContent:

Module 1:Introduction(6 Hours)

Needforquality,DefinitionofQuality,Evolutionof quality,ProductqualityandServicequality,DimensionsofQuality, DefinitionofTotalqualitymanagement,QualityPlanning,Quality costs-Analysis,TechniquesforQualityCosts,andBasicconceptsof Total Quality Management. QualityCouncil,QualityStatements,Strategicqualityplanning, BarrierstoTQMImplementation,BenefitsofTQM,Contributionsof Deming, Juran and Crosby.

Module 2:TQMPrinciples(6 Hours)
Customersatisfaction-CustomerPerceptionof Quality,CustomerComplaints,ServiceQuality.CustomerRetention; Employeeinvolvement,motivation;Empowerment;Teamand Teamwork;Qualitycircles,recognitionandreward,performance appraisal;Continuousprocessimprovement;PDCAcycle,5S, Kaizen; Supplier partnership, Partnering, Supplier rating & selection.

Module 3:TQM Tools and Techniques (10 Hours)
Benchmarking- Reasons to Benchmark,BenchmarkingProcess;QualityFunctionDeployment (QFD);TaguchiQualityLossFunction;Seventraditionaltoolsof quality;Newmanagementtools;Processcapability;Sixsigma-concepts,methodology;TPM-concepts,improvementneeds, performance measures; FMEA- Stages of FMEA.

Module 4:QualitySystems (4 Hours)
NeedforISO9000andOtherQualitySystems, ISO9001:2015QualitySystem-Elements,Documentation;Quality Auditing, QS 9000, ISO 14000- Concept, Requirements and Benefits; TQM implementation in manufacturing and service sectors

LearningResources:
1.D.H.Besterfield,C.Besterfield,G.H.Besterfield,M.Besterfield,H.Urdhwaresheand R. Urdhwareshe, Total Quality Management, Pearson Education, 2018.
2.A. Mitra, Fundamentals of Quality Control and Improvement, Wiley Student Edition, 2008.
3.S. Ramasamy, Total Quality Management, McGraw Hill Publishing Co., New Delhi, 2011.
4.J.R.EvansandW.M.Lindsay,TheManagementandControlofQuality,CengageLearning,1999.
5.D.C. Montgomery, Introduction to Statistical Quality Control, John Wiley, 2019.
6.M.P. Poonia, Total Quality Management, Khanna Book Publishing, 2018.

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Project Work Intermediate

Course Code	PR ME 705
Course Title	Project Work Intermediate
Number of Credits	6 (L: 0, T: 0, P: 12)
Prerequisites	Nil
Course Category	Project (PR)

Number of classes	130 hours

Course Outcome:-

After completion of the course, students will be able to:

CO Number	CO Description	K-level
CO-1	Demonstrate a sound technical knowledge of their selected project topic	K-2
CO-2	Develop the skill of working in a Team	K-3
CO-3	Design engineering solutions to complex problems utilizing a systematic approach	K-6
CO-4	Design the solution of an engineering project involving latest tools and techniques	K-6
CO-5	Develop the skill of effective communication with engineers and the community at large in written an oral forms	K-3
CO-6	Demonstrate the knowledge, skills and attitudes of a professional engineer	K-2

Course Content:-

The project topic should be selected / chosen to ensure the satisfaction of the urgent need to establish a direct link between education, national development and productivity and thus reduce the gap between the world of work and the world of study. The course should have the following-

1) Develop sound knowledge about the domain of the project work.
2) Perform detailed study about various components of a project.
3) Learn to be an important member of a team for successful execution of a project work.
4) Study about methodologies and professional way of documentation and communication related to project work.
5) Develop idea about problem formulation, finding the solution of a complex engineering problem.
6) Develop project report as per the suggested format to communicate the findings of the project work.
7) Acquire the skill of effective oral communication to the fellow engineers and people in the society at large.
8) Develop knowledge of how to organize, scope, plan, do and act within a project thesis.
9) Familiarity with specific tools (i.e. hardware equipment and software) relevant to the project selected.
10) Demonstrate the implementation of a project work.

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Industry Internship – II

Course Code	SI ME 706
Course Title	Industry Internship – II
Number of Credits	1 (L: 0, T: 0, P: 0)

Prerequisites	Nil
Course Category	Summer Internship (SI)
Number of classes	-

Course Outcome:-

After completion of the course, students will be able to:

CO Number	CO Description	K-level
CO-1	Solve real life challenges in the workplace by analysing work environment and conditions, and selecting appropriate skill sets acquired from the course of study	K-3
CO-2	Develop a right work attitude, self-confidence, interpersonal skills and ability to work as a team in a real organisational setting	K-3
CO-3	Demonstrate the skill to communicate and collaborate effectively and appropriately with different professionals in the work environment through written and oral means	K-2
CO-4	Show professional ethics by displaying positive disposition during internship	K-2
CO-5	Decide career options by considering opportunities in company, sector, industry, professional and educational advancement	K-5

Course Content:-

The industry internship aims to provide the student with:

1. A practice-oriented and 'hands-on' working experience in the real world or industry, and to enhance the student's learning experience.

2. An opportunity to develop a right work attitude, self-confidence, interpersonal skills and ability to work as a team in a real organisational setting.

3. An opportunity to further develop and enhance operational, customer service and other life-long knowledge and skills in a real world work environment.

4. Pre-employment training opportunities and an opportunity for the company or organisation to assess the performance of the student and to offer the student an employment opportunity after his/her graduation, if it deems fit.

Each student shall

1) Identify an internship program of relevance in his/her branch of engineering to undergo during summer break between 6^{th} and 7^{th} semester,

2) Get approval of the concerned HOD,

3) Undergo the industry internship program for minimum 4 weeks duration

4) Prepare their own report

5) Present in the class among fellow students and faculty members / deliver viva voce.

6) Submit the report and participation/course completion certificate.

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Seminar on Contemporary Engineering Topics – I

Course Code	SE ME 707
Course Title	Seminar on Contemporary Engineering Topics – I
Number of Credits	1 (L: 0, T: 0, P: 2)
Prerequisites	Nil
Course Category	Seminar (SE)
Number of classes	24 hours

Course Outcome:-

After completion of the course, students will be able to:

CO Number	CO Description	K-level
CO-1	Identify contemporary topics in respective branch of engineering	K-3
CO-2	Survey literature to understand insight of the selected topic	K-4
CO-3	Develop report writing and presentation making skill	K-3
CO-4	Present the topic so prepared among audience using suitable aid	K-3

Course Content:-

Each student shall

1) Identify a topic of current relevance in his/her branch of engineering,

2) Get approval of the faculty concerned/HOD,

3) Collect sufficient literature on the selected topic, study it thoroughly (literature survey),

4) Prepare their own report and presentation slides and

5) Present in the class among fellow students and faculty members.

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