K.D.K.College of Engineering, Nagpur
(NAAC,NBA Accredited Autonomous Institute)
Department of Mechanical Engineering
Minutes of the Meeting

Date 10th May 2025
Venue : Mechanical Department Library, KDK College of Engineering, Nagpur
Chairperson : Dr.S.R.Ikhar, Head, Department of Mechanical Engineering
Attendees :

Dr.A.V.Vanalkar	Er.V.N.Mujbaile	Er.A.N.Madne
Dr.P.G.Mehar	Dr.V.B.Vaidya	Dr.A.P.Ninawe
Er.V.D.Dhopte	Er. Mrs.S.G.Bawane	Er.M.S.Shelke
Er.H.V.Sondawale	Dr.D.A.Jolhe	Dr.H.P.Jawale
Dr.P.B.Lanjewar	Er.A.M.Ghadole	Dr.T.C.Parshiwanikar
Dr.Himanshu Shukla		

Agenda :

1. Finalization of Examination Scheme
2. Presentation and approval of Subject Syllabus of 3rd and 4th Sem B.Tech Mech.Engg
3. Conclusion and vote of thanks

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1. **Welcome**
   - The meeting commenced with a welcome address and briefing of last meeting by the Chairman of Board of Studies

2. **Presentation and Approval of Scheme and Syllabus :**
   - Dr.A.V.Vanalkar displayed the scheme and syllabus for 3rd and 4th sem Mech on smart board.
   - Detailed discussions were held regarding the proposed scheme and syllabus.
   - The members suggested not to use words like understand etc. and use words from BTL for CO statements. 1 credit = 15 hrs and 3 credits = 45 hrs.
   - It was suggested to include foreign author books in text book.
   - In 3rd semester, it was brought into notice that 5 to 6 are repeated practical in Machine Drawing practical.
   - In Strength of Material practical it should be written that to conduct 8 practical out of 10.
   - In Basics of Mechanisms, only mechanism, quantitative kinematic analysis using graphical methods, cam & follower to be considered.
   - In Basics of Electric vehicle syllabus be aligned with Mechanical Engineering than Electrical Engineering.
   - In Industrial Robotics include COBOTS and in practical include performance or demonstration,

- It was suggested in Engineering Economics to include product and process costing. Update unit 4 i.e. product & process costing, activity based costing, overhead, break even analysis.
- In 4th semester, it was suggested to exclude Coriolis component and restrict only on four bar chain and crank and slider mechanism quantitative analysis using graphical method.
- In Hydraulics of Machines Lab.don't use word study rather use demonstration.
- In Operation Research in unit 4 include game theory and decision theory. Use software wherever possible.
- In Industrial Safety (Open Elective-II) include OSHA guidelines.
- For Manufacturing Techniques it was suggested to use "Foundry Practices"

- It as suggested in English subject to include research papers and technical papers reading, referencing and citation styles.
- In Fundamentals of Management syllabus should be personal management, project management, group behavior, finance, marketing, operation and material management.
- It was suggested in Energy Management to include carbon credits and foot print. Unit 3 should include ISO 14000 QS 9000
- After thorough deliberations, the scheme and syllabus for 3rd and 4th sem Mechanical Engineering were unanimously passed and accepted by all members present.

3. **Conclusion :**
   - The meeting concluded with a vote of thanks by the Chairman of the Board of Studies.

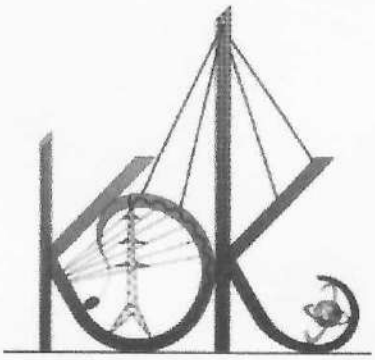
Chairman
Board of Studies
Mechanical Engineering
KDKCE, Nagpur

K.D.K.College of Engineering, Nagpur
(NAAC,NBA Accredited Autonomous Institute)
Department of Mechanical Engineering

Board of Studies (BoS) in Mechanical Engineering

Sr. No.	Particulars	Name	Signature
1.	Head, Department of Mechanical Engineering (Chairperson)	Dr.S.R.Ikhar Head	
2.	All Faculty members of the Department	1. Dr.A.V.Vanalkar	
		2. Er.V.N.Mujbaile	
		3. Er.A.N.Madne	
		4. Dr.P.G.Mehar	
		5. Dr.V.B.Vaidya	
		6. Dr.A.P.Ninawe	
		7. Er.V.D.Dhopte	
		8. Er.Mrs.S.G.Bawane	
		9. Er.M.S.Shelke	
		10. Er.H.V.Sondawale	
3.	Two subject experts from outside the parent University are to be nominated by the Academic Council	1. Dr.D.A.Jolhe Asst. Professor, Mechanical Engineering Department, Visvesvaraya National Institute of Technology, Nagpur 9422166167 2. Dr. Hemant P. Jawale Asst.Professor, Mechanical Engineering Department, Visvesvaraya National Institute of Technology, Nagpur 9422960372	Jolhe 10/05/2025 10/5/25 (P.B. Lanjewar)
4.	One expert is to be nominated by the Vice-Chancellor from a panel of six recommended by the Autonomous College Principal	Dr.P.B.Lanjewar, Professor, Mechanical Engineering Department, St.Vincent Pallotti College of Engineering & Technology, Gavsi Manapur, Wardha Road, Nagpur 9975549133	HPJawale 10/05/2025
5.	One representative from	Et.Atul M. Ghadole,	

	industry/corporate sector/allied areas to be nominated by the Principal	Proprietor, M/s.Shailesh Engineerning Works, Buttibori, Nagpur 9423069320	
6.	One member of the College alumni to be nominated by the Principal	Dr.Himanshu Shukla, Assistant Professor, Mechanical Engineering Department, RKNEC, Nagpur (M) 7620442511	10/5/2025
7.	Experts from outside the Autonomous College, whenever special courses of studies are to be formulated, to be nominated by the Principal	Dr.Tejpal C. Parshiwanikar, Asst. Professor & Head, Mechanical Engineering Department, G.H.Raisoni Institute of Engineering & Technology, Nagpur (M) 9373676769	10/5/25



K. D. K. College of Engineering, Nagpur 440024
(NAAC, NBA Accredited Autonomous Institute)

Scheme and Syllabus for

Bachelor of Technology (Mechanical Engineering)

Submitted by

Board of Studies in Mechanical Engineering

2025-26

Institute

Vision:

Service to the society through Quality Technical Education

Mission:

- Academic Excellence in Engineering and Technology through Complete dedication to all round Growth of Students.
- Enable the Students to Develop Outstanding Professional with Technical Competence and Management Skills.
- Fulfill the Expectance of the Society and Industries with Ethical Standards for developing Sustainable Solutions

Department

Vision:

Developing technocrats in Mechanical Engineering with computational and design skills, leadership and industrial practices, meeting the requirements of industry / business and society, through Quality Technical Education.

Mission:

M1. Developing Quality Mechanical Engineering graduates by imparting theoretical and practical knowledge with the exposure to work practices in Industry and Business.

M2. Developing graduates with over all personality, communication skills, computational skills and managerial skills with ethics to fulfill the expectations of the Industry and Society.

M3. Providing opportunities to practice industrial processes, pursue higher studies and entrepreneurship skills for sustainable growth.

Program Educational Objectives (PEOs)

PEO1:- Graduates shall have good technical competency to take up industrial projects / responsibilities as per the National / International requirements for enriched employability.

PEO2:-Graduates shall design and develop innovative products / systems through application of mechanical and allied engineering knowledge, computational skills to promote research and higher studies.

PEO3:-Graduates shall work successfully as leaders or as part of the team on multidisciplinary projects and undertake consultancy and entrepreneurship as their career option.

PROGRAM OUTCOMES (POs)

PO1: Engineering Knowledge: Apply the knowledge of mathematics, natural science, computing, engineering fundamentals, and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environmental as required. (WK5)

PO4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8)

PO5: Engineering Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)

PO6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7)

PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO8: Individual and Collaborative Team Work: Function effectively as an individual, and as a member or leader in divers/multi-disciplinary teams.

PO9: Communication: Communicate effectively and inclusively within engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences

PO10: Project Management and Finance: Apply knowledge and understanding of the engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multi-disciplinary environments.

PO11: Life-Long Learning: Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: To acquire and apply knowledge in various domains like Design, Thermal, Production and allied areas through theory / practical / industrial visits.

PSO2: To acquire Engineering knowledge, Computational, Management, Soft skills and Entrepreneurship skills for the betterment of Industrial and Social requirement.

B.Tech. Sem-III (B. Tech Mechanical Engineering - Major)

S N	Course Category	Course Code	Name of Subject	BOS	Teaching Scheme (hrs.)			Total Credit	Examination Scheme					
									Theory				Practical	
					(Th)	TU	P		Exam Hrs.	MSE	CA	ESE	CA	ESE
1	PCC-II	3BME01T	Fluid Mechanics	Mech	3	-	-	3	3	30	20	50	-	-
2	PCC-III	3BME01P	Machine Drawing Lab	Mech	-	-	2	1	-				25	25
3	PCC-IV	3BME02T	Strength of Material	Mech	3	-	-	3	3	30	20	50	-	-
4	PCC-IV	3BME02P	Strength of Material Lab	Mech	-	-	2	1	-	-	-	-	25	25
5	MDM-I	3BMEMD01T	MDM 1 (Refer Basket)	Mech	3	-	-	3	3	30	20	50	-	-
6	OEC-I	3BOE01T	Open Elective-I (Refer Basket)	ASH	3	-	-	3	3	30	20	50	-	-
7	EEM-01	3BEM01T/ 4BEM02T	(Refer Basket)	ASH	2	-	-	2	2	15	10	25	-	-
8	VEC-01	3BVE01T/ 4BVE02T	(Refer Basket)	ASH	2	-	-	2	2	15	10	25	-	-
9	CEP-I	3BME03P	CEP /Mini Project	Mech	-	-	4	2	-	-	-	-	50	50
Total					**16**	**-**	**8**	**20**		**150**	**100**	**250**	**100**	**100**
Total Marks (Theory & Practical)										**500**			**200**	
Total Marks (IIIrd Semester)										**700**				

B.Tech. Sem-IV (B. Tech Mechanical Engineering - Major)

S N	Course Category	Course Code	Name of Subject	BOS	Teaching Scheme (hrs.)			Total Credit	Examination Scheme					
									Theory				Practical	
					(Th)	TU	P		Exam Hrs.	MSE	CA	ESE	CA	ESE
1	PCC-V	4BME01T	Machines and Mechanisms	Mech	3	-	-	3	3	30	20	50	-	-
2	PCC-VI	4BME01P	3D Solid Modeling	Mech	-	-	2	1	-	-	-	-	25	25
3	PCC-VII	4BME02T	Hydraulic Machines	Mech	3	-	-	3	3	30	20	50	-	-
4	PCC-VII	4BME02P	Hydraulic Machines Lab	Mech	-	-	2	1	-	-	-	-	25	25
5	MDM-II	4BMEMD02T	MDM 2 (Refer Basket)	Mech	2	-	-	2	2	15	10	25	-	-
6	OEC-II	4BOE02T	Open Elective-II (Refer Basket)	ASH	2	-	-	2	2	15	10	25	-	-
7	AEC-02	4BAE02T	(Refer Basket)	ASH	2	-	-	2	2	15	10	25	-	-
8	EEM-02	3BEM01T/ 4BEM02T	(Refer Basket)	ASH	2	-	-	2	2	15	10	25	-	-
9	VEC-02	3BVE01T/ 4BVE02T	(Refer Basket)	ASH	2	-	-	2	2	15	10	25	-	-
10	VSEC-II	4BME03P	Manufacturing Techniques	Mech	-	-	4	2	-	-	-	-	50	50
Total					**16**	**-**	**08**	**20**		**135**	**90**	**225**	**100**	**100**
Total Marks (Theory & Practical)										**450**			**200**	
Total Marks (IVth Semester)										**650**				

List of Multi-disciplinary Minor (MDM)

Offered by Department	Sr. No.	Course category	Course Code	Title of the MDM Course	Credit	Semester
Mechanical Engineering	1	Multi-disciplinary Minor - 01	3BMEMD01T	Basics of Mechanisms	3	III
	2	Multi-disciplinary Minor - 02	4BMEMD02T	Engineering Material	2	IV
	3	Multi-disciplinary Minor - 03	5BMEMD03T	Computer Aided Design	3	V
	4	Multi-disciplinary Minor - 04	6BMEMD04T	Basics of Machine Design	2	VI
	5	Multi-disciplinary Minor - 05	7BMEMD05T	Product Design and Development	2	VII
	6	Multi-disciplinary Minor - 06	8BMEMD06T	Industry 5.0	2	VIII

List of Multi-disciplinary Minor ** (MDM) (Robotics and Computer Integrated Manufacturing)

Offered by Department	Sr. No.	Course category	Course Code	Title of the MDM Course	Credit	Semester
Mechanical Engineering	1	Multi-disciplinary Minor - 01	3BMEMD01T	Introduction to Robotics	3	III
	2	Multi-disciplinary Minor - 02	4BMEMD02T	Industrial Robotics	2	IV
	3	Multi-disciplinary Minor - 03	5BMEMD03T	Computer Integrated Manufacturing	3	V
	4	Multi-disciplinary Minor - 04	6BMEMD04T	Substractive Manufacturing	2	VI
	5	Multi-disciplinary Minor - 05	7BMEMD05T	Additive Manufacturing	2	VII
	6	Multi-disciplinary Minor - 06	8BMEMD06T	Supply Chain Management	2	VIII

			June 2025	1.00	Applicable for AY 2025-26 onwards
Chairman, BoS	Dean (Acad.)	Principal	Date of release	Version	

KDK College of Engineering, Nagpur

Faculty of Engineering and Technology

Courses offered by Applied Science and Humanities Board

Open Elective Courses for III Sem. B. Tech.

Sr. No.	Semester	Course Code	Subjects	Credits
1	III	3BOE01T - A	Principles of Management	3
2	III	3BOE01T - B	Professional Practices & Ethics	3
3	III	3BOE01T - C	Insurance & Banking Management	3
4	III	3BOE01T - D	Total Quality Management	3
5	III	3BOE01T - E	Campus Sustainability	3
6	III	3BOE01T - F	Indian Stock Market	3
7	III	3BOE01T - G	Climate Change	3

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KDK College of Engineering, Nagpur

B. Tech.

Civil / Mechanical/ Electrical/ ETC/ CS/ IT/ AI&DS Engineering

Courses offered by Applied Science and Humanities Board

Entrepreneurship/Economics/Management Courses (EEM-01 and EEM-02)

Sr. No.	Course Code	Course Name
1	3BEM01T-A /4BEM02T-A	Entrepreneurship Development
2	3BEM01T-B /4BEM02T-B	Economics for Engineers
3	3BEM01T-C /4BEM02T-C	Human Resource Management
4	3BEM01T-D /4BEM02T-D	Financial management
5	3BEM01T-E /4BEM02T-E	Strategic management

Value Education Courses (VEC-01 and VEC 02)

EM	Course Code	Course Name
1	3BVE01T-A /4BVE02T-A	Environmental Studies
2	3BVE01T-B /4BVE02T-B	Indian Constitution
3	3BVE01T-C /4BVE02T-C	Civic Education
4	3BVE01T-D /4BVE02T-D	Gender education
5	3BVE01T-E /4BVE02T-E	Universal Human Values

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KDK College of Engineering, Nagpur

Faculty of Engineering and Technology

B. Tech.

Courses offered by Applied Science and Humanities Board

Open Elective Courses for IV Sem. B. Tech.

Sr. No.	Semester	Course Code	Subjects	Credits
1	IV	4BOE02T - A	Corporate Social Responsibility	2
2	IV	4BOE02T - B	Life Skills	2
3	IV	4BOE02T - C	Digital Marketing	2
4	IV	4BOE02T - D	Basic of Mutual Fund	2
5	IV	4BOE02T - E	Introduction to Psychology	2
6	IV	4BOE02T - F	World Geography & Global Issue	2
7	IV	4BOE02T - G	Intercultural Communication	2

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KDK College of Engineering, Nagpur

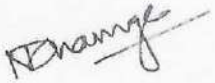
B. Tech.

Civil / Mechanical/ Electrical/ ETC/ CS/ IT/ AI&DS Engineering

Courses offered by Applied Science and Humanities Board

Ability Enhancement Courses (AEC-02)

Sr. No.	Course Code	Course Name
1	4BAE02T-A	Introduction to German Language
2	4BAE02T-B	Stress Management
3	4BAE02T-C	Critical thinking
4	4BAE02T-D	Employability skills
5	4BAE02T-E	Technical English writing

			June 2025	1.00	Applicable for AY 2025-26 onwards
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K. D. K College of Engineering, Nagpur
Mechanical Engineering Department
Track for Honor or Major Courses-Product Design
(Applicable to Students of Mechanical Engineering)

Sr. No.	Course Name	Coordinator	Course Duration
1	Manufacturing Guidelines For Product Design	Prof. Inderdeep Singh	8 weeks
2	Product Design and Development	Prof. Inderdeep Singh	4 weeks
3	Product Design and Manufacturing	Prof. J.Ramkumar Prof. Amandeep Singh	12 weeks
4	Design Practice	Prof. Shantanu Bhattacharya	8 weeks
5	Basics of Materials Engineering	Prof. Ratna Kumar Annabattula	12 weeks
6	Production Technology: Theory and Practice	Prof. Sounak Kumar Choudhury	12 weeks
7	Design Practice - II	Prof. Shantanu Bhattacharya	8 weeks
8	Ergonomics Workplace Analysis	Prof. Urmi R. Salve	4 weeks
9	System Design for Sustainability	Prof. Sharmistha Banerjee	12 weeks
10	Digital Human Modeling and Simulation for Virtual Ergonomics Evaluation	Prof. Sougata Karmakar	8 weeks
11	Gear And Gear Unit Design: Theory and Practice	Prof. Rathindranath Maiti	8 weeks
12	Design for Quality, Manufacturing and Assembly	Prof. Palaniappan Ramu	8 weeks
13	Design of Precision Machines	Prof. Jitendra P. Khatait	12 weeks
14	Introduction to Robotics	Prof. Ashish Dutta	12 weeks
15	Wheeled Mobile Robots	Prof. Asokan Thondiyath Prof. Santhakumar Mohan	8 weeks
16	Design of Farm Machinery	Prof. Hifjur Raheman	12 weeks

NOTE- 1. Ascertain the credits for each course
2. Total minimum credits to be acquired is 18

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K. D. K College of Engineering, Nagpur
Mechanical Engineering Department
Track for Minor Courses-Energy System
(Applicable to Students of Other Discipline)

Sr. No.	Course Name	Coordinator	Course Duration
1	Thermodynamics	Prof. Anand T. N. C	12 weeks
2	Applied Thermodynamics for Engineers	Prof. Dipankar N. Basu	12 weeks
3	Fluid Dynamics and Turbomachines	Prof. Dhiman Chatterjee, Prof. Shamit Bakshi	8 weeks
4	Fundamentals of Heat Transfer	Prof. Somnath Roy	12 weeks
5	Heat Transfer	Prof. Sunando Dasgupta	12 weeks
6	Conduction And Convection Heat Transfer	Prof. Suman Chakraborty Prof. Sankar Kumar Som	12 weeks
7	Transport Processes I: Heat and Mass Transfer	Prof. V. Kumaran	12 weeks
8	Fundamentals of Conduction and Radiation	Prof. Amaresh Dalal, Prof. Dipankar N Basu	12 weeks
9	Conduction And Convection: Fundamentals And Applications	Prof. Gautam Biswas / Prof. Sameer Khandekar	12 weeks
10	Power Plant Engineering	Prof. Ravi Kumar	8 weeks
11	Energy Conservation and Waste Heat Recovery	Prof. Prasanta Kumar Das, Prof. A Bhattacharya	12 weeks
12	Bioenergy	Prof. Mainak Das	8 weeks
13	Waste to Energy Conversion	Prof. P. Mondal	8 weeks
14	Non-conventional energy Resources	Prof. Prathap Haridoss	12 weeks
15	Technologies for Clean and Renewable Energy Production	Prof. P. Mondal	8 weeks
16	Selection of Nanomaterials for Energy Harvesting and Storage Application	Prof. Kaushik Pal	4 weeks

NOTE- 1. Ascertain the credits for each course
2. Total minimum credits to be acquired is 18

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K. D. K. College of Engineering, Nagpur
Faculty of Science and Technology
B. Tech. Mechanical Engineering

Semester III	Subject Code: 3BME01T	Name of Subject: Fluid Mechanics		
Total Hours Distribution Per Week				
Total Credit: 3	Lecture (L): 3 Hrs		Tutorial (T) : --	Practical (P): --
Examination Scheme				
Mid Sem Examination	Continuous Assessment	End Sem Examination	Total Marks	Examination Duration:
30 Marks	20 Marks	50 Marks	100 Marks	3 Hours

Course Objectives	
1	To understand Fluid properties and differentiate various types of fluid flow
2	To analyze fluid static and kinematic and determine stability of floating body.
3	To explore fluid dynamics and their applications
4	To identify laminar and turbulent flow and apply dimensional analysis techniques in fluid flow field
5	To investigate energy losses in pipes and power transmission through pipes

Course Outcomes	
After completion of syllabus, the student is able to	
1	Define properties of fluid and identify types of flow also pressure and its measurement
2	Elaborate fluid static and kinematics, principle and calculate meta centric height. Also stability of floating body.
3	Solve fluid dynamic problems and applications of Bernoulli's theorem
4	Differentiate laminar and turbulent flow and apply dimensional analysis techniques in fluid flow field
5	Calculate energy losses in pipes and power transmission through pipes

Course Competency	
1	Upon successful completion of this course, students will be able to analyze fluid properties and classify different types of fluid flow
2	Evaluate static and kinematic aspects of fluids, and determine the stability of floating bodies.
3	They will be proficient in applying principles of fluid dynamics to solve practical problems,
4	Distinguish between laminar and turbulent flows, perform dimensional analysis for fluid flow applications,
5	Assess energy losses in pipe systems for efficient power transmission. Overall, students will have the competence to apply theoretical and practical knowledge of fluid mechanics to engineering design and analysis tasks

Programme Outcomes

CO-PO Articulating Matrix:

CO	Program Outcomes & Program Specific Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	1	1	-	-	-	-	-	3	3	1
CO2	3	2	2	2	1	-	-	-	-	-	3	3	1
CO3	3	2	2	2	1	-	-	-	-	-	3	3	1
CO4	3	2	2	1	1	-	-	-	-	-	3	3	1
CO5	3	2	1	2	1	-	-	-	-	-	3	3	1

SYLLABUS

Details of Topic	Hours	Mapped with CO
Unit 1 Introduction to fluid mechanics :	8	CO1
Fluid properties :,mass density, weight density, specific weight, specific volume, dynamic viscosity ,kinematic viscosity, newton's law of viscosity, surface tension , capillarity, bulk modulus, compressibility, vapour pressure, types of fluid.		
Pressure and its measurement: Fluid pressure at a point, pascal law, hydrostatic law, archimedies principle, ,absolute, gauge, atmospheric, vacuum pressure, Measurement pressure, Manometers		
Unit 2 fluid statics and Kinematics:	8	CO2
Buoyancy and floatation: force of buoyancy, center of buoyancy, metacenter, metacentric height, stability of floating and submerged bodies, analytical method for metacentric height, hydrostatics forces on surfaces.		
Fluid Kinematic: *Types of fluid* flow, steady, unsteady, uniform, non-		

uniform, laminar, turbulent, compressible, incompressible, rotational, irrational flow, rate of flow or discharge, continuity equation, continuity equation for three dimensional flow, velocity and acceleration, velocity potential function and stream function.		
Unit 3 Fluid dynamic: fluid dynamic equation of motion, Euler's equation of motion, Bernoullis equation of motion and its assumption, practical application of bernoullis equation, venturimeter, orficemeter, pitot tube etc	8	CO3
Unit 4 Dimensional analysis, laminar and turbulent flow **Dimensional analysis:** primary and derived quantities, dimensional homogeneity, methods of dimensional analysis, Rayleigh and Buckingham pi method. **laminar and turbulent flow:** definition, relation between pressure and shear stresses, laminar flow through round pipe, turbulent flow and velocity distribution	8	CO4
Unit 5: Flow Through Pipes and power transmission through pipes **Flow Through Pipes:** Loss of Energy in pipes, hydraulic gradient and total energy line, syphon equivalent pipe, flow through pipes in series. **Power transmission through pipes:** Condition for maximum transmission of power, maximum efficiency of transmission of power.	8	CO5

Text Books**

1. Fluid Mechanics and Hydraulic Machines, Dr. R. K. Bansal, Laxmi Publications (P) Ltd., New Delhi.
2. Fluid Mechanics and Hydraulic Machines, R. K. Rajput, S. Chand & Company Ltd.
3. Fluid Mechanics and Hydraulic Machines, D.S. Kumar, S.K. Kataria & Sons.

References Books**

1. Introduction to Fluid Mechanics, James E. A., John and HAbern W. A., Prentice – Hall
2. Fluid Mechanics Cengel and Cimbla, Tata McGraw- Hill
3. Fluid Mechanics, A.K. Jain, Khanna Publications

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K. D. K. College of Engineering, Nagpur
Faculty of Science and Technology
B. Tech. Mechanical Engineering

Semester III	Subject Code: 3BME01P	Name of Subject: Machine Drawing Lab		
Total Hours Distribution Per Week				
Total Credit: 1	Lecture (L): -	Tutorial (T) : -	Practical (P): 2 Hrs	
Examination Scheme				
Mid Sem Examination	Continuous Assessment	End Sem Examination	Total Marks	Examination Duration:
-	25 Marks	25 Marks	50 Marks	-

	Practical Course Objectives
1	To introduce students to the fundamentals of machine drawing, including standards and conventions.
2	To develop skills in freehand sketching, orthographic projections, sectional views, and isometric drawings and enable students to draw detailed and assembly drawings of basic machine components.
3	To familiarize students with industrial practices like dimensioning, tolerances, and interpretation of blueprints and enable students to draw detailed and assembly drawings of basic machine components.

Practical Course Outcomes	
After completing the practical course, students will be able to	
1	Apply correct drawing standards (lines, lettering, dimensioning) as per BIS/ISO codes.
2	Draw orthographic, isometric, and sectional views of simple machine components.
3	Create detailed part drawings and complete assembly drawings of joints, couplings, bearings, and other machine elements.
4	Interpret industrial blueprints and manufacturing drawings accurately.

Course Competency	
1	Demonstrate proficiency in applying appropriate drawing standards (lines, lettering, dimensioning) as per BIS/ISO codes
2	Accurately produce orthographic, isometric, and sectional views of simple machine components
3	Develop detailed part and assembly drawings of machine elements such as joints, couplings, and bearings
4	Interpret industrial blueprints and manufacturing drawings with precision.*

CO-PO Articulating Matrix:

CO	Program Outcomes & Program Specific Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	2	1	-	-	1	1	1	-	-	3	2	2
CO2	2	2	1	-	-	1	1	1	-	-	3	2	2
CO3	2	2	1	-	-	1	1	1	-	-	3	2	2
CO4	2	2	1	-	-	1	1	1	-	-	3	2	2

LIST OF PRACTICALS:

Pr. No.	List of Practicals
1	Drawing Sheets, Name Blocks, Types of Lines, Standard dimensioning methods, Applying Tolerances.
2	Standard Components and their representations, Standard Features.
3	Machining Symbols, Welding Symbols, Surface Finish Symbols.
4	Heat Treatment, Manufacturing Instructions, Allowances, Materials.
5	2-D orthographic projection of machine elements (Sheet 1)
6	2-D orthographic projection of machine elements (Sheet 2)
7	Sectional views
8	Dimensioning and detailing.
9	Limit, Fits and Tolerances (Standard, types, application and selection for assembly and

	Manufacturing method)
10	Geometrical dimensioning and tolerances (symbols, applications) datum's, referencing.

Text Books**

1. Naryana K.L., Kannaiah R., Venkata Reddy K "Machine Drawing", New Age Int.Pub.
2. Naryana K..L., K.annaiah R., Yenkata Reddy K "Production Drawing", New Age Int.Pub.
3. N.D.Bhatt "Machine Drawing; Ed", Charotar Publishing House.

References Books**

1. PSG College of Technology "Design data", DPV Printers, Coimbature, I 2000.
2. "Engg. Drawing practice for schools & colleges", Bureau of Indian Standards, I Ed.; 2002.st 1998.

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K. D. K. College of Engineering, Nagpur
Faculty of Science and Technology
B. Tech. Mechanical Engineering

Semester III	Subject Code: 3BME02T	Name of Subject: Strength of Materials		
Total Hours Distribution Per Week				
Total Credit: 3	Lecture (L): 3 Hrs		Tutorial (T) : --	Practical (P): --
Examination Scheme				
Mid Sem Examination	Continuous Assessment	End Sem Examination	Total Marks	Examination Duration:
30 Marks	20 Marks	50 Marks	100 Marks	3 Hours

Course Objectives	
1	To study different types of stresses and strain induced in mechanical elements subjected to various types of loads
2	To understand the concept of combined stresses and theories of failure.
3	To study shear force and bending moment induced in beam when subjected to different loading, bending stresses in beam and deflection in beam.
4	To understand crippling load in column for different end conditions and to understand concept strain energy.

Course Outcomes	
After completion of syllabus, the student is able to	
1	Determine different types of stresses and strain in the material subjected to load.
2	Evaluate the principal stresses, draw Mohr's circle & study different theories of failure.
3	Draw shear force and bending moment diagram and determine bending stresses.
4	Find deflection in beam and strain energy induced in mechanical elements for different loading condition.
5	Find crippling load for different column end conditions.

Course Competency	
1	Proficient in analyzing and determining various types of stresses and strains in materials subjected to loads
2	capable of evaluating principal stresses, constructing Mohr's circle, and applying different failure theories
3	skilled in drawing shear force and bending moment diagrams, and calculating bending stresses
4	able to compute deflections and strain energy in mechanical elements under different loading conditions
5	competent in determining critical buckling loads for columns with various end conditions

CO-PO Articulating Matrix:

CO	Program Outcomes & Program Specific Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	1	-	1	-	-	-	-	-	-	3	3	1
CO2	3	2	-	1	-	-	-	-	-	-	3	3	1
CO3	3	1	-	2	-	-	-	-	-	-	3	3	1
CO4	3	2	-	1	-	-	-	-	-	-	3	3	1
CO5	3	1	-	1	-	-	-	-	-	-	3	3	1

SYLLABUS

Details of Topic	Hours	Mapped with CO
Unit 1: Introduction to Stresses & Strains Simple stress and strains, types of stress and strain, Hooks law, elastic limit, stress-strain diagram for ductile and brittle material, modulus of elasticity, modulus of rigidity, thermal stress and strain, analysis of composite section Concept of longitudinal stress & strain and lateral stress & strain, Poisson's ratio, volumetric stresses and strain with uni-axial, bi-axial and tri-axial loading, bulk modulus, relation between Young's modulus and modulus of rigidity, relation between Poisson's ratio and bulk modulus	8	CO1
Unit 2: Concept of Principal Stresses, Mohr's Circle& Theories of failure Principal stresses and strain, principal planes, analytical method of determining stresses on oblique section when member is subjected to direct stresses in one plane and in mutually perpendicular two planes, analytical method of determining stresses on oblique section when member is subjected to shear stress and direct stresses in two mutually perpendicular planes, Mohr's circle for representation of principal stresses, factor of safety, theories of failure	8	CO2
Unit 3: SFD & BMD and Bending Stress in beam Types of beam (cantilever beam, simply supported beam, overhung beam etc.),	8	CO3

Types of loads (Concentrated load, UDL and moment), sign conventions for bending moment and shear force, Shear force and bending moment diagrams for above loading Pure bending, theory of simple bending with assumptions & expressions for bending stress, Derivation of bending equation, Bending stresses in symmetrical sections, section modulus for various shapes of beam sections		
Unit 4: Deflection of Beam & Strain Energy	8	CO4
Relation between slope, deflection & radius of curvature, Macaulay's method to determine deflection & slope of simply supported beams subjected to concentrated load and UDL Strain energy stored in a body when it is subjected to gradually applied load, suddenly applied loads & impact loads, Strain energy stored in bending, Strain energy stored in torsion		
Unit 5: Column & Struts	8	CO5
Failure of long & short column, slenderness ratio, assumptions made in Euler's column theory, end conditions for column, derivation of crippling load for column with both ends hinged,crippling load for various end conditions of column, Effective length of column, limitations of Euler's formula, Rankine formula		

Text Books**

1. Strength of Materials by S.S. Rattan, McGraw Hill Education (India) Pvt. Ltd, 3rd edition, 2016
2. Strength of Materials by R.K. Rajput, S. Chand & Company Ltd.

References Books**

1. Mechanics of Materials by Beer, Johnson, Dewolf and Mazurek, Tata McGraw Hill, 7th edition, 2015
2. Elements of Strength of Materials by Timoshenko, S.P. and Young, D.H., East West Press, 5th edition, 2011
3. Applied Strength of Materials by Robert L. Mott, PHI Learning Pvt. Ltd., 5th edition, 2009
4. Strength of Materials by S. Ramamrutham and R. Narayan, DhanpatRai Publishing Company (P) Ltd., 18th edition, 2017

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K. D. K. College of Engineering, Nagpur
Faculty of Science and Technology
B. Tech. Mechanical Engineering

Semester III	Subject Code: 3BME02P	Name of Subject: Strength of Material Lab	
Total Hours Distribution Per Week			
Total Credit: 1	Lecture (L): -	Tutorial (T) : -	Practical (P): 2 Hrs

Examination Scheme				
Mid Sem Examination	Continuous Assessment	End Sem Examination	Total Marks	Examination Duration:
-	25 Marks	25 Marks	50 Marks	--

Practical Course Objectives	
1	To familiarize with various material test to know its properties.
2	To know various material properties.
3	To test behavior of beam, spring, and column under loading condition.

Practical Course Outcomes	
After completing the practical course, students will be able to	
1	Analyze the stress-strain curve of ductile material to determine material properties.
2	Determine bending stress and deflection in beam.
3	Evaluate the effect of tensile, bending, torsion and buckling load and can utilized the gained knowledge while tackling real life engineering problems for different types of Materials.

Course Competency	
1	Ability to analyze stress-strain characteristics of ductile materials to determine their properties
2	Proficient in calculating bending stresses and deflections in beams
3	Capable of evaluating the effects of tensile, bending, torsion, and buckling loads on materials and structures; and effectively applying this knowledge to solve practical engineering problems involving various materials.

CO-PO Articulating Matrix:

CO	Program Outcomes & Program Specific Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	2	-	-	-	-	-	-	3	2	1
CO2	3	2	1	2	-	-	-	-	-	-	3	2	1
CO3	3	2	1	2	-	-	-	-	-	-	3	2	1

LIST OF PRACTICAL:

Pr. No.	List of Practical (Perform any 8 practical out of 10)
1	Study of Universal Testing Machine.
2	Tension test on ductile material to determine tension properties.
3	Compression test on materials.
4	Impact test on materials.
5	Determination of bending stress by deflection of beam.
6	Determine the deflection of beam and verify it by using Macaulay's method.
7	Measurement of hardness of material with the help of Hardness Tester.
8	Determination of the spring stiffness.
9	Determination of Buckling load of columns.
10	Torsion test of metal shaft.

Text Books

1. Strength of Materials by S. Ramamrutham and R. Narayanan, Dhanpat Rai Publishing Company (P) Ltd, 18th Edition 2017.
2. Strength of Materials by S.S.Rattan, Mcgraw Hill Education, 3rd edition , 2016

References Books

1. Elements of Strength of Materials by Timoshenko, S.P. and Young, D.H., East West Press, 5th edition, 2011

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K. D. K. College of Engineering, Nagpur
Faculty of Science and Technology
B. Tech. Mechanical Engineering

Multi-disciplinary Minor

Semester III	Subject Code: 3BMEMD01T	Name of Subject: Basics of Mechanisms		
Total Hours Distribution per week				
Total Credit: 3	**Lecture (L): 3 Hrs**		**Tutorial (T) : --**	**Practical (P): --**
Examination Scheme				
Mid Sem Examination	**Continuous Assessment**	**End Sem Examination**	**Total Marks**	**Examination Duration:**
30 Marks	**20 Marks**	**50 Marks**	**100 Marks**	**3 Hours**

Course Objectives	
1	To understand with principles of machines and mechanisms, emphasizing the analysis and synthesis of simple mechanical systems.
2	To inculcate kinematic analysis of mechanism
3	To synthesis cam profile of various cams
4	To contrive new mechanisms and understand gears
5	To know various gear trains and its application

Course Outcomes	
After completion of syllabus, the student is able to	
1	Know various mechanisms and their classification and will be able to select appropriate mechanism and application of various mechanism
2	Differentiate analysis and carry out analysis of mechanisms
3	Construct cam profiles and analyze the follower motion.
4	Illustrate Geometry of gear, its types, analysis of motions of gear teeth. Study of gear trains and their applications in various machines
5	Study of gear trains and their applications in various machines

Course Competency	
1	Proficient in identifying and classifying various mechanisms, selecting appropriate mechanisms for specific applications
2	Performing analysis of their motions
3	Capable of designing and constructing cam profiles and analyzing follower motions
4	Knowledgeable in the geometry, types, and motion analysis of gears
5	Able to study and analyze gear trains and their applications in different machinery

CO-PO Articulating Matrix:

CO	Program Outcomes & Program Specific Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	3	1	1	-	-	-	-	-	2	2	2
CO2	2	2	2	2	2	2	1	-	-	-	2	2	2
CO3	2	2	2	1	1	3	3	-	-	-	2	2	2
CO4	2	2	2	-	-	2	2	-	-	-	2	2	2
CO5	2	2	2	-	-	2	2	-	-	-	2	2	2

SYLLABUS

Details of Topic	Hours	Mapped with CO
Unit 1 Introduction	8	CO1
Basic concept of kinematics analysis, link, kinematics pairs, kinematics chain, mechanism, Difference between machine and mechanism, Inversions, machine, simple & compound chain, Various types of mechanisms		
Degrees of freedom, Estimation of degree of freedom of mechanism by Grubber's criterion and other methods. Harding's notations,		
Classification of four bar chain , Class-I & Class-II, Kutzbach's criteria		
Applications of mechanism in real world.		
Unit 2 Kinematic Analysis	8	CO2
Kinematic analysis of simple mechanisms using Graphical method		
Unit 3 Cams and followers	8	CO3
Types of cams and followers, types of follower motion, velocity and acceleration diagrams, Construction of cam profile.		

Applications of cams in machinery		
Unit 4: Gears Classification of gears, Types of gears, Spur gears - terminology, conjugate gear tooth action and law of gearing,	8	CO4
Unit 5: Gear trains Various types of Gear Trains and their applications	8	CO5

Text Books**

1. Theory of Machine, S. S. Rattan, Tata McGraw Hill.
2. Mechanism and Machine Theory, J.S. Rao & Dukki Patti, New Age International (P) Ltd, Publishers

References Books**

1. Theory of Machines and Mechanisms, J. E. Shigley and J. J. Uicker, Oxford University Press
2. Advanced Mechanism Design–Analysis and Synthesis, A.G.Erdman and G.N.Sandor, Vol. I and II, Prentice – Hall
3. "Mechanisms and Mechanical Devices Source Book", Neil Sclater, Nicholas P Chrironis, McGraw- Hill
3. Kinematics and Linkage Design, A. S. Hall, Jr., Prentice – Hall
4. Theory of Machines, P L Ballaney, Khanna Publications

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K. D. K. College of Engineering, Nagpur
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Semester -III	Subject Code: 3BMEMD01T	Name of Subject: Introduction To Robotics		
Total Hours Distribution per week				
Total Credit: 3	Lecture (L): 3 Hrs		Tutorial (T) : T	Practical (P): --
Examination Scheme				
Mid Sem Examination	Continuous Assessment	End Sem Examination	Total Marks	Examination Duration:
30 Marks	20 Marks	50 Marks	100 Marks	3 Hours

Course Objectives	
1	To Understand and discuss the fundamental elementary concepts of Robotics.
2	The students will learn about Robot Anatomy And Motion Analysis
3	The students will understand the concept of intelligent module for robotic motion control, robot control system, Artificial Intelligence in Robotics
4	To Educate on Robot Sensors, various path planning techniques.
5	To know Robotics Applications, use of innovative robotic devices

Course Outcomes	
After completion of syllabus, the student is able to	
1	Understand the significance, social impact and future prospects of robotics and automation in various engineering applications.
2	Identify and describe the components and anatomy of robotic system
3	Know about various path planning techniques and analyze different motions of robotics system
4	Use the Robot Sensors, various path planning techniques.
5	Apply robotics concept to automate the monotonous and hazardous tasks and categorize various types of robots based on the design and applications in real world scenarios.

Course Competency	
After completion of syllabus, the student is able to gain the specific knowledge, skills, and abilities that a student is expected to demonstrate by the end of the course	
1	Student will able to Understand social impact and future prospects of robotics.
2	Student will able to Comprehend components and anatomy of robotic system
3	Student will able to Perceive about various path planning techniques and different motions of robotics system

4	Student will able to Recognize about various Robot Sensors.
5	Student will able to apply knowledge of robotics concept to automation and applications in real world scenarios.

CO-PO Articulating Matrix:

CO	Program Outcomes & Program Specific Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	1	1	-	2	2	-	1	2	-	3	2	1
CO2	3	-	-	-	2	2	-	2	2	-	3	2	2
CO3	2	1	1	-	2	2	-	1	1	-	3	2	1
CO4	3	-	-	-	2	-	-	1	1	-	3	1	1
CO5	3	-	1	-	2	2	-	2	1	-	3	1	2

SYLLABUS

Details of Topic	Hours	Mapped with CO
Unit 1 Introduction To Robotics: Introduction to Robotics and Automation, laws of robot, brief history of robotics, basic components of robot, robot specifications, classification of robots, human system and robotics, safety measures in robotics, social impact, Robotics market and the future prospects, advantages and disadvantages of robots.	8	CO1
Unit 2 Robot Anatomy And Motion Analysis: Anatomy of a Robot, Robot configurations: polar, cylindrical, Cartesian, and jointed arm configurations, Robot links and joints, Degrees of freedom: types of movements, vertical, radial and rotational traverse, roll, pitch and yaw,	8	CO2
Unit 3 Robot Control Systems, Open-loop vs. Closed-loop Control, ID Controllers (Basic),Sensor Integration and Feedback Systems.Artificial Intelligence in Robotics (Introduction),Introduction to Machine Learning and Computer Vision, Path Planning and Obstacle Avoidance, Simultaneous Localization and Mapping (SLAM) – Overview	8	CO3
Unit 4 Robot Sensors: Introduction of robotic sensors, contact type sensors, force, torque, touch, position, velocity sensors, non-contact type sensors, electro-optical imaging sensors, proximity sensors, range imaging sensors, , safety measures in robots. Path Planning: Definition-Joint space technique, Use of P-degree polynomial-Cubic,polynomial.	8	CO4

Unit 5 Robotics Applications: Material Handling: pick and place, palletizing and depalletizing, machining loading and unloading, welding & assembly, Medical, agricultural and space applications, unmanned vehicles: ground, Ariel and underwater applications, robotic for computer integrated manufacturing. Types of robots: Manipulator, Legged robo.	8	CO5

Text Books**

1. S.R. Deb, Robotics Technology and flexible automation, Tata McGraw-Hill Education, 2009.
2. Mikell P. Groover et. al., "Industrial Robots - Technology, Programming and Applications", McGraw Hill, Special Edition, (2012).
3. Ganesh S Hegde, "A textbook on Industrial Robotics", University science press, 3rdedition, 2017.
4. R.K.Mittal and I.J.Nagrath, Robotics and Control, Tata McGraw Hill, New Delhi,4th Reprint, 2005.
5. JohnJ.Craig ,Introduction to Robotics Mechanics and Control, Third edition, Pearson Education
6. M.P.Groover, M.Weiss, R.N. Nageland N. G.Odrej, Industrial Robotics, McGraw-Hill Singapore, 1996.

References Books**

1. Ashitava Ghoshal, Robotics-Fundamental Concepts and Analysis', Oxford University Press, Sixth impression, 2010.
2. K. K.Appu Kuttan, Robotics, I K International, 2007.
3. Edwin Wise, Applied Robotics, Cengage Learning, 2003.
4. Richard D Klafter, Thomas A Chmielewski, Michael Negin, "Robotics Engineering – An Integrated Approach", Eastern Economy Edition, Prentice Hall of India Pvt. Ltd., 2006.
5. Fu K S, Gonzalez R C, Lee C.S.G, "Robotics: Control, Sensing, Vision and Intelligence", McGraw Hill, 1987. https://www.robots.com/applications.

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KDK College of Engineering, Nagpur

B. Tech.

CE/ ME/ EE/ CSE/ IT/ AI&DS/ ETC Engineering

Semester III	Subject Code: 3BOE01T - A	Name of Subject: Principles of Management	
Total Distribution per week			
Total Credit: 3	Lecture (L): 3	Tutorial (T): 0	Practical (P): 0

Examination Scheme				
Continuous Assessment	Mid Semester Examination	End Semester Examination	Total Marks	Examination Duration:
20 Marks	30 Marks	50 Marks	100 Marks	3 Hrs

Course Objectives	
1	To enable students, understand the fundamental concepts of management, including the evolution and managerial roles and functions.
2	To enable students to learn the principles, processes, and types of planning and decision-making in managerial contexts.
3	To analyze different organizational structures and processes including staffing, delegation, and departmentalization.
4	To understand behavioral aspects of directing, including motivation, leadership, and communication.
5	To make them learn various control mechanisms, including budgeting and performance monitoring, to improve organizational productivity and effectiveness.

Course Outcomes	
After completion of syllabus, the student will be able to	
1	Define and explain the core concepts of management and distinguish between managers and administrators.
2	Demonstrate knowledge of planning, including setting objectives, formulating policies, and applying planning tools and techniques.
3	Analyse different organizational structures and processes including staffing, delegation, and departmentalization.
4	Understand behavioural aspects of directing, including motivation, leadership, and communication.
5	Utilize various control mechanisms, including budgeting and performance monitoring, to improve organizational productivity and effectiveness.

Course Competencies	
1	Apply foundational knowledge of management principles and develop the ability to plan, organize, lead, and control organizational activities effectively.
2	Implement communication skills, leadership skills, decision-making skills and performance monitoring skills to improve productivity and efficiency

CO_PO Mapping											
	Programme Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	-	-	-	-	2	2	-	-	3	3
CO2	2	2	-	-	3	-	-	-	--	3	3
CO3	-	3	-	-	-	-	-	3	-	3	3
CO4	-	-	-	-	-	-	3	3	3	-	3
CO5	-	2	-	-	-	-	-	-	-	3	3

Course Contents		Mapped with CO
Unit I : Introduction to Management:	8	CO1
Definition, Nature, Importance, Scope of Management – managerial roles and skills- Science or Art – Manager Vs Administrator – Evolution of Management Scientific, human relations, system and contingency approaches (contributions of F.W Taylor, Henry Fayol, Elton Mayo, Gilberth and McGregor) - Levels and Functions of Management.		
Unit II : Planning:	8	CO2
Nature and purpose of planning – planning process – types of planning – objectives – setting objectives – policies – Planning premises – Planning Tools and Techniques – Decision making steps and process.		
Unit III : Organizing:	8	CO3
Nature and purpose – Formal and informal organization – organization chart – organization structure – types – Line and staff authority – departmentalization – delegation of authority – centralization and decentralization – Span of Management - Job design- Recruitment, selection, Training and Compensation.		
Unit IV : Directing:	8	CO4
Foundations of individual and group behavior – motivation – motivational techniques – job enlargement – job enrichment – leadership – types and theories of leadership – communication – process of communication – barrier in communication – effective communication.		
Unit V : Controlling:	8	CO5
System and process of controlling – budgetary and non-budgetary control techniques – use of computers and IT in Management control – Productivity problems and management – control and performance – direct and preventive control – reporting.		

	Text Books
1	Principles and Practice of Management: L M Prasad, Sultan Chand & Sons educational. New Delhi
2	Principles of Management, Ramaswamy T., Himalaya Publication

3	Essentials of Management, Harold Koontz, O'Donnell and Heinz Weihrich, 2012, New Delhi, 9th edition, Tata McGraw Hill
4	Fundamentals of Management, Stephen P. Robbins, David A. Decenzo, 2016, Pearson Education, 9th Edition
5	Management Today- Principles and Practice / Edition-13th reprint
	Reference Books
1	Management - Text & Cases, Satya Raju, PHI, New Delhi
2	Management Fundamentals: Concepts, Applications, & Skill Development, 6th edition, Sage, 2014
3	Principles Of Management, Richard L. Daft, Cengage Learning, 2009

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KDK College of Engineering, Nagpur

B. Tech.

CE/ ME/ EE/ CSE/ IT/ AI&DS/ ETC Engineering

Semester III	Subject Code: 3BOE01T - B	Name of Subject: Professional Practices & Ethics	
Total Distribution per week			
Total Credit: 3	Lecture (L): 3	Tutorial (T): 0	Practical (P): 0

Examination Scheme				
Continuous Assessment	**Mid Semester Examination**	**End Semester Examination**	**Total Marks**	**Examination Duration:**
20 Marks	30 Marks	50 Marks	100 Marks	3 Hrs

	Course Objectives
1	To understand the basic purpose of profession, professional ethics and various moral and social issues.
2	To analyze various moral issues and theories of moral development
3	To realize their roles of applying ethical principles at various professional levels
4	To identify their responsibilities for safety and risk benefit analysis.
5	To understand their constructive roles in dealing various global issues.

	Course Outcomes
After completion of syllabus, the student will be able to	
1	Understand basic purpose of profession, professional ethics and various moral and social issues.
2	Analyze various moral issues and theories of moral development.
3	Realize their roles of applying ethical principles at various professional levels.
4	Identify their responsibilities for safety and risk benefit analysis.
5	Understand their constructive roles in dealing various global issues.

	Course Competencies
1	Apply professional ethics, moral values, and social responsibilities while dealing with real-world scenarios in their respective professions.
2	Analyze ethical issues critically and perform risk-benefit analysis to make informed and responsible decisions in professional settings.
3	Demonstrate responsible behaviour and actively contribute to addressing global and societal challenges through ethical and socially conscious practices.

CO_PO Mapping											
	Programme Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	-	-	-	-	2	3	1	1	-	3
CO2	-	2	-	-	-	-	3	-	1	-	2
CO3	-	-	-	-	-	-	3	1	2	-	1
CO4	-	-	2	-	2	-	2	-	-	-	3
CO5	-	-	-	-	-	3	3	1	1	-	3

Course Contents		Mapped with CO
Unit I : Human Values and Ethics: Human Values, Morals, values and Ethics, Integrity, Work ethics, Service learning, Civic virtue, Respect for others, living peacefully, Caring, Sharing, Honesty, Courage	8	CO1
Unit II : Engineering Ethics: Engineering Ethics, Senses of 'Engineering Ethics', Variety of moral issues, Moral dilemmas, Moral Autonomy, Kohlberg's theory, Gilligan's theory	8	CO2
Unit III : Engineering as Social Experimentation: Engineering as Social Experimentation, Engineering as Experimentation, Engineers as responsible Experimenters, Codes of Ethics, A Balanced Outlook on Law (Industrial Disputes Act, 1947; 07 3 Industrial Employment (Standing Orders) Act, 1946; Workmen's Compensation Act, 1923	8	CO3
Unit IV : Safeties, Responsibilities and Rights: Safety, Responsibilities and rights, Safety and Risk, Assessment of Safety and Risk, Risk Benefit Analysis and Reducing Risk, Collective Bargaining, Professional Rights, Employee Rights	8	CO4
Unit V : Global Issues and Professional Responsibilities: Global issues, Multinational Corporations, Computer Ethics, Weapons Development, Engineers as Managers, Consulting Engineers, Engineers as Expert Witnesses and Advisors	8	CO5

	Text Book/ Reference Books
1	Professional Ethics, R. Subramaniam, Oxford Publications, New Delhi.
2	Human Values and Professional Ethics by Jayshree Suresh and B. S. Raghavan, S. Chand Publications
3	Human Values & Professional Ethics by S. B. Gogate, Vikas Publishing House Pvt. Ltd., Noida.

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KDK College of Engineering, Nagpur

B. Tech.

CE/ ME/ EE/ CSE/ IT/ AI&DS/ ETC Engineering

Semester III	Subject Code: 3BOE01T - C	Name of Subject: Insurance and Banking Management	
Total Distribution per week			
Total Credit: 3	Lecture (L): 3	Tutorial (T): 0	Practical (P): 0

Examination Scheme				
Continuous Assessment	Mid Semester Examination	End Semester Examination	Total Marks	Examination Duration:
20 Marks	30 Marks	50 Marks	100 Marks	3 Hrs

	Course Objectives
1	To introduce the structure and functioning of the banking industry, with a focus on commercial and corporate banking in India.
2	To understand key commercial banking operations and regulatory frameworks like KYC, AML, FEMA, and payment systems (NEFT, RTGS, SWIFT).
3	To explore banking risk management practices, including ALM, NPA management, credit risk, and other financial risks.
4	To provide insights into insurance fundamentals, types of insurance policies, and risk measurement techniques
5	To examine the operational aspects of insurance companies including underwriting and claims management.

	Course Outcomes
After completion of syllabus, the student will be able to	
1	Explain the structure and types of banking institutions in India and the concept of core and universal banking.
2	Describe key operations in commercial banking and apply regulatory norms such as KYC, AML, RTGS, NEFT, and FEMA.
3	Evaluate asset-liability management processes and prudential norms related to NPAs and credit risk management.
4	Illustrate the concepts and types of life and general insurance, and understand premium calculation and risk measurement.
5	Analyze the operational aspects of insurance companies including underwriting principles and claims settlement processes.

Course Competencies	
1	Understand the structure and regulations of banking and insurance in India.
2	Apply risk management practices and compliance frameworks like KYC, AML, FEMA, NEFT, and RTGS.
3	Analyze insurance policies and claims processes to evaluate financial and operational risks.

CO_PO Mapping											
	Programme Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	2	-	-	-	2	3
CO2	-	-	-	-	2	2	2	-	-	3	3
CO3	-	-	-	-	2	2	-	-	-	3	3
CO4	-	-	-	-	3	2	2	-	-	3	2
CO5	-	-	-	-	3	2	2	-	-	3	2

Course Contents		Mapped with CO
Unit I : Introduction to Banking: Banking Industry: Structure of Banking Industry - Public and Private Sectors Banks in India - Corporate Banking and Universal Banking - Core Banking Innovation in Banking: E-Banking - Delivery Channels - ATM - EFTPOS - Phone Banking - Internet Banking - SMS Banking - Mobile Banking - Credit/Debit Cards - Smart Cards - UPI - Bancassurance.	8	CO1
Unit II : Commercial Banking Operations: Banking Operations: Payment and Settlement System - New Age Clearing - New Age Payment - RTGS - NEFT - SWIFT - NTGS - KYC Norms and Anti - Money Laundering - FEMA. Asset Liability Management (ALM): Concept - Organization and Techniques - Provision for NPA's - NPA's in Commercial Banks - Causes and Suggestions - Prudential Norms.	8	CO2
Unit III : Management of Banking Organization: Credit Risk Management: Introduction - Capital Adequacy Norms - Standardized and Advanced Approaches for Credit Risk - Credit Rating/Credit Scoring - Rating System Design. Loan Management: Contents of Loan Policy - Evaluating Credit Applicant Market Risk - Liquidity Risk - Interest Rate Risk - FOREX Risk.	8	CO3

Unit IV Introduction to Insurance:	8	CO4
Introduction, Concept - Nature - Scope and Significance - Investment Patterns - Types of Policies. Life insurance: Premium ,Calculations - Annuities - Measurement of Risk and Morality Table. General Insurance: Fire Insurance - Conditions of Fire Insurance - Subrogation and Reinsurance - Accident and Motor Insurance - Types of Motor Insurance - Factors to be considered for Premium Fixing - Concept of Health Insurance - Group Insurance - Home Insurance - Catastrophe Insurance		
Unit V : Management of Insurance Companies:	8	CO5
Underwriting: Functions - Principles - Underwriting in Life Insurance - Underwriting in Non-Life Insurance. Claims Management: Claim Settlement in General Insurance - Accident Benefit - Disability Benefit - Permanent Disability Benefit - Claim Settlement in Life Insurance - Maturity Claims and Death Claims.		

Text/ Reference Books	
1	N.R. Mohan Prakash, Banking, Risk and Insurance Management, Vikas Publishing
2	M.N. Mishra & S.B. Mishra, Insurance: Principles and Practice, S. Chand & Co
3	Sunil Kumar, Essentials of Banking and Insurance, JSR Publishing House
4	Bank Management and Financial Services (Indian Edition), Peter Rose & Sylvia Hudgins, 8th Edition, McGraw Hill Education
5	Principles And Practice of Bank Management, 2nd Revised Edition, Dr. P. Subba Rao & Dr. Promod Kumar Khanna, Himalaya Publishing House

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KDK College of Engineering, Nagpur

B. Tech.

CE/ ME/ EE/ CSE/ IT/ AI&DS/ ETC Engineering

Semester III	Subject Code: 3BOE01T - D	Name of Subject: Total Quality Management	
Total Distribution per week			
Total Credit: 3	Lecture (L): 3	Tutorial (T): 0	Practical (P): 0

Examination Scheme				
Continuous Assessment	**Mid Semester Examination**	**End Semester Examination**	**Total Marks**	**Examination Duration:**
20 Marks	30 Marks	50 Marks	100 Marks	3 Hrs

Course Objectives	
1	Understand the principles, history, and key contributors of Total Quality Management (TQM)
2	Learn and apply essential quality tools like Kaizen, Six Sigma, and cost analysis.
3	Manage customer satisfaction, employee involvement, and supplier relationships.
4	Use quality improvement techniques such as control charts and the DMAIC process.
5	Apply advanced TQM tools like Benchmarking, QFD, TPM, and FMEA to enhance quality and reliability

Course Outcomes	
After completion of syllabus, the student will be able to	
1	Develop an understanding about Quality management in corporate world.
2	Employ various techniques being used in Total Quality Management.
3	Engage into control of processes in manufacturing and operations
4	Audit control systems and Quality management
5	Apply TQM tools like Benchmarking, QFD, Taguchi Loss Function, TPM, and FMEA to improve quality and reliability in industrial and service processes.

Course Competencies	
1	Apply Total Quality Management (TQM) principles in real-world corporate settings.
2	Operate quality tools and techniques to improve processes and ensure product reliability.
3	Evaluate and audit quality systems to support continuous improvement.

CO_PO Mapping											
	Programme Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	-	2	-	2	1	-	-	-	1	1
CO2	-	2	2	-	3	1	-	-	-	2	2
CO3	-	2	3	-	2	1	1	2	-	2	2
CO4	-	2	2	2	2	1	1	-	-	2	2
CO5	-	2	3	-	3	1	1	-	2	2	2

Course Contents		Mapped with CO
Unit I: Introduction to Total Quality Management	8	CO1
Introduction to Total Quality Management, A brief history, the concept of quality, evolution of total quality, principles of total quality, Gurus of total quality management, their philosophies and contributions, characteristics of quality leader, customer satisfaction, customer perception of quality, feedback, customer complaints.		
Unit II: Tools of Quality Management	8	CO2
Process, Problem solving method, Kaizen, Six Sigma, performance measures, Cost of Quality, Tools for Quality Assurance,		
Unit III: Customers and Suppliers Management	8	CO3
TQM Principles - Customer satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Motivation, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Benefits, Continuous Process Improvement –Juran Trilogy, PDSA Cycle, 5S, Kaizen, Supplier Partnership – Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures – Basic Concepts, Strategy		
Unit IV: Quality Improvement Techniques	8	CO4
Quality Improvement Techniques - Control Charts for Variables – Definitions, Variation: Common vs. Special Causes, Process capability, Concept of six sigma - Introduction, advantages of six sigma, six sigma DMAIC process		
Unit V: Total Productive Maintenance	8	CO5
TQM Tools - Benchmarking – Reasons to Benchmark, Benchmarking Process, Quality Function Deployment (QFD) – House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs, FMEA – Stages of FMEA		

Text Books	
1	Dale H.Besterfiled, et at., Total Quality Management Pearson Education Asia, 1999. (Indian Areprint 2002)
2	Total Quality Management by Dale H. Besterfield,2019, Perason
Reference Books	
1	James R.Evans & William M.Lidsay, The Management and Control of Quality, (5th Edition), South-Western (Thomson Learning), 2002 (ISBN 0-324-06680-5)
2	Feigenbaum.A.V. "Total Quality Management", McGraw-Hill, 1991
3	Oakland.J.S. "Total Quality Management" Butterworth – Heinemann Ltd., Oxford. 1989

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KDK College of Engineering, Nagpur

B. Tech.

CE/ ME/ EE/ CSE/ IT/ AI&DS/ ETC Engineering

Semester III	Subject Code: 3BOE01T - E	Name of Subject: Campus Sustainability	
Total Distribution per week			
Total Credit: 3	Lecture (L): 3	Tutorial (T): 0	Practical (P): 0

Examination Scheme				
Continuous Assessment	Mid Semester Examination	End Semester Examination	Total Marks	Examination Duration:
20 Marks	30 Marks	50 Marks	100 Marks	3 Hrs

Course Objectives	
1	Develop an understanding of the principles and practices of sustainability in the context of educational institutions.
2	Build awareness of ecological, economic, and social sustainability challenges on campuses.
3	Enable students to assess and reduce the environmental footprint of academic activities.
4	Introduce tools and strategies for energy, water, and waste efficiency within campuses.
5	Promote student engagement and leadership in sustainability initiatives.

Course Outcomes	
After completion of syllabus, the student will be able to	
1	Explain the concept of sustainability and its relevance to campus ecosystems.
2	Evaluate current campus practices in energy, water, and waste management.
3	Analyze the application of green infrastructure and sustainable mobility in institutions.
4	Propose practical and technical strategies for improving campus sustainability.
5	Demonstrate environmental responsibility through individual and group actions.

Course Competencies	
1	Understand the concept of sustainability and its application to campus ecosystems.
2	Evaluate and improve energy, water, and waste practices within institutions.
3	Apply green infrastructure strategies and promote sustainable mobility on campuses.

CO_PO Mapping											
	Programme Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	3	3	-	2	-	2
CO2	-	-	-		-	2	3	-	-	2	2
CO3	-	-	-	2	-	2	2	-	2	2	2
CO4	-	-	-	2	-	2	2	-	2	3	2
CO5	-	-	-	-	-	2	3	3	3	2	-

Course Contents		Mapped with CO
Unit I: Foundations of Sustainability	8	CO1
Introduction to sustainability: environmental, economic, social dimensions,The role of academic institutions in promoting sustainability, UN Sustainable Development Goals (SDGs) and Education for Sustainable Development (ESD), Examples of sustainable campuses worldwide		
Unit II: Energy Management in Campus Infrastructure	8	CO2
Campus energy audits: methods and case studies, Renewable energy integration: solar, wind, biomass, Energy conservation in labs, hostels, and classrooms, Smart grids, sensors, and building automation systems		
Unit III: Water Conservation and Solid Waste Management	8	CO3
Water audits and sustainable usage, Rainwater harvesting systems and greywater reuse, Solid waste segregation, composting, and recycling models, E-waste handling and hazardous waste precautions		
Unit IV: Green Buildings and Sustainable Transportation	8	CO4
Concepts of green building: LEED, GRIHA, EDGE certifications, Use of sustainable construction materials, Campus biodiversity and green landscaping Bicycle-friendly campuses, EV charging, carpool systems		
Unit V: Community Engagement and Behavior Change	8	CO5
Building a green culture through clubs and campaigns, Institutional policies and green charters, Sustainability reporting and auditing tools, Design and presentation of a campus sustainability project		

	Text book/Reference Books
1	Geng, Yong, and Brent, Daniel. Sustainable Campus: Theory and Practice. Springer, 2021.
2	Agyeman, Julian et al. Local Environment: The International Journal of Justice and Sustainability (Selected papers)
3	United Nations. UN Sustainable Development Goals Reports – https://sdgs.un.org/
4	National Institute of Urban Affairs. Campus Sustainability Guidelines for Indian Institutions
5	AICTE & TERI Green Campus Manual (India-specific guidelines)

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KDK College of Engineering, Nagpur

B. Tech.

CE/ ME/ EE/ CSE/ IT/ AI&DS/ ETC Engineering

Semester III	Subject Code: 3BOE01T - F	Name of Subject: Indian Stock Market

Total Distribution per week			
Total Credit: 3	Lecture (L): 3	Tutorial (T): 0	Practical (P): 0

Examination Scheme				
Continuous Assessment	Mid Semester Examination	End Semester Examination	Total Marks	Examination Duration:
20 Marks	30 Marks	50 Marks	100 Marks	3 Hrs

Course Objectives	
1	Provide an in-depth understanding of the Indian capital and stock market structure.
2	Equip students with knowledge of equity, derivatives, mutual funds, and trading platforms.
3	Build analytical skills through fundamental and technical evaluation of securities.
4	Develop understanding of portfolio construction and investment strategies
5	Familiarize students with the regulatory framework, investor protection, and ethical investing

Course Outcomes	
After completion of syllabus, the student will be able to	
1	Explain the structure and functions of Indian stock markets and financial instruments.
2	Demonstrate knowledge of trading mechanisms and regulatory compliance.
3	Apply technical and fundamental analysis to evaluate investment opportunities.
4	Analyze and compare financial products like mutual funds, ETFs, and derivatives
5	Construct and manage a diversified portfolio applying key risk-return concepts.

Course Competencies	
1	Understand the structure and functions of the Indian stock market and its financial instruments.
2	Apply analytical tools and trading knowledge to evaluate investments and build portfolios.
3	Demonstrate understanding of regulatory compliance and ethical investing practices.

CO_PO Mapping											
	Programme Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	1	2	-	-	2	-	-	-	1	2
CO2	2	1	2	-	-	3	-	-	2	2	3
CO3	1	2	3	-	-	2	-	-	-	3	3
CO4	1	1	2	-	-	2	-	-	-	2	3
CO5	2	1	3	-	-	2	-	-	-	3	3

Course Contents		Mapped with CO
Unit I: Overview of Financial Markets & Stock Exchanges	8	CO1
Introduction to financial markets: Money vs. Capital market, Primary & Secondary markets, Stock exchanges in India: NSE, BSE, MCX, Role of SEBI and regulatory framework, Market participants: FIIs, DIIs, retail, HNIs Demat & Trading accounts, clearing & settlement (T+1 cycle)		
Unit II: Equity Market Instruments & Trading Mechanism	8	CO2
Types of securities: Equity, preference shares, debentures, IPO Process and Book Building, Market indices: Nifty, Sensex (construction & relevance), Order types: market, limit, stop-loss, Trading mechanisms: intraday vs. delivery, Circuit breakers, price bands, margin systems		
Unit III: Technical & Fundamental Analysis	8	CO3
Charts: Line, bar, candlestick, Patterns: head & shoulders, double top/bottom, triangles, Indicators: Moving Average, RSI, MACD, Bollinger Bands Fundamental analysis: P&L statement, Balance Sheet, Cash Flow Key ratios: EPS, P/E, ROE, Debt-equity ratio, DCF Model basics		
Unit IV: Derivatives and Mutual Funds	8	CO4
Introduction to Derivatives: Futures and Options, Hedging, speculation, arbitrage, Option chain, Greeks (basic understanding), Mutual funds: Types, NAV, SIP, SWP, AUM, ETFs and Index Funds, Fund selection and performance metrics		
Unit V: Portfolio Management & Regulatory Environment		
Risk-return analysis and investor profiling, Asset allocation & diversification strategies, Basics of portfolio construction, Regulatory bodies: SEBI, AMFI, NISM, Insider trading, corporate governance, taxation (STCG, LTCG), Investor protection and grievance redressal	8	CO5

	Text Books
1	Indian Financial System" By M. Y. Khan
2	McGraw Hill Education (Covers capital markets, SEBI, trading mechanisms, mutual funds)
	Reference Books
1	"Security Analysis and Portfolio Management" – S. Kevin, PHI Learning
2	"Fundamentals of Financial Markets" – V. A. Avadhani, Himalaya Publishing
3	"Fundamental Analysis for Investors" – Raghunathan V., McGraw Hill
4	NSE Academy Certified Capital Market Professional (E-NCCMP) modules
5	NISM Series: Equity Derivatives & Mutual Funds Distributor Study Material

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KDK College of Engineering, Nagpur

B. Tech.

CE/ ME/ EE/ CSE/ IT/ AI&DS/ ETC Engineering

Semester III	Subject Code: 3BOE01T - G	Name of Subject: Climate Change	
Total Distribution per week			
Total Credit: 3	Lecture (L): 3	Tutorial (T): 0	Practical (P): 0

Examination Scheme				
Continuous Assessment	Mid Semester Examination	End Semester Examination	Total Marks	Examination Duration:
20 Marks	30 Marks	50 Marks	100 Marks	3 Hrs

Course Objectives	
1	Understand the scientific principles underlying climate change.
2	Explore the causes and evidence of global warming and climate change.
3	Analyze the impacts of climate change on ecosystems, societies, and economies
4	Examine national and international climate policies, treaties, and frameworks.
5	Identify engineering and technological strategies for climate mitigation and adaptation.

Course Outcomes	
After completion of syllabus, the student will be able to	
1	Explain the basic science of climate systems and greenhouse effect.
2	Interpret evidence and data supporting global climate change.
3	Assess environmental, social, and economic impacts of climate change.
4	Describe national and international responses and frameworks like UNFCCC, Kyoto Protocol, Paris Agreement.
5	Propose technological and policy-based solutions to mitigate and adapt to climate change.

Course Competencies	
1	Inculcate the scientific basis of climate systems and global warming.
2	Analyze climate change impacts and interpret related environmental data.
3	Evaluate global climate policies and propose strategies for mitigation and adaptation.

CO_PO Mapping											
	Programme Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	2	-	-	-	-	-	-	-	-	2
CO2	-	3	-	2	2	-	-	-	-	-	3
CO3	-	2	-	-	3	2	-	-	2	2	-
CO4	-	-	-	-	3	3	-	-	-	2	2
CO5	-	2	3	2	2	3	3	1	1	2	-

Course Contents		Mapped with CO
Unit I: Climate Science Fundamentals	8	CO1
Earth's energy balance and the greenhouse effect, Natural vs anthropogenic causes of climate change, Role of carbon cycle and feedback mechanisms, Climate models and prediction tools		
Unit II: Evidence of Climate Change	8	CO2
Observed temperature and precipitation trends, Melting glaciers, sea-level rise, ocean acidification, IPCC reports and global climate data sources, Regional climate change patterns in India		
Unit III: Impacts of Climate Change	8	CO3
Environmental: biodiversity, forests, oceans, Social: health, migration, and agriculture, Economic: infrastructure, energy, and livelihoods, Case studies: floods, droughts, cyclones		
Unit IV: Climate Change Governance	8	CO4
Global treaties: UNFCCC, Kyoto Protocol, Paris Agreement, National policies: NAPCC, SAPCCs (India's response), Role of international bodies: IPCC, UNEP, COP summits, Climate finance and carbon trading		
Unit V: Mitigation and Adaptation Strategies	8	CO5
Renewable energy technologies and carbon capture, Sustainable urban and industrial design, Disaster-resilient infrastructure, Behavioral and lifestyle changes, Role of engineers in climate innovation		

	Text Books
1	1. Climate Change: From Science to Sustainability" by A. Barrie Pittock – Earthscan
2	"Global Warming: Understanding the Forecast" by David Archer – Wiley
3	"Introduction to Climate Change" by D. G. Martin – Oxford University Press

	Reference Books
1	IPCC Sixth Assessment Report (AR6) – https://www.ipcc.ch
2	India's National Action Plan on Climate Change (NAPCC) – https://moef.gov.in
3	"The Climate Solution" by Mridula Ramesh – Hachette India
4	UN SDG Goal 13 Reports – https://sdgs.un.org/goals/goal13

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KDK College of Engineering, Nagpur
B. Tech.
Entrepreneurship/ Economics/ Management (EEM)

Semester III/IV	Subject Code: 3BEM01T-A /4BEM02T-A	Name of Subject: Entrepreneurship Development		
Total Hours Distribution per week				
Total Credit: 2	Lecture (L): 2 Hrs		Tutorial (T) : --	Practical (P): --
Examination Scheme				
Mid Semester Examination	Continuous Assessment	End Semester Examination	Total Marks	Examination Duration:
15 Marks	10 Marks	25 Marks	50 Marks	2 Hours

Course Objectives	
1	To enable the students to understand the concept of Entrepreneurship and to learn the Professional behaviour expected of an entrepreneur.
2	To identify significant changes and trends which create business opportunities and to analyze the environment for potential business opportunities.
3	To provide conceptual exposure on converting idea to a successful entrepreneurial firm
4	To provide information about various funding sources

Course Outcomes	
After completion of syllabus, the student will be able to	
CO1	Understand the basic concepts of entrepreneurship and business opportunities
CO2	Understands the ideas to develop & convert the successful business ideas
CO3	Understand & solve problems related to market, technical aspects & assessment of project feasibility
CO4	Prepare project reports for starting a new venture on team based & raising the funds for starting the business.

Course Competency	
1	Understand the fundamentals of entrepreneurship, its types, traits, cultural aspects, and challenges including the role of women and SHGs in economic development.
2	Develop the ability to recognize business opportunities, generate innovative ideas, and protect intellectual property through patents and IPR.
3	Evaluate and analyze business opportunities using tools like market, technical, cost-benefit, and network analyses to determine project feasibility.
4	Acquire skills to prepare business plans and understand funding options including.

Programme Outcome											
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	1	2	-	-	1	2
CO2	-	-	-	-	-	2	-	2	-	-	3
CO3	-	1	-	-	-	1	-	-	-	3	2
CO4	-	-	-	-	-	2	-	3	3	3	2

Details of Topic	Hours	Mapped CO
UNIT I: Entrepreneurship Entrepreneur: Meaning of entrepreneurship – Types of Entrepreneurships – Traits of entrepreneurship – Factors promoting entrepreneurship- Barriers to entrepreneurship- the entrepreneurial culture- Stages in entrepreneurial process – Women entrepreneurship and economic development- SHG.	7	CO1
UNIT II: Developing Successful Business Ideas Recognizing opportunities – trend analysis – generating ideas – Brainstorming, Focus Groups, Surveys, Customer advisory boards, Day in the life research – Encouraging focal point for ideas and creativity at a firm level- Protecting ideas from being lost or stolen – Patents & IPR	7	CO2
UNIT III: Opportunity Identification and Evaluation Opportunity identification and product/service selection – Generation and screening the project ideas – Market analysis, Technical analysis, Cost benefit analysis and network analysis- Project formulation – Assessment of project feasibility- Dealing with basic and initial problems of setting up of Enterprises.	8	CO3

UNIT IV: Business Planning Process & Funding Meaning of business plan- Business plan process- Advantages of business planning- preparing a model project report for starting a new venture (Team-based project work). Sources of Finance- Venture capital- Venture capital process- Business angles- Commercial banks- Government Grants and Schemes.	8	CO4

TEXT BOOKS:

1. Reddy, Entrepreneurship: Text & Cases - Cengage, New Delhi.
2. Kuratko/ Rao, Entrepreneurship: a south Asian perspective.- Cengage, New Delhi.
3. Leach/Melicher, Entrepreneurial Finance – Cengage. , New Delhi.
4. K. Sundar – Entrepreneurship Development – Vijay Nicole Imprints private limited
5. Khanka S.S., Entrepreneurial Development, S. Chand & Co. Ltd., New Delhi, 2001.
6. Sangeeta Sharma, Entrepreneurship Development, PHI Learning Pvt. Ltd., 2016.

REFERENCE BOOKS:

1. Barringer, B., Entrepreneurship: Successfully Launching New Ventures, 3rd Edition, Pearson, 2011.
2. Bessant, J., and Tidd, J., Innovation and Entrepreneurship, 2nd Edition, John Wiley &Sons, 2011.
3. Desai, V., Small Scale Industries and Entrepreneurship, Himalaya Publishing House, 2011.
4. Donald, F.K., Entrepreneurship- Theory, Process and Practice, 9th Edition, Cengage Learning, 2014.
5. Hirsch, R.D., Peters, M. and Shepherd, D., Entrepreneurship, 6th Edition, Tata McGraw-Hill Education Pvt. Ltd., 2006.

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B. Tech.

Entrepreneurship/Economics/Management (EEM)

Semester III/IV	Subject Code: 3BEM01T-B/ 4BEM02T-B	Name of Subject: Economics for Engineers		
Total Hours Distribution per week				
Total Credit: 2	Lecture (L): 2 Hrs		Tutorial (T) : --	Practical (P): --
Examination Scheme				
Mid Semester Examination	Continuous Assessment	End Semester Examination	Total Marks	Examination Duration:
15 Marks	10 Marks	25 Marks	50 Marks	2 Hours

Course Objectives	
1	Acquire knowledge of economics to facilitate the process of economic decision making
2	Acquire knowledge on basic financial management aspects
3	Develop the skills to analyze financial statements

Course Outcomes	
After completion of syllabus, the student will be able to	
CO1	Understand the concepts of economics and will also learn to use the principles of economics in the engineering discipline.
CO2	Develop the insight in understanding the consumer and production behavior and functioning of market economy.
CO3	Understand about interest Rates, Evaluation Methods and Rate of Return Analysis
CO4	Learn the implications of monetary and fiscal policies in Indian economy.

Course Competency	
1	Understand core economic principles, analyze market demand/supply, and apply elasticity concepts in decision-making.
2	Analyze firm behavior under different market structures and optimize production and cost strategies.
3	Apply time value of money principles and perform economic evaluation using present worth, annual worth, and IRR methods.
4	Evaluate key macroeconomic issues in India and understand monetary and fiscal policy tools to address them.

CO-PO Articulating Matrix

Programme Outcome and Programme Specific Outcomes											
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	-	-	-	2	-	-	-	-	2
CO2	2	2	2	-	-	3	-	-	-	-	2
CO3	2	-	3	-	-	-	-	-	-	2	2
CO4	2	3	-	-	-	3	2	-	-	-	2

Details of Topic	Hours	Mapped CO
Unit I: **Introduction and Demand Analysis** Principles of economics, how markets work: market forces of supply and demand, Elasticity and its application, Consumer equilibrium	7Hr	CO1
Unit II: **Theory of Production, Cost and Firms** Firms' production, cost and revenue behavior; resources optimization; Firms' behavior under- competitive markets, monopoly, monopolistic competition and oligopoly.	8Hr.	CO2
Unit III: **Engineering Economy** Time value of money: Single-Payment and Uniform Series, Nominal and Effective Interest Rates, Evaluation Methods: Present Worth Analysis, Annual Worth Analysis, Rate of Return Analysis	7 Hr.	CO3
Unit IV: **Indian Economy** Nature and size of Indian Economy, Problems- Poverty, Unemployment, Inflation, measures for controlling these problems, Monetary policy- meaning, objectives, tools, fiscal policy-meaning, objectives, tools.	8 Hr.	CO4

Suggested Text Books

- N. Gregory Mankiw, Principles of Microeconomics,
- Krugman, Paul, and Robin Wells. Microeconomics. New York, NY
- WG Sullman, EM Wicks and CP Koelling, Engineering Economy, Pearson
- Chan S Park, Fundamentals of Engineering Economics, Always Learning
- Anindya Sen, Microeconomics, OUP India
- Leland T. Blank & Anthony J. Tarquin, Engineering Economy, McGraw-Hill
- Hal R. Varian Intermediate Microeconomics, W. W. Norton and Company
- Ruder Dutt and Sundaram, Indian Economy, S. Chand

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KDK College of Engineering, Nagpur
B.Tech.
Entrepreneurship/Economics/Management (EEM)

Semester III/IV	Subject Code: 3BEM01T-C/ 4BEM02T-C	Name of Subject: Human Resources Management		
Total Hours Distribution per week				
Total Credit: 2	Lecture (L): 2 Hrs		Tutorial (T) : --	Practical (P): --
Examination Scheme				
Mid Semester Examination	Continuous Assessment	End Semester Examination	Total Marks	Examination Duration:
15 Marks	10 Marks	25 Marks	50 Marks	2 Hours

Course Objectives	
1	To gain knowledge into the basics of Human Resource Management.
2	To expose the students to current human resource practices and exercises designed to enhance critical skills.
3	To expose the students to various aspects of human resource training & development
4	To impart knowledge on performance appraisal of employees

Course Outcomes	
After completion of syllabus, the student will be able to	
CO1	relate the significance of human resource management and examine the role of human resource development in the success of an organization.
CO2	understand the need for planning and process of acquisition of human resources for a firm
CO3	design a training program using a useful framework for evaluating training needs.
CO4	understand importance of performance appraisal and also understand different methods of doing it.

	Course Competancy
1	Understand the fundamental concepts, functions, and the dynamic environment of Human Resource Management, particularly in the Indian context.
2	Develop the ability to plan human resources through job analysis, job design, and HR planning systems and strategies.
3	Gain insights into recruitment, selection, and employee development practices, including modern training techniques and evaluation methods.
4	Analyze and apply various performance appraisal methods including individual, group, and modern techniques like MBO and 360-degree feedback.

CO-PO Articulating Ma

Programme Outcome and Programme Specific Outcomes											
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	-	-	-	-	2	3	-	-	2	2
CO2	1	-	-	-	2	2	3	2	-	3	2
CO3	-	1	-	-	2	-	-	2	-	2	2
CO4	-	-	1	-	2	2	-	2	2	2	2

Details of Topic	Hours	Mapped CO
UNIT – I: INTRODUCTION Human Resource Management: Meaning – definition – objectives – functions. HRM in a dynamic environment: Internal & External Environment. HRM in India:Introduction - Human Relation Movement - Scope of HR in India - Recent Trends in HR in India - Call Centers and BPOs.	7	CO1
Unit – II HUMAN RESOURCE PLANNING Introduction - Need for HR Planning - Process of HR Planning - HR Planning System – Responsibility of HR Planner - Job analysis – Job description –Job evaluation- Job specification – Job design- (Case analysis)	7	CO2
Unit – III PROCUREMENT OF HUMAN RESOURCES, TRAINING AND DEVELOPMENT Introduction - Concept of Recruitment - Factors affecting Recruitment - Sources of Recruitment - Traditional and Modern Methods - Recruitment and Selection Policies - Recruitment Practices - Concept of Selection - Selection Techniques (Case Analysis) **Training and Development:** Introduction - Meaning of Training - Importance of Training - Training Needs –Types and Techniques of Training Need and Importance of Management Development -Evaluation of training programme (Case analysis)	9	CO3
Unit – IV EMPLOYEE PERFORMANCE APPRAISAL Meaning- Need of employee review - Concept of employee appraisal - Types of Appraisal methods - Individual Evaluation Methods - Multiple Person Evaluation Methods - MBO- 360 Degree Appraisal. CBCS – 2020	7	CO4

Suggested Text Books:-

1. Gary Dessler- Human Resource Management- Pearson Publishers
2. Alan Price- Fundamentals of Human Resource Management – Cengage Learning Emea
3. P. Subba Rao- Essentials of Human Resource Management and industrial relations- Text and cases - Himalaya Publishing House.
4. C.B. Mamoria- Personnel Management- Himalaya publications.
5. Shashi K. Gupta- Rosy Joshy- Human Resource Management- kalyani publishers.
6. Seema Sanghil-Human Resource Management- Vikas Publications CBCS – 2020

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KDK College of Engineering, Nagpur

B. Tech.

Entrepreneurship/Economics/Management (EEM)

Semester III/IV	Subject Code: 3BEM01T-D/ 4BEM02T-D	Name of Subject: Financial Management		
Total Hours Distribution per week				
Total Credit: 2	Lecture (L): 2 Hrs		Tutorial (T) : --	Practical (P): --
Examination Scheme				
Mid Semester Examination	Continuous Assessment	End Semester Examination	Total Marks	Examination Duration:
15 Marks	10 Marks	25 Marks	50 Marks	2 Hours

Course Objectives	
1	To introduce engineering students to the fundamental principles of financial management.
2	To help students understand financial statements, cost analysis, and budgeting.
3	To develop the ability to analyze financial data for decision-making.
4	To equip students with skills to evaluate investment and financing decisions.

Course Outcomes	
After completion of syllabus, the student is able to	
CO1	Explain the concepts and functions of financial management in business contexts.
CO2	Interpret and analyze financial statements to assess financial health.
CO3	Apply techniques for capital budgeting, cost of capital, and working capital management.
CO4	Evaluate various financing options and their implications for business decisions.

Course Competency	
1	Understand the fundamental concepts of financial management, time value of money, and analyze financial statements using ratio analysis.
2	Evaluate investment decisions using capital budgeting techniques like NPV, IRR, and understand risk in project selection.
3	Manage day-to-day business finances by understanding working capital components and financing strategies.
4	Identify various sources of finance, compute cost of capital, and apply capital structure and dividend policy theories.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	-	-	-	-	2	-	-	-	2	1
CO2	-	2	-	-	1	2	-	-	-	2	2
CO3	1	-	-	-	-	-	-	-	-	2	2
CO4	-	-	2	-	-	2	-	-	-	3	2

Details of Topic	Hours	Mapped CO
Unit 1: Introduction to Financial Management and Analysis • Nature, Scope, and Objectives of Financial Management • Role of a Financial Manager in an Engineering Firm • Time Value of Money: Concepts and Calculations • Financial Statements: Balance Sheet, Income Statement, Cash Flow Statement • Financial Ratio Analysis	7	CO1
Unit 2: Capital Budgeting and Investment Decisions • Importance of Capital Budgeting • Techniques: Payback Period, Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index • Risk Analysis in Capital Budgeting • Capital Rationing and Ranking of Investment Proposals	7	CO2
Unit 3: Working Capital Management Concepts of Working Capital and Operating Cycle • Determinants of Working Capital Requirements • Cash, Inventory, and Receivables Management • Working Capital Financing	8	CO3
Unit 4: Sources of Finance and Cost of Capital • Equity and Debt Financing • Lease and Hire Purchase Financing • Cost of Capital: Cost of Debt, Equity, and Weighted Average Cost of Capital (WACC) • Capital Structure Theories and Leverage Analysis • Dividend Decisions and Policies	8	CO4

Textbook:

- **I.M. Pandey**, *Financial Management*, Vikas Publishing House, Latest Edition

Reference Books:

1. **Prasanna Chandra**, *Financial Management: Theory and Practice*, McGraw Hill
2. **M.Y. Khan and P.K. Jain**, *Financial Management: Text, Problems and Cases*, McGraw Hill
3. **Eugene F. Brigham & Joel F. Houston**, *Fundamentals of Financial Management*, Cengage Learning
4. **James C. Van Horne & John M. Wachowicz**, *Fundamentals of Financial Management*, Pearson Education

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KDK College of Engineering, Nagpur
B. Tech.
(Ability Enhancement Course AEC-2)

Semester III/IV	Subject Code: 3BEM01T-E/ 4BEM02T-E	Name of Subject: Strategic Management		
Total Hours Distribution per week				
Total Credit: 2	Lecture (L): 2 Hrs		Tutorial (T) : --	Practical (P): --
Examination Scheme				
Mid Semester Examination	Continuous Assessment	End Semester Examination	Total Marks	Examination Duration:
15 Marks	10 Marks	25 Marks	50 Marks	2 Hours

Course Objectives	
1	To enable the learners to understand new forms of Strategic Management concepts and their use in business
2	To provide information pertaining to Business, Corporate and Global Reforms
3	To develop learning and analytical skills of the learners to enable them to solve cases and to provide strategic solutions
4	To acquaint the learners with recent developments and trends in the business corporate world

Course Outcomes	
After completion of syllabus, the student will be able to	
CO1	Understand the basic concepts of entrepreneurship and business opportunities
CO2	Understands the ideas to develop & convert the successful business ideas
CO3	Understand & solve problems related to market, technical aspects & assessment of project feasibility
CO4	Prepare project reports for starting a new venture on team based & raising the funds for starting the business.

Course Competency	
1	Understand the foundational concepts of strategic management, its processes, levels, functional strategies, and environmental scanning.
2	Analyze, formulate, and evaluate corporate strategies using strategic tools like SWOT, BCG, and GE Matrix, and understand implementation challenges.
3	Understand corporate restructuring, renewal strategies, strategic alliances, and the role of IT and PPP in business growth.
4	Evaluate outsourcing models, disaster management strategies, and start-up policies like "Make in India" for entrepreneurial development.

CO-PO Articulating Matrix

Programme Outcome and Programme Specific Outcomes											
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	-	-	-	-	3	2	-	-	2	3
CO2	-	2	-	-	-	2	-	2	-	2	2
CO3	1	-	1	-	-	1	-	-	-	3	2
CO4	-	-	-	2	-	2	-	3	3	3	2

Details of Topic	Hours	Mapped CO
Unit-I: Introduction to Strategic Management Concept of Strategic Management, Strategic Management Process, Vision, Mission and Goals, Benefits and Risks of Strategic Management. Levels of Strategies: Corporate, Business and Operational Level Strategy, Functional Strategies: Human Resource Strategy, Marketing Strategy, Financial Strategy, Operational Strategy, Business Environment: Components of Environment, Micro and Macro and Environmental Scanning.	7	CO1
Unit-II: Strategy Formulation, Implementation and Evaluation Strategic Formulation: Stages and Importance, Formulation of Alternative Strategies: Mergers, Acquisitions, Takeovers, Joint Ventures, Diversification, Turnaround, Divestment and Liquidation. Strategic Analysis and Choice: Issues and Structures, Corporate Portfolio Analysis- SWOT Analysis, BCG Matrix, GE Nine Cell Matrix, Hofer's Matrix, ETOP-Environmental Threat and Opportunity Profile, Strategic Choice- Factors and Importance. Strategic Implementation: Steps, Importance and Problems,	9	CO2

Resource Allocation- Importance & Challenges , Strategic Evaluation and Control: Importance, Limitations and Techniques ,Budgetary Control: Advantages, Limitations.		
Unit-III: Business, Corporate and Global Strategies Corporate Restructuring Strategies: Concept, Need and Forms, Corporate Renewal Strategies: Concept, Internal and External factors and Causes. Strategic Alliance: Concept, Types, Importance, Problems of Indian Strategic Alliances and International Businesses ,Public Private Participation: Importance, Problems and Governing Strategies of PPP Model. ,Information Technology Driven Strategies: Importance, Limitations and contribution of IT sector in Indian Business.	6	CO3
Unit-IV: Business Process Outsourcing and Knowledge Process Outsourcing in India: Concept and Strategies. Reasons for growing BPO and KPO businesses in India. Reengineering Business Processes-Business Reengineering, Process Re-engineering and Operational Re-engineering. Disaster Management: Concept, Problems and Consequences of Disasters, Strategies for Managing and Preventing disasters and Cope up Strategies. Start-up Business Strategies and Make in India Model: Process of business start-ups and its Challenges, Growth Prospects and government initiatives in Make in India.	8	CO4

Text Books:

- Strategic Management, A Dynamic Perspective -Concepts and Cases – Mason A. Carpenter, Wm. Gerard Sanders, Prashant Salwan, Published by Dorling Kindersley (India) Pvt Ltd, Licensees of Pearson Education in south Asia
- Strategic Management and Competitive Advantage-Concepts Jay B. Barney, William S. Hesterly, Published by PHI Learning Private Limited, New Delhi
- Globalization, Liberalization and Strategic Management - V. P. Michael

Reference Books:

- Business Organisation – Rajendra P. Maheshwari, J.P. Mahajan, Published by International Book House Pvt Ltd
- Disasters and Development- Cuny Fred C, Published by Oxford University Press, Oxford

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KDK College of Engineering, Nagpur

B. Tech.

Value Education Course (VEC)

Semester	Subject Code:	Name of Subject: Environmental Studies
III/IV	3BVE01T-A 4BVE02T-A	

Total Hours Distribution per week			
Total Credit: 2	Lecture (L): 2 Hrs	Tutorial (T) : --	Practical (P): --

Examination Scheme				
Mid Semester Examination	Continuous Assessment	End Semester Examination	Total Marks	Examination Duration:
15 Marks	10 Marks	25 Marks	50 Marks	2 Hours

Course Objectives	
1	A systematic study of human interaction with the environment in the interests of solving complex problems.
2	Study of physical and biological characters of the environment, also the social and cultural factors along with the impact of man on environment.
3	Bring together the principles of various disciplines of Sciences, to solve contemporary environmental problems.

Course Outcomes	
After completion of syllabus, the student is able to	
CO1	Understand the Multidisciplinary nature of environmental science and gain in-depth knowledge of natural processes that sustain life and govern economy.
CO2	Develop critical thinking for shaping strategies (scientific, social, economic and legal) for environmental protection and conservation of biodiversity, social equity and sustainable development.
CO3	Acquire values and attitudes towards understanding complex environmental-economic social challenges, and participating actively in solving current environmental problems and preventing the future ones.
CO4	Adopt sustainability as a practice in life, society and industry and know their roles and ethics, as citizens, and consumers in a complex, interconnected world.

Course Competency	
1	Applying the interdependence of environmental disciplines and importance of sustainable development.
2	Comprehend ecosystem dynamics, energy flow, and biodiversity types, values, threats, and conservation practices.
3	Analyze various types of pollution, hazards, and disasters. Apply EIA and auditing methods for sustainable environmental planning.
4	Evaluate the social dimensions of environmental problems and global agreements. Understand policy frameworks and ethics in sustainability.

CO-PO Articulating Matrix

Programme Outcome and Programme Specific Outcomes											
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	-	1	-	-	3		-	-	-	2
CO2	-	1	1	-	-	3		-	-	-	2
CO3	1	-	2	2	2	3	1	-	-	-	2
CO4	1	-	2	-	-	3	3	-	2	1	2

SYLLABUS

Details of Topic	Hours	Mapped CO
Unit – I **Environment as a multidisciplinary subject and Natural resources** Environment: Definition, Scope, basic terms, importance, need for public awareness, concept of sustainable development. Natural resources and associated problems. Forest, water, mineral, food and land resources. Role of individuals in conservation of natural resources. Equitable use of resources for sustainable lifestyle. Environmental Application of remote sensing and GIS	6	CO1
Unit – II Ecosystem and Biodiversity Ecosystem: Concept, Structure and Functions, Energy Flow, Food Chain, Food web, and Ecological Pyramids; Grassland and pond Ecosystem. Ecological succession. Biodiversity: Introduction, definition, Types (genetic, species & ecosystem), value of biodiversity, Biodiversity at Global, National and local Levels. Hot spots of biodiversity; Threats to biodiversity; conservation, In-situ and Ex-situ conservation; Relevant case studies, laws and Legislations.	8	CO2
UNIT-III: **Environmental Pollution, hazards, Disaster management & EIA:** Pollution: Definition, causes, effects and control measures of Water, Air, solid, noise and nuclear pollution. Environmental hazards & Disaster management: Definition, and types of mitigation. Preparedness and awareness. Environmental impact assessment (EIA); scope, importance and need. Role of IT in environment. Environmental Auditing; Relevant case studies, laws and Legislations.	8	CO3
Unit – IV **Social Issues and Environment, Environmental conventions** Population explosion, Urban problems related to energy, resettlement and rehabilitation of people, their problems and concerns, family welfare programme, human health, women and child welfare; environmental ethics & consumerism. Mass tourism and environment. Sustainable tourism. Stockholm convention, Kyoto Protocol, Montreal Protocol, COP Conference of Parties), Ramsar Convention, Rio Summit, Convention on Biological Diversity; National Green Tribunal; Relevant case studies, laws and Legislations.	8	CO4

Textbooks:

1.Environmenta Studies: ISBN: 8188458-77-5

2.Environmenta StudiesISBN-978-81-317-2118-6

Reference books:

1.Environmenta Studies Univ. Sci. PressISBN-978-81-318-0641-8

2.Environmenta Studie: ISBN: 8188458-77-5

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KDK College of Engineering, Nagpur
B. Tech.
Value Education Course (VEC)

Semester	Subject Code:	Name of Subject:		
III/IV	3BVE01T-B/ 4BVE02T-B	Indian Constitution		
Total Hours Distribution per week				
Total Credit: 2	Lecture (L): 2 Hrs		Tutorial (T) : 2	Practical (P): --
Examination Scheme				
Mid Semester Examination	Continuous Assessment	End Semester Examination	Total Marks	Examination Duration:
15 Marks	10 Marks	25Marks	50 Marks	2Hrs

Course Objectives	
1	To impart a comprehensive outlook about the nature of the Indian Constitution
2	To identify the importance of Fundamental Rights and Fundamental Duties
3	To understand the Functioning of Union and State in Indian Federal System.

Course Outcomes	
After completion of syllabus, the students will be able to	
CO1	Interpret the Basic Concepts of Indian Constitution
CO2	Evaluate the Fundamental Rights and Fundamental Duties in proper sense
CO3	Analyze the Indian political system, the powers and functions of the Union and State Governments in detail
CO4	Learn about the Institutions of Indian Politics and to acquire a sense of Democratic System

Course Competency	
1	Explain the meaning and significance of the Constitution and its role in democratic governance
2	Identify the historical sources and development of the Indian Constitution.
3	Interpret the key features of the Constitution including citizenship, the Preamble, and core values.
4	Distinguish between Fundamental Rights, Fundamental Duties, and Directive Principles of State Policy

CO-PO Articulating Matrix

	Programme Outcomes										
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	-	-	-	-	3	3	-	-	-	2
CO2	-	2	-	-	-	3	3	-	2	2	2
CO3	-	-	2	-	-	3	2	-	-	1	2
CO4	1	-	-	-	-	3	3	2	2	2	2

Details of Topic	Hours	Mapped with CO
Unit 1: Introduction	6	CO1
Constitution' meaning of the term,, Indian Constitution: Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy		
Unit 2: Union Government and its Administration		
Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha	6	CO2
Unit 3: State Government and its Administration		
Governor: Role and Position, CM and Council of ministers, State Secretariat: Organization, Structure and Functions	6	CO3
Unit4: Local Administration		
District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayati Raj: Introduction, PRI: Zila Pachayat, Elected officials and their roles, CEO Zila Pachayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy	6	CO4

Text Books

1. 'Indian Constitution' by D.D. Basu
2. 'Indian Administration' by Avasti and Avasti

References Books

1. 'Indian Polity' by Laxmikanth
2. 'Indian Administration' by Subhash Kashyap
3. Chakrabarty, Bidyut, Indian Government and Politics, New Delhi: Sage Publishing, 2008.
4. M. V. Pylee, India's Constitution, New Delhi; S. Chand Pub., 2017 (16th edn.)
   J.N. Pandey, The Constitutional Law of India, Allahabad; Central Law Agency, 2018 (55th edition)

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B. Tech.

Value Education Course (VEC)

Semester III/IV	Subject Code: 3BVE01T-C/ 4BVE02T-C	Name of Subject: Civic Education		
Total Hours Distribution per week				
Total Credit: 2	Lecture (L): 2 Hrs		Tutorial (T) : --	Practical (P): --
Examination Scheme				
Mid Semester Examination	Continuous Assessment	End Semester Examination	Total Marks	Examination Duration:
15 Marks	10 Marks	25 Marks	50 Marks	2 Hours

Course Objectives	
1	To explore how engineering practices influence societal development and responsibilities engineers hold towards the public.
2	To comprehend ethical principles and frameworks guiding engineers in making morally sound decisions.
3	To identify the standards of professional behavior expected from engineers, including accountability and continuous development.
4	To understand the legal obligations and rights of engineers, encompassing laws, regulations, and intellectual property considerations.

Course Outcomes	
CO1	Explain how engineering solutions affect communities and the environment, emphasizing sustainable and socially responsible practices
CO2	Utilize established ethical theories and codes to analyze and resolve moral dilemmas encountered in engineering scenarios.
CO3	Exhibit understanding of professional standards, manage conflicts of interest, and commit to lifelong learning within the engineering profession.
CO4	Identify and apply relevant laws and regulations affecting engineering practice, including contract law, liability, and intellectual property rights.

Course Competency	
1	Apply ethical theories, professional codes, and decision-making frameworks to real-world engineering dilemmas
2	Demonstrate professional conduct, manage conflicts of interest, and commit to lifelong learning in engineering.
3	Interpret and apply legal principles such as licensing, contracts, torts, and intellectual property in engineering.

CO-PO Articulating Matrix

Programme Outcome and Programme Specific Outcomes											
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	2	2	-	-	3	-	-	-	-	-
CO2	-	-	-	-	-	-	2	2	-	-	-
CO3	-	-	-	-	-	-	3	-	-	2	3
CO4	-	-	-	-	-	2	2	-	-	2	-

Details of Topic	Hours	Mapped CO
UNIT – I: Engineers and Society: Articulate the multifaceted role of engineers within society, evaluate the societal implications of engineering project, and demonstrate an understanding of sustainable practices in engineering.	7	CO1
Unit – II Engineering Ethics and Moral Responsibility: Foundations of Engineering Ethics: Introduction to ethical theories and principles relevant to engineering, Codes of Ethics: Study of professional codes such as those from the NSPE and ASCE, Ethical Decision-Making: Frameworks for resolving ethical dilemmas in engineering contexts, Whistle blowing and Professional Integrity: Understanding the importance of honesty and reporting unethical practices.	7	CO2
Unit – III Professional Responsibility and Conduct: Professionalism in Engineering: Defining the standards and expectations of professional conduct, Accountability and Responsibility: Understanding the engineer's obligation to clients, employers, and the public, Conflict of Interest: Identifying and managing situations where personal interests may conflict with professional duties, Lifelong Learning: Emphasizing the importance of continuous professional development.	8	CO3

Unit – IV Legal Aspects in Engineering Practice; Engineering Laws and Regulations: Overview of laws governing engineering practice, including licensing requirements. Contract Law: Understanding contractual obligations and liabilities in engineering projects. Tort Law and Negligence: Exploring legal consequences of engineering failures and negligence. Intellectual Property Rights: Protecting innovations and respecting intellectual property of others.	8	CO4

SUGGESTED TEXT BOOKS:

1) Ethics in Engineering by Mike W. Martin and Roland Schinzinger Panimalar Institute of Technology.
2) Engineering Ethics by Charles B. Fleddermann Panimalar Institute of Technology.

REFERENCE BOOKS:

1) Professional Responsibility: The Role of the Engineer in Society.
2) Engineering in Society" by the Royal Academy of Engineering Royal Academy of Engineering.

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KDK College of Engineering, Nagpur
B. Tech.
Value Education Course (VEC)

Semester III/IV	Subject Code: 3BVE01T-D/ 4BVE02T-D	Name of Subject: Gender Education		
Total Hours Distribution per week				
Total Credit: 2	Lecture (L): 2 Hrs		Tutorial (T) : --	Practical (P): --
Examination Scheme				
Mid Semester Examination	Continuous Assessment	End Semester Examination	Total Marks	Examination Duration:
15 Marks	10 Marks	25 Marks	50 Marks	2 Hours

Course Objectives	
1	Understand fundamental concepts related to gender and their relevance in engineering contexts.
2	Analyse the social construction of gender and its impact on professional environments.
3	Evaluate gender disparities in various sectors, including education, employment, and technology.
4	Develop strategies to promote gender equity and inclusivity within engineering practices

Course Outcomes	
After completion of syllabus, the student is able to	
CO1	Differentiate between sex and gender, and explain related concepts such as patriarchy, gender roles, and stereotypes.
CO2	Assess the influence of social institutions on gender socialization and discrimination.
CO3	Critically examine gender issues within the Indian societal and educational context.
CO4	Propose and implement inclusive practices to address gender disparities in engineering fields.

Course Competency	
1	Understand diverse gender identities & to analyse biases and stereotypes.
2	Analyse how gender roles and discrimination are socially constructed and perpetuated through various institutions.
3	Examine the formation and reinforcement of gender roles in Indian society and assess legal and civil efforts for gender justice
4	Evaluate the role of education in shaping gender perceptions and propose strategies for inclusive, gender-sensitive pedagogy.

CO-PO Articulating Matrix

Programme Outcomes											
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	2	2	-	2	-	2
CO2	-	-	-	-	-	3	3	-	-	-	2
CO3	-	-	-	-	-	3	2	2	2	-	3
CO4	-	-	-	-	-	2	3	2	3	2	3

SYLLABUS

Details of Topic	Hours	Mapped CO
Unit 1 **Understanding Gender Concepts** Definitions of sex and gender. Key concepts: patriarchy, gender roles, stereotypes, and bias. Introduction to feminist theories: liberal, radical, Marxist, psychoanalytic, socialist.Understanding diversity within gender identities, including LGBTQ+ perspectives.Group discussions on gender perceptions in engineering. Case studies analyzing gender bias in technological developments	7	CO1
Unit 2 **Social Construction of Gende:** Gender socialization processes in family, education, and media. Gender discrimination in social institutions and life events. Concepts of gendered allocation of power and resources. Barriers to gender equity in professional settings, including the "glass ceiling" phenomenon .Role-playing exercises to understand gender dynamics in workplaces. Analysis of media representations of gender roles.	7	CO2
UNIT 3 **Gender in Indian Society** Construction of gender as a social category in Indian society. Reinforcement of gendered identities through institutions like family, religion, caste, and education. Emergence of movements for gender justice and the role of law and civil society. Constitutional provisions for gender equality and their implementation. Research projects on gender-based policies in India. Debates on the effectiveness of legal frameworks in promoting gender equity.	8	CO3
Unit 4 **Gender and Education:** Historical background of social and educational reform movements focusing on women's education. Analysis of gender issues in curriculum and pedagogical processes .Impact of National Curriculum Framework and National Education Policy 2020 on gender inclusivity. Strategies for integrating gender perspectives into engineering education. Curriculum review to identify gender biases. Workshops on developing gender-sensitive teaching materials.	8	CO4

SUGGESTED TEXTBOOKS:-

1) Gender and Development by Janet Momsen.
2) Gender: The Basics By Hilary M Lips

REFERENCE BOOKS:-

1) Ethics in Engineering by Mike W Martin & Roland Schinzinger
2) Human Values and Professional Ethics by R.R. Gour, R Sangal & G.P.Bagaria

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B. Tech.

Value Education Course (VEC)

Semester III/IV	Subject Code: 3BVE01T-E 4BVE02T-E	Name of Subject: Universal Human Values		
Total Hours Distribution per week				
Total Credit: 2	Lecture (L): 2 Hrs		Tutorial (T) : --	Practical (P): --
Examination Scheme				
Mid Sem Examination	**Continuous Assessment**	**End Sem Examination**	**Total Marks**	**Examination Duration:**
15 Marks	10 Marks	25 Marks	50 Marks	2 Hours

Course Objectives	
1	To help students distinguish between values and skills, and understand the need, basic Guidelines, content and process of value education.
2	To help students initiate a process of dialog within themselves to know what they 'really want to be' in their life and profession.
3	To help students understand the meaning of happiness and prosperity for a human being.
4	To facilitate the students to understand harmony at all the levels of human living, and live accordingly.
5	To facilitate the students in applying the understanding of harmony in existence in their profession and lead an ethical life.

Course Outcomes	
After completion of syllabus, the student will be able to	
COI	Understand the significance of value inputs in a classroom and start applying them in their life and profession
COII	Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
COIII	Understand the role of a human being in ensuring harmony in society and nature.
COIV	Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

Course Competency	
1	Apply the concept, purpose, and methods of value education for personal growth and societal well-being.
2	Develop self-awareness and recognize the need for harmony between the Self and the Body.
3	Analyze the foundations of ethical human conduct and identify ways to address social disparities.
4	Apply ethical principles and right understanding to resolve issues in professional life and contribute to sustainable development.

CO-PO Articulating Matrix

Programme Outcome											
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	2	3	2	-	-	2
CO2	-	-	-	-	-	2	2	-	-	-	2
CO3	-	-	-	-	-	3	2	2	2		2
CO4	-	-	-	-	-	3	3	2	2	2	3

Details of Topic	Hours	Mapped CO
Unit – I **Introduction to Value Education** 1. Value Education- Definition, Concept and Need. 2. The Content and Process of Value Education. 3. Basic Guidelines for Value Education. 4. Self-exploration as a means of Value Education. 5. Happiness and Prosperity as parts of Value Education	7	CO1
Unit – II: Harmony in the Human Being 1. Human Being is more than just the Body. 2. Harmony of the Self ('I') with the Body. 3. Understanding Myself as Co-existence of the Self and the Body. 4. Understanding Needs of the Self and the needs of the Body. 5. Understanding the activities in the Self and the activities in the Body.	7	CO2
UNIT-III: **Social Ethics** 1. The Basics for Ethical Human Conduct. 2. Defects in Ethical Human Conduct. 3. Holistic Alternative and Universal Order. 4. Universal Human Order and Ethical Conduct. 5. Human Rights violation and Social Disparities.	8	CO3
Unit – IV **Professional Ethics** 1. Value based Life and Profession. 2. Professional Ethics and Right Understanding. 3. Competence in Professional Ethics. 4. Issues in Professional Ethics – The Current Scenario. 5. Vision for Holistic Technologies, Production System and Management Models.	8	CO4

TEXT BOOKS

1. A.N Tripathy, New Age International Publishers, 2003.
2. Bajpai. B. L ,New Royal Book Co, Lucknow, Reprinted, 2004
3. Bertrand Russell Human Society in Ethics & Politics

REFERENCE BOOKS

1. Gaur. R.R. , Sangal. R, Bagaria. G.P, A Foundation Course in Value Education, Excel Books, 2009.
2. Gaur. R.R. , Sangal. R , Bagaria. G.P, Teachers Manual Excel Books, 2009.
3. I.C. Sharma , Ethical Philosophy of India Nagin & co Julundhar
4. Mortimer. J. Adler, – Whatman has made of man
5. William Lilly Introduction to Ethic Allied Publisher

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K. D. K. College of Engineering, Nagpur
Faculty of Science and Technology
B. Tech. Mechanical Engineering

Semester III	Subject Code: 3BME03P	Name of Subject: Community Engagement Project/Mini Project	
Total Hours Distribution per week			
Total Credit: 2	Lecture (L): --	Tutorial (T) : --	Practical (P): 4 Hrs.

Examination Scheme				
Mid Sem Examination	Continuous Assessment	End Sem Examination	Total Marks	Examination Duration:
--	50 Marks	50 Marks	100 Marks	---

Course Objectives	
1	To acquaint with the process of identifying the needs and converting it into the problem.
2	To familiarize the process of solving the problem in a group.
3	To acquaint with the process of applying basic engineering fundamentals to attempt solutions to the problems.
4	To inculcate the process of self-learning and research.

Course Outcomes	
After completion of syllabus, the student is able to	
1	Identify and convert problems based on societal /research needs.
2	Apply Knowledge and skill to solve societal problems in a group.
3	Develop interpersonal skills to work as a member of a group or leader.
4	Analyse the impact of solutions in societal and environmental context for sustainable development.
5	Demonstrate project management principles during project work.

CO-PO Articulating Matrix:

CO	Program Outcomes & Program Specific Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	3	1	3	3	1	3	2	2	2	2	2
CO2	3	3	2	1	3	3	1	3	2	2	2	2	2

CO3	-	-	-	-	-	-	1	3	2	3	2	2	2
CO4	1	1	1	-	2	2	1	2	2	2	1	2	2
CO5	-	-	-	-	-	-	1	-	-	3	1	2	2

Course Competency	
1	Ability to identify and translate societal or research challenges into actionable projects
2	Apply technical knowledge and teamwork skills to develop solutions for societal problems
3	Demonstrate effective interpersonal and leadership skills within group settings
4	Analyze the societal and environmental impacts of proposed solutions to promote sustainable development
5	Utilize project management principles to plan, execute, and evaluate project work

Mini Project:

- In this case in one semester students' group shall complete project in all aspects including:
  - Identification of need/problem.
  - Prepare a plan of your mini project in the form of Network diagram.
  - Analyse the problem and obtain the multiple solutions.
  - Proposed final solution.
  - Procurement of components/systems.
  - Building prototype and testing.
- Two reviews will be conducted for continuous assessment,
  - First shall be for finalisation of problem and proposed solution
  - Second shall be for implementation and testing of solutions.

Proposed Domain for Mini Project:

Automation, Robotics, Solar Energy, IoT, Software, Mechatronics, AI, Agriculture, related to industry and society.

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K. D. K. College of Engineering, Nagpur
Faculty of Science and Technology
B. Tech. Mechanical Engineering

Semester IV	Subject Code: 4BME01T	Name of Subject: Machines and Mechanisms		
Total Hours Distribution per week				
Total Credit: 3	**Lecture (L): 3 Hrs**	**Tutorial (T) : --**	**Practical (P): --**	
Examination Scheme				
Mid Sem Examination	**Continuous Assessment**	**End Sem Examination**	**Total Marks**	**Examination Duration:**
30 Marks	**20 Marks**	**50 Marks**	**100 Marks**	**3 Hours**

Course Objectives	
1	To understand with principles of machines and mechanisms, emphasizing the analysis and synthesis of simple mechanical systems.
2	To inculcate kinematic analysis and synthesis of mechanism
3	To synthesis cam profile of various cams
4	To contrive new mechanisms and understand gears and gear train

Course Outcomes	
After completion of syllabus, the student is able to	
1	Know various machines and mechanisms and their classification and will be able to select appropriate mechanism
2	Estimating difference between analysis and synthesis and carry out analysis of mechanisms
3	Contrive or synthesize new mechanisms for specific requirements and Perform computer aided analysis of simple mechanisms
4	Construct cam profiles and analyze the follower motion.
5	Analyze Geometry of gear, its types, analysis of motions of gear teeth. Study of gear trains and their applications in various machines

Course Competency	
1	Proficient in identifying, classifying, and selecting appropriate machines and mechanisms for various applications
2	Capable of analyzing and synthesizing mechanisms to meet specific requirements and skilled in performing computer-aided analysis of mechanisms
3	Able to design and analyze cam profiles and follower motions
4	Knowledgeable in the geometry, types, and motion analysis of gears and competent in studying gear trains and their applications in machinery

CO-PO Articulating Matrix:

CO	Program Outcomes & Program Specific Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	3	1	1	-	-	-	-	-	2	2	2
CO2	2	2	2	2	2	2	1	-	-	-	2	2	2
CO3	2	2	2	1	1	3	3	-	-	-	2	2	2
CO4	2	2	2	-	-	2	2	-	-	-	2	2	2
CO5	2	2	2	-	-	2	2	-	-	-	2	2	2

SYLLABUS

Details of Topic	Hours	Mapped with CO
Unit 1 Introduction	8	CO1
Basic concept of kinematics analysis and synthesis, link, kinematics pairs, kinematics chain, mechanism, Difference between machine and mechanism, Inversions, machine, simple & compound chain, Robotic mechanism.		
Degrees of freedom, Estimation of degree of freedom of mechanism by Grubber's criterion and other methods. Harding's notations,		
Classification of four bar chain , Class-I & Class-II, Kutzbach's criteria		
Applications of mechanism in real world.		
Unit 2 Kinematic Analysis	8	CO2
Kinematic analysis of simple mechanisms (Velocity and Acceleration) using Graphical Method.		
Velocity analysis using Instantaneous center of Rotation method, Kennedy's theorem		
Unit 3 Kinematic Synthesis	8	CO3
a. Synthesis of mechanisms using Graphical method		
b. Synthesis of mechanisms using analytical technique. Restricted to synthesis of crank rocker and slider crank mechanism only		
Unit 4 Cams and followers	8	CO4

Types of cams and followers, types of follower motion, velocity and acceleration diagrams, Construction of cam profile.		
Applications of cams in machinery		
Unit 5: Gears and gear trains		
Classification of gears, Types of gears, Spur gears - terminology, conjugate gear tooth action and law of gearing, involute and cycloidal profile , contact ratio, Interference and under cutting, methods of avoiding interference, minimum number of teeth	8	CO5
Various types of Gear Trains and their applications		

Text Books**

1. Theory of Machine, S. S. Rattan, Tata McGraw Hill.
2. Mechanism and Machine Theory, J.S. Rao & Dukki Patti, New Age International (P) Ltd, Publishers
3. Theory of Machines, P L Ballaney, Khanna Publications

References Books**

1. Theory of Machines and Mechanisms, J. E. Shigley and J. J. Uicker, Oxford University Press
2. Advanced Mechanism Design–Analysis and Synthesis, A.G.Erdman and G.N.Sandor, Vol. I and II, Prentice – Hall
4 "Mechanisms and Mechanical Devices Source Book", Neil Sclater, Nicholas P Chrironis, McGraw- Hill
4. Kinematics and Linkage Design, A. S. Hall, Jr., Prentice – Hall
5. Mechanism Synthesis and Analysis, A. H. Soni, McGraw Hill

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K. D. K. College of Engineering, Nagpur
Faculty of Science and Technology
B. Tech. Mechanical Engineering

Semester IV	Subject Code: 4BME01P	Name of Subject: 3D Solid Modeling	
Total Hours Distribution per week			
Total Credit: 1	**Lecture (L): -**	**Tutorial (T) : -**	**Practical (P): 2 Hrs**

Examination Scheme				
Mid Sem Examination	**Continuous Assessment**	**End Sem Examination**	**Total Marks**	**Examination Duration:**
-	25	25	50	

Practical Course Objectives	
1	To understand 2-D and 3-D geometric modeling commands to create 3-D model.
2	To understand the assembly of different components.
3	To understand the production drawing.

Practical Course Outcomes	
After completing the practical course, students will be able to	
1	Use different 2-D commands in sketch mode to create 3-D model and understand different geometric constraints
2	Use 3-D modeling commands to create 3-D model and to create production drawing.
3	Create assembly of different components and animate it.

Course Competency	
1	Efficient in utilizing 2D sketching commands and geometric constraints to develop accurate 3D models
2	Capable of applying 3D modeling commands to create detailed parts and assemblies
3	Skilled in assembling multiple components and animating assemblies to visualize movement and functionality; and able to generate comprehensive production drawings for manufacturing

CO-PO Articulating Matrix:

CO	Program Outcomes & Program Specific Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	-	-	-	3	-	-	-	-	-	3	3	2
CO2	3	-	-	-	3	-	-	-	-	-	3	3	2
CO3	3	-	-	-	3	-	-	-	-	-	3	3	2

LIST OF PRACTICAL:

Pr. No.	List of Practical (Perform any 8 practical out of 10)
1	Introduction to various 3-D modeling software and its applications.
2	2-D geometric modeling commands to create 3-D model
3	Different methods of geometric constraints, adding and editing dimensions
4	3-D geometric modeling commands required to create 3-D model
5	Generation of 3-D model using any software (Practice Model 1)
6	Generation of 3-D model using any software (Practice Model 2)
7	Generation of assembly model using any software (Practice Model 1)
8	Generation of assembly model using any software (Practice Model 2)
9	Generation of production drawing
10	Animation of simple mechanism using any software

Text Books

1. CAD/CAM theory and Practice, Ibrahim Zeid and R. Sivasubramanian, McGraw Hill Education.

References Books

1. Machine Drawing by N. D. Bhat, Charotar Publication

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K. D. K. College of Engineering, Nagpur
Faculty of Science and Technology
B. Tech. Mechanical Engineering

Semester IV	Subject Code: 4BME02T	Name of Subject: Hydraulic Machines	
Total Credit: 3	Lecture (L): 3 Hrs	Tutorial (T) : --	Practical (P): --

Examination Scheme				
Mid Sem Examination	Continuous Assessment	End Sem Examination	Total Marks	Examination Duration:
30 Marks	20 Marks	50 Marks	100 Marks	3 Hours

Course Objectives	
1	To know hydraulic turbines, centrifugal pumps, positive displacement pumps
2	To understand practical applications of fluid; based on momentum and angular momentum principles involved in hydraulic machines.
3	To understand design parameters and performance characteristics of various hydraulic machines & devices.
4	To learn more about power generation by using water
5	To learn more miscellaneous water lifting devices

Course Outcomes	
After completion of syllabus, the student is able to	
1	Classify turbo-machine, components of HEPP, Design of Pelton wheel
2	Design of Francis and Kaplan Turbine, Governing of turbine
3	Design of centrifugal Pumps
4	Design of reciprocating Pumps
5	Evaluate model testing and miscellaneous Water Lifting Device

Course Competency	
1	Proficient in understanding the principles, design, and operational characteristics of hydraulic turbines, centrifugal pumps, and positive displacement pumps
2	Capable of analyzing fluid flow using momentum and angular momentum principles
3	Skilled in evaluating performance parameters of various hydraulic machines and devices
4	Knowledgeable in water-based power generation methods
5	Capable of assessing miscellaneous water lifting devices for practical applications

CO-PO Articulating Matrix:

CO	Program Outcomes & Program Specific Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	2	2	-	-	-	-	-	-	3	3	1
CO2	3	2	2	2	-	-	-	-	-	-	3	3	1
CO3	3	2	2	2	-	-	-	-	-	-	3	3	1
CO4	3	2	2	2	-	-	-	-	-	-	3	3	1
CO5	3	2	2	2	-	-	-	-	-	-	3	3	1

SYLLABUS

Details of Topic	Hours	Mapped with CO
Unit 1: Theory of turbo machines and their classification, Elements of hydro-electric power plant, Impulse Turbine:- principle, constructional features, Installation of Pelton Turbine, Velocity Diagram and Analysis, Working proportions, Design parameters, Governing.	8	CO1
Unit II: **Reaction or pressure Turbine**:- principles of operation, Degree of reaction, comparison over Pelton Turbine, Classification Of Draft tube, Cavitation in Turbine, Francis Turbine, Propeller Turbine, Kaplan Turbine:- Types, Constructional features, Installations, Velocity Diagram and analysis, Working proportions, Design parameters, Governing.	8	CO2
Unit III : Centrifugal pumps:- Principle of operation, Classification, Component of Centrifugal Pump installation, Priming , Fundamental equation, Various heads, Velocity triangles and their analysis, or, Effect of outlet blade angle, Vane shapes, Losses and Efficiencies of pumps, Multi staging of pumps, Design Consideration, Working proportions, N.P.S.H., Cavitations in pumps	8	CO3
Unit IV: Positive Displacement Pumps:- Basic principle, Classification, Reciprocating pump working, Design Main Components, Slip, % slip,	8	CO4

negative slip, Work Done, Indicator Diagram, effect of accleration head and friction head on indicator diagram ,Cavitations, Air vessels, Seperation		
Unit V: Model testing: turbine and pump. **Miscellaneous Water Lifting Device**: - Air lift pumps, Hydraulic Ram, Submersible pump, Regenerative pumps, Gear pump, screw pump, Vane pump	8	CO5

References:

Text Books Recommended:

1. Fluid Mechanics & hydraulic machine– R.K.Rajput, S.Chand Publications
2. Fluid Mechanics & Hydraulic Machines – R. K. Bansal, Laxmi Publications

Reference Books Recommended:

1. Fluid Mechanics with Engineering Applications, E. Finnemore & Franzini, Tata Mc-Graw Hill
2. Hydraulic Machines-Theory and Design, V. P. Vasandani, Khanna Publishers
3. Fluid Mechanics, A. K. Jain, Khanna Publishers
4.. Fluid Mechanics, John F. Douglas, Pearson

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K. D. K. College of Engineering, Nagpur
Faculty of Science and Technology
B. Tech. Mechanical Engineering

Semester IV	Subject Code: 4BME02P	Name of Subject: Hydraulic Machines Lab	
Total Credit: 1	Lecture (L): --	Tutorial (T) : --	Practical (P): 2 Hrs.

Examination Scheme				
Mid Sem Examination	Continuous Assessment	End Sem Examination	Total Marks	Examination Duration:
--	25 Marks	25 Marks	50 Marks	--

Course Outcomes	
After successful completion of this course the student will be able to:	
1	Analyze performance characteristics of Pelton turbine.
2	Analyze performance characteristics of Francis turbine.
3	Analyze performance characteristics of Kaplan turbine.
4	Analyze performance characteristics of Centrifugal pump.
5	Learn and understand of Hydro-electric power plant

Course Competency	
1	Able to experimentally analyze and interpret the performance characteristics of Pelton, Francis, and Kaplan turbines, as well as centrifugal pumps
2	proficient in understanding the operational principles and components of hydro-electric power plants
3	capable of applying laboratory skills to assess the efficiency and functionality of hydraulic machines and power generation systems

CO-PO Articulating Matrix:

CO	Program Outcomes & Program Specific Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	1	-	-	-	-	1	3	1	-	2	2	1
CO2	3	1	-	-	-	-	1	3	1	-	2	2	1
CO3	3	1	-	-	-	-	1	3	1	-	2	2	1
CO4	3	1	-	-	-	-	1	3	1	-	2	2	1
CO5	3	1	-	-	-	-	1	3	1	-	2	2	1

LIST OF PRACTICAL:

Sr. No.	List of Practical (Minimum Eight out of following shall be studies OR performed)
01	To determine the metacentric height of given floating vessel.
02	To verify Bernoulli's theorem.
03	To find the value of co-efficient of Discharge of given venturimeter meter fitted in a pipe.
04	To find the value of co-efficient of Discharge for a given orifice meter.
05	To demonstrate and Performance on Pelton wheel.
06	To demonstrate and Performance on Francis Turbine.
07	To demonstrate on Kaplan Turbine.
08	To demonstrate and Performance on Reciprocating pump.
09	To demonstrate and Performance on Variable speed Centrifugal pump.
10	Visit or prepare report on hydro-electric power plant.

Suggested References:
1.Fluid Mechanics & hydraulic Machines – R.K.Rajput, S.Chand Publications 2. Fluid Mechanics & hydraulic Machines – R. K. Bansal, Laxmi Publications 3.Lab manual

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K. D. K. College of Engineering, Nagpur
Faculty of Science and Technology
B. Tech. Mechanical Engineering
Multi-disciplinary Minor

Semester IV	Subject Code: 4BMEMD02T	Name of Subject: Engineering Materials		
Total Hours Distribution per week				
Total Credits: 2	Lectures (L): 2 Hrs/week	Tutorial (T): --	Practical (P):--	
Examination Scheme				
Mid Sem Examination	Continuous Assessment	End Sem Examination	Total Marks	Examination Duration
15	10	25	50	2 Hrs

Course Objectives	
1	To study classification and properties of Engineering Materials
2	To study various Metals and their Alloys
3	To explore various Non-Metallic Materials
4	To know Material Testing

Course Outcomes	
After completion of syllabus, the student is able to	
1	Discuss classification and various properties of Engineering Materials
2	Identify various Metals and their Alloys
3	Illustrate various Non-Metallic Materials
4	Select and perform Material Testing

Course Competency	
1	Able to classify and evaluate the properties of engineering materials
2	Identify and differentiate various metals and their alloys
3	Understand the characteristics of non-metallic materials
4	Perform material testing to assess suitability for engineering applications

CO-PO Articulating Matrix:

CO	Program Outcomes & Program Specific Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	-	-	-	-	2	-	-	-	-	3	3	2
CO2	3	-	-	-	-	2	-	-	-	-	3	3	2
CO3	3	-	-	-	-	2	-	-	-	-	3	3	2
CO4	3	-	-	-	-	2	-	-	-	-	3	3	2

Syllabus

Details of Topic	Hours	Mapped with CO
Unit I	7	CO1
Introduction of Engineering Materials: Classification of materials: Metals, Ceramics, Polymers, Composites, Semiconductors Properties of materials: Mechanical, Thermal, Electrical, Optical, and Magnetic Concept of materials selection based on application and performance		
Unit II	7	CO2
Metals and Alloys Ferrous metals: Cast iron, Steel (classification and properties) Non-ferrous metals: Aluminium, Copper, Magnesium, Zinc, Titanium Heat treatment of steels Defination, Process and applications		
Unit III	7	CO3
Non-Metallic Materials Polymers: Types (thermoplastics, thermosets), Properties, Applications Ceramics: Structure, Properties, Advantages, Limitations Composite materials: Types (PMC, MMC, CMC), Manufacturing methods, Applications		
Unit IV	7	CO4
Material Testing Mechanical testing: Tensile, Hardness (Brinell, Rockwell, Vickers), Impact (Charpy, Izod), Fatigue, Creep Non-destructive testing (NDT): Visual, Ultrasonic, Radiography, Dye Penetrant, Magnetic Particle testing Sustainability and recyclability of materials		

Text Books**

1. Engineering Materials and Metallurgy, R.S. Khurmi & R.S. Sedha, S. Chand
2. Material Science and Engineering, Dr. K. M. Gupta, Umesh Publications
3. A Textbook of Engineering Materials, M. A. Jayakumar, Lakshmi Publications

Reference Books**

1. Introduction to Physical Metallurgy, Sidney H. Avner, Tata McGraw-Hill
2. Engineering Materials and Metallurgy, Kodgire & Kodgire, Everest Publishing House
3. Materials Science and Engineering: A First Course, V. Raghavan, PHI Learning
4. Essentials of Materials Science and Engineering, Donald R. Askeland, Cengage Learning

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K. D. K. College of Engineering, Nagpur
Faculty of Science and Technology
B. Tech. Mechanical Engineering

Semester -IV	Subject Code: 4BMEMD02T	Name of Subject: Industrial Robotics		
Total Hours Distribution per week				
Total Credit: 2	Lecture (L): 2 Hrs	Tutorial (T) : T	Practical (P): --	
Examination Scheme				
Mid Sem Examination	Continuous Assessment	End Sem Examination	Total Marks	Examination Duration:
15 Marks	10 Marks	25 Marks	50 Marks	2 Hours

Course Objectives	
1	To make the students conversant with Basic concepts, history of robots, various types of Robots.
2	The students will learn about various Components of a Robot & its working.
3	The students will understand the concept of Robot Control Systems, concept of Artificial Intelligence in Robotic
4	To introduce concept of Robot Sensors, robot environment and robot input/output interfaces.
5	The students will understand the concept Robot cell layouts, its structure.

Course Outcomes	
After completion of syllabus, the student is able to	
1	Comprehend the basic Introduction of robots.
2	Know various types of Robots, its components.
3	Perceive the knowledge of Robot Control Systems. Artificial Intelligence in Robotic.
4	Understand the basic knowledge of Robot Sensors.
5	Know concept of Robot cell layouts, its structure.

Course Competency	
After completion of syllabus, the student is able to gain the specific knowledge, skills, and abilities that a student is expected to demonstrate by the end of the course	
1	Student will able to Understand classification of robots.
2	Student will able to Comprehend Components of a Robot & its working,

3	Student will able to Perceive about various robot control system structure & Artificial Intelligence in Robotics.
4	Student will able to Recognize about Robot Sensors, its types, robot environment.
5	Student will able to apply knowledge of robots cell layout, its role in material handling system.

CO-PO Articulating Matrix:

CO	Program Outcomes & Program Specific Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	1	-	-	3	-	-	-	-	-	3	3	1
CO2	3	-	1	-	2	2	-	-	-	-	3	3	2
CO3	3	-	-	-	2	3	-	-	-	-	3	3	2
CO4	2	-	1	-	2	2	-	-	-	-	3	3	1
CO5	2	1	-	-	2	2	-	-	-	-	3	3	1

SYLLABUS

Details of Topic	Hours	Mapped with CO
Unit 1 Basic concepts: - Brief history, Types of Robot–Technology, Robot classifications and specifications, Various manipulators, Sensors, work cell, Programming languages.	8	CO1
Unit 2 Various Components of a Robot & its working, Actuators (DC motors, servo motors, stepper motors),Microcontrollers and Embedded Systems (Arduino, Raspberry Pi),Power Supply Systems	8	CO2
Unit 3 Robot Control Systems, Open-loop vs. Closed-loop Control, ID Controllers (Basic), Sensor Integration and Feedback Systems. **Artificial Intelligence in Robotics (Introduction),** Introduction to Machine Learning and Computer Vision, Path Planning and Obstacle Avoidance, Simultaneous Localization and Mapping (SLAM) – Overview	8	CO3
Unit 4 Robot Sensors: Introduction of robotic sensors, contact type sensors, force, torque, touch, position, velocity sensors, non-contact type sensors, electro-optical imaging sensors, proximity sensors, range imaging sensors, robot environment and robot input/output interfaces, machine intelligence, safety measures in robots.	8	CO4

Unit 5 Robot cell layouts, multiple robots and machine interface, other considerations in work cell design, work cell control, interlocks, error detection and recovery. General considerations in robot material handling, material transfer applications, pick and place operations, machine loading and unloading, plastic molding, forging, machining operations, stamping press operations using robots.	8	CO5

Text Books**

1. R.K.Mittal and I.J.Nagrath, Robotics and Control, Tata McGraw Hill, New Delhi,4th Reprint, 2005.
2. JohnJ.Craig ,Introduction to Robotics Mechanics and Control, Third edition, Pearson Education
3. M.P.Groover, M.Weiss, R.N. Nageland N. G.Odrej, Industrial Robotics, McGraw-Hill Singapore, 1996.

References Books**

1. Ashitava Ghoshal, Robotics-Fundamental Concepts and Analysis', Oxford University Press, Sixth impression, 2010.
2. K. K.Appu Kuttan, Robotics, I K International, 2007.
3. Edwin Wise, Applied Robotics, Cengage Learning, 2003.
4. R.D.Klafter,T.A.Chimielewski and M.Negin, Robotic Engineering–An Integrated Approach, Prentice Hall of India, New Delhi, 1994.
5. B.K.Ghosh, Control in Robotics and Automation: Sensor Based Integration, Allied Publishers,Chennai, 1998.
6. S.Ghoshal, " Embedded Systems & Robotics" – Projects using the 8051 Microcontroller", Cengage Learning

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KDK College of Engineering, Nagpur

B. Tech.

CE/ ME/ EE/ CSE/ IT/ AI&DS/ ETC Engineering

Semester IV	Subject Code: 4BOE02T - A	Name of Subject: Corporate Social Responsibility	
Total Distribution per week			
Total Credit: 2	Lecture (L): 2	Tutorial (T): 0	Practical (P): 0

Examination Scheme				
Continuous Assessment	Mid Semester Examination	End Semester Examination	Total Marks	Examination Duration:
10 Marks	15 Marks	25 Marks	50 Marks	2 Hrs

Course Objectives	
1	To introduce students to the concept, principles, and importance of CSR in business and society.
2	To help students understand ethical, environmental, and social challenges in corporate decision-making.
3	To explore CSR practices in India and globally, including legal and regulatory frameworks.
4	To develop students' ability to plan and evaluate CSR initiatives.

Course Outcomes	
After completion of syllabus, the student will be able to	
1	Define CSR and explain its significance in the modern business environment.
2	Evaluate CSR in different areas and implement the concept of TBL.
3	Analyze legal and ethical dimensions along with the planning and implementation of corporate responsibility.
4	Reflect on their own ethical responsibilities as future professionals and evaluate the CSR strategies and activities of Indian and global companies.

Course Competencies	
1	Understand and apply the concepts, principles, and significance of CSR in business and society.
2	Evaluate CSR initiatives in various domains and analyze their ethical, legal, and environmental implications.
3	Reflect on their personal responsibilities as future professionals and contribute to sustainable and responsible corporate practices locally and globally.

KDK College of Engineering, Nagpur
Faculty of Science and Technology
B. Tech.

CE/ ME/ EE/ CSE/ IT/ AIDS/ ETC Engineering

Semester IV	Subject Code: 4BOE02T - B	Name of Subject: Life Skills	
Total Distribution per week			
Total Credit: 2	Lecture (L): 2	Tutorial (T): 0	Practical (P): 0
Examination Scheme			

Continuous Assessment	Mid Semester Examination	End Semester Examination	Total Marks	Examination Duration:
10 Marks	15 Marks	25 Marks	50 Marks	2 Hrs

Course Objectives	
1	To enable students to understand the significance of self-awareness and life skills.
2	To develop self-awareness, emotional intelligence, and to equip students with skills for stress and time management
3	To understand the importance of decision-making, and critical thinking.
4	To foster leadership skills, interpersonal relationships and teamwork.

Course Outcomes	
After completion of syllabus, the student will be able to	
1	Apply essential life skills for personal and professional development.
2	Develop self-awareness, emotional intelligence, and to equip students with skills for stress and time management
3	Learn and implement the decision-making, and critical thinking.
4	Apply leadership skills, interpersonal relationships and teamwork.

Course Competencies	
1	Understand and apply essential life skills for personal and professional growth.
2	Develop self-awareness, emotional intelligence, and time management for handling stress effectively.
3	Demonstrate sound decision-making, critical thinking, interpersonal relationships, and leadership abilities in real-life and professional situations.

CO_PO Mapping											
	Programme Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	2	3	2	2	2	3
CO2	-	-	-	-	-	2	3	2	2	2	3
CO3	-	2	2	1	-	1	2	1	2	2	3
CO4	-	1	2	-	-	2	2	3	3	3	3

Course Contents		Mapped with CO
Unit I : Introduction to Life Skills and Personal Development	8	CO1
Concept and importance of life skills. Types of life skills as defined by WHO. Role of life skills in personal and professional development, Value education and self-discipline. Life skills vs soft skills vs hard skills		
Unit II : Self-Awareness and Emotional Intelligence	8	CO2
Understanding self: SWOT analysis, Johari Window for self-assessment. Emotional Intelligence: Definition and domains (Goleman's model). Managing emotions and empathy. Stress and time management techniques		
Unit III : Decision-Making and Critical Thinking	8	CO3
Types and styles of decision-making. Problem-solving techniques and frameworks. Critical thinking process and tools (e.g., root cause analysis). Barriers to effective decision-making. Case studies and exercises		
Unit IV Leadership and Teamwork Skills:	8	CO4
Basics of leadership and leadership styles. Team building, group dynamics. Interpersonal relationships in personal and professional life. Conflict resolution and negotiation skills. Communication for effective teamwork		

Text/ Reference Books	
1	Barun K. Mitra, "Personality Development & Soft Skills", Oxford Publishers
2	David. A. Whetten and Kim S. Cameron. Developing Management S&/Is. 8th ed. Pearson
3	Kalyana, "Soft Skill for Managers"; First Edition; Wiley Publishing Ltd.

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KDK College of Engineering, Nagpur
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B. Tech.

CE/ ME/ EE/ CSE/ IT/ AIDS/ ETC Engineering

Semester IV	Subject Code: 4BOE02T - C	Name of Subject: Digital Marketing	
Total Distribution per week			
Total Credit: 2	Lecture (L): 2	Tutorial (T): 0	Practical (P): 0

Examination Scheme				
Continuous Assessment	Mid Semester Examination	End Semester Examination	Total Marks	Examination Duration:
10 Marks	15 Marks	25 Marks	50 Marks	2 Hrs

Course Objectives	
1	To understand the basic concept of Digital Marketing.
2	To comprehend the concept of Online Marketing.
3	To perceive the importance of social media platforms in Digital Marketing.
4	To learn and utilize social media as tools for digital marketing.

Course Outcomes	
After completion of syllabus, the student will be able to	
1	Understand the core concepts of Digital Marketing
2	Summarize the core concepts of Online Marketing.
3	Understand the social media platforms for business.
4	Apply the various tools of digital marketing

Course Competencies	
1	Understand and explain the fundamental concepts of digital and online marketing.
2	Demonstrate the ability to identify and use major social media platforms for business marketing purposes.
3	Apply key digital marketing tools and techniques effectively to develop and manage online marketing strategies.

CO_PO Mapping											
	Programme Outcomes										
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	2	-	-	-	1	-	-	-	2	2
CO2	2	2	-	-	-	1	-	-	-	2	2
CO3	2	2	-	-	-	2	-	-	2	3	2
CO4	2	3	3	-	-	2	-	-	2	3	2

Course Contents	Hours	Mapped with CO
Unit I : Introduction to Digital Marketing:	8	CO1
The Concept, Need & Evolution of Digital Marketing, Reason for growing importance of Digital Marketing in India, Digital Marketing: Types & Examples, Case Study on Digital Marketing		
Unit II : Online Marketing:	8	CO2
The concept of Digital Marketing Mix, 7 P's of Online Marketing: Product, Price, Promotion, Place People, Process, Physical evidence, Methods of Online Marketing promotion, Mobile Marketing & its types, concept of Email marketing, types of emails		
Unit III : Social Media Marketing:	8	CO3
Concept, Types of social media, social media for Business use, Facebook for Business, Developing Facebook Marketing Strategy Facebook Advertising, Instagram for advertisers-Marketing tools and Techniques, Instagram Best Practices Snapchat for Business, Twitter Usage for business, Terminology and Account Security, Advertising on Twitter, Twitter for Marketing, LinkedIn for Business, LinkedIn for Advertising, LinkedIn for Recruiters.		
Unit IV Tools for Digital Marketing:	8	CO4
Overview of Hootsuite: Dashboard and Features, Social Media Listening and Monitoring, Social Media Publishing and Scheduling, Campaign using Mailchimp: Overview of Mailchimp Features and Interface, Building Email Lists and Segmentation, Creating Email Campaigns: Templates and Content Design, Advertising tools: Google Ads, Canva Interface.		

Text Books	
1	Principles and Practice of Management: L. M Prasad, Sultan Chand & Sons educational, New Delhi
2	Principles of Management, Ramaswamy T., Himalaya Publication
3	Essentials of Management, Harold Koontz, O'Donnell and Heinz Weihrich, 2012, New Delhi, 9th edition, Tata McGraw Hill

4	Fundamentals of Management, Stephen P. Robbins, David A. Decenzo, 2016, Pearson Education, 9th Edition
5	Management Today- Principles and Practice / Edition-13th reprint

Reference Books	
1	Management - Text & Cases, Satya Raju, PHI, New Delhi
2	Management Fundamentals: Concepts, Applications, & Skill Development, 6th edition. Sage. 2014
3	Principles Of Management, Richard L. Daft, Cengage Learning, 2009

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KDK College of Engineering, Nagpur

B. Tech.

CE/ ME/ EE/ CSE/ IT/ AI&DS/ ETC Engineering

Semester IV	Subject Code: 4BOE02T - D	Name of Subject: Basic of Mutual Fund	
Total Distribution per week			
Total Credit: 2	Lecture (L): 2	Tutorial (T): 0	Practical (P): 0

Examination Scheme				
Continuous Assessment	Mid Semester Examination	End Semester Examination	Total Marks	Examination Duration:
10 Marks	15 Marks	25 Marks	50 Marks	2 Hrs

Course Objectives	
1	To introduce students to the fundamental concepts, structure, and key terminology of mutual funds.
2	To provide an understanding of various mutual fund types, investment plans, and their suitability for different investor profiles.
3	To equip students with the ability to evaluate mutual fund performance and understand the investment process.
4	To familiarize students with the regulatory environment, tax implications, and emerging trends in mutual fund investment.

Course Outcomes	
	After completion of syllabus, the student will be able to
1	1. Understand the structure, key components, features, and risks of mutual funds along with essential financial terms like NAV, AUM, and Expense Ratio.
2	Identify and compare various types of mutual funds and investment options, assessing their suitability based on different investor goals and profiles.
3	Evaluate mutual fund performance using key indicators (Sharpe Ratio, Alpha, Beta), and apply knowledge of fund selection and investment procedures.
4	Explain the regulatory framework of mutual funds, assess taxation aspects, and recognize current trends such as digital platforms and robo-advisors.

Course Competencies	
1	Understand and explain the structure, types, and objectives of mutual funds.
2	Interpret and analyze mutual fund performance indicators like NAV, risk, and return.
3	Demonstrate and develop the ability to select suitable mutual fund schemes based on investor profiles, financial goals, and regulatory guidelines.

CO_PO Mapping											
	Programme Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 1	3	2	-	-	-	2	-	-	-	2	1
CO 2	2	3	2	-	-	2	-	-	-	2	-
CO 3	2	3	3	-	-	2	-	-	-	3	1
CO 4	1	2	2	-	-	3	-	-	-	3	2

Course Contents		Mapped with CO
Unit I : Fundamentals of Mutual Funds	8	CO1
Expense Ratio Definition, Features, and Benefits of Mutual Funds, Limitations and Risks Associated, Structure of Mutual Funds: Sponsor, AMC, Trustee, Custodian, Key Terms: NAV, AUM, Exit Load, Expense Ratio		
Unit II : Types and Classification of Mutual Funds	8	CO2
Open-ended vs. Close-ended Funds, Types: Equity, Debt, Hybrid, Index Funds, ETFs, Investment Plans: SIP, STP, SWP, Suitability of Different Funds for Investor Profiles		
Unit III : Evaluation and Investment Process	8	CO3
Performance Indicators: Risk & Return, Sharpe Ratio, Alpha, Beta,Understanding Fund Fact Sheets and Ratings (CRISIL, Value Research), How to Invest: Online and Offline Methods, KYC Compliance and Investor Onboarding, Fund Selection Based on Financial Goals, Role of Fund Managers and Fund Houses		
Unit IV: Regulatory Framework, Taxation & Trends	8	CO4
Regulatory Bodies: SEBI and AMFI, Investor Protection Mechanisms and Grievance Redressal, Tax Implications: Capital Gains, Dividends, and ELSS		
Emerging Trends: Direct Plans, Robo-Advisors, Digital Platforms		

Text Books	
1	Mutual Funds in India: Structure, Performance and Regulations" By Amitabh Gupta – Oxford University Press

Reference Books	
1	Guide to Indian Mutual Funds" – CNBC TV18
2	"The Intelligent Investor" – Benjamin Graham (Chapters relevant to fund investing)
3	AMFI Study Material – Mutual Fund Distributors Certification
4	NISM Mutual Fund Foundation Certification Booklet

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KDK College of Engineering, Nagpur
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B. Tech.

CE/ ME/ EE/ CSE/ IT/ AIDS/ ETC Engineering

Semester IV	Subject Code: 4BOE02T - E	Name of Subject: Introduction to Psychology	
Total Distribution per week			
Total Credit: 2	Lecture (L): 2	Tutorial (T): 0	Practical (P): 0

Examination Scheme				
Continuous Assessment	Mid Semester Examination	End Semester Examination	Total Marks	Examination Duration:
10 Marks	15 Marks	25 Marks	50 Marks	2 Hrs

Course Objectives	
1	Introduce the basic concepts and principles of psychology relevant to human behavior.
2	Familiarize students with psychological processes such as perception, learning, and memory.
3	Enhance self-awareness, emotional intelligence, and interpersonal effectiveness.
4	Apply psychological understanding to academic, professional, and everyday contexts.

Course Outcomes	
After completion of syllabus, the student will be able to	
1	Describe the scope, approaches, and applications of psychology.
2	Explain key psychological processes like attention, learning, motivation, and memory.
3	Demonstrate understanding of personality, emotional intelligence, and interpersonal skills.
4	Apply psychological insights to improve academic, professional, and social functioning.

Course Competencies	
1	Understand and explain the fundamental concepts and psychological processes underlying human behavior.
2	Demonstrate awareness of self, emotional intelligence, and interpersonal effectiveness.
3	Apply psychological principles to enhance academic performance, professional development, and personal well-being.

CO_PO Mapping											
	Programme Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	2	-	-	1	-	2
CO2	-	-	-	-	-	1	-	-	1	-	2
CO3	--	-	-	-	-	2	2	2	2	1	2
CO4	-	-	-	-	-	3	2	2	3	2	3

Course Contents		Mapped with CO
Unit I: Introduction to Psychology	8	CO1
Definition, nature, and goals of psychology. History and major schools: Structuralism, Functionalism, Behaviorism, Psychoanalysis, Humanism. Branches of psychology. Relevance of psychology to engineering and technology		
Unit II: Cognitive and Emotional Processes	8	CO2
Sensation and perception, Attention and learning (classical and operant conditioning). Memory and forgetting, Motivation and emotion: theories and types		
Unit III: Personality and Intelligence	8	CO3
Concept and assessment of personality (Freud, Big Five). Emotional intelligence and stress management. Types of intelligence and IQ testing. Self-awareness and self-regulation		
Unit IV: Psychology in Real Life	8	CO4
Application in academics: focus, time management, stress reduction. Group behavior, leadership, and communication. Conflict resolution and interpersonal relationships. Psychology at the workplace: motivation and productivity		

	Text Books
1	"Introduction to Psychology" by Morgan, King, Weisz & Schopler – McGraw Hill
2	"Psychology" by Robert A. Baron – Pearson Education

	Reference Books
1	Understanding Psychology" by Feldman – McGraw Hill
2	Emotional Intelligence" by Daniel Goleman – Bantam Books
3	NPTEL & SWAYAM modules on Psychology (Govt. of India platforms)
4	Psychology: The Science of Behavior" by Carlson & Buskist – Pearson

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KDK College of Engineering, Nagpur

B. Tech.

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Semester IV	Subject Code: 4BOE02T - F	Name of Subject: World Geography & Global Issue	
Total Distribution per week			
Total Credit: 2	Lecture (L): 2	Tutorial (T): 0	Practical (P): 0

Examination Scheme				
Continuous Assessment	Mid Semester Examination	End Semester Examination	Total Marks	Examination Duration:
10 Marks	15 Marks	25 Marks	50 Marks	2 Hrs

Course Objectives	
1	1. Build foundational knowledge of physical and political geography.
2	Enable analysis of the link between geography and global issues.
3	Foster understanding of demographic, environmental, and development challenges.
4	Develop spatial thinking, critical analysis, and global awareness.

Course Outcomes	
After completion of syllabus, the student will be able to	
1	Identify and describe key physical and political features of the world using maps.
2	Explain how geography influences cultural, political, and economic systems.
3	Analyze population trends, urbanization, and environmental issues from a global perspective.
4	Evaluate international policies and treaties addressing global challenges.

Course Competencies	
1	Understand and interpret key physical and political features of the world using spatial tools like maps.
2	Analyze the relationship between geography and global issues such as culture, politics, population, and the environment.
3	Apply geographic knowledge to critically evaluate global challenges and international responses.

CO_PO Mapping											
	Programme Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	2	-	-	-	2	1	2
CO2	-	-	-	-	-	3	2	-	2	1	2
CO3	-	-	-	-	-	3	2	-	2	1	3
CO4	-	-	-	-	-	3	2	-	2	2	3

Course Contents		Mapped with CO
Unit I: Fundamentals of Geography and Mapping	8	CO1
Scope of geography: physical and human, Latitude, longitude, and time zones, World continents, oceans, mountains, rivers, and deserts, Basics of maps, scales, and interpretation		
Unit II: World Regions and Geopolitical Dynamics	8	CO2
Global regional divisions: Asia, Europe, Africa, Americas, Oceania. Climate zones and ecosystems, Natural resource distribution and conflicts Case studies: boundary disputes and political geography		
, Unit III: Population, Migration, and Urban Growth	8	CO3
Demographic indicators and population distribution, Migration trends and causes, Urbanization and challenges of megacities, Sustainable urban development		
Unit IV: Environmental Challenges and Global Governance	8	CO4
Global warming, biodiversity loss, pollution, Natural disasters and risk mitigation, UN Sustainable Development Goals (SDGs), Climate treaties: Paris Agreement, Kyoto Protocol, Role of UN, World Bank, WHO, WTO in global governance		

Text Books	
1	World Regional Geography: Global Patterns, Local Lives – Lydia Mihelic Pulsipher & Alex Pulsipher (Macmillan)
2	Global Issues: An Introduction – John L. Seitz & Kristen A. Hite (Wiley-Blackwell)

Reference Books	
1	Geography of the World – DK Publications
2	Environmental Geography – Savindra Singh
3	Global Problems and the Culture of Capitalism -- Richard H. Robbins
4	World Bank Data Reports – https://data.worldbank.org/
5	United Nations SDG Reports – https://sdgs.un.org/

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KDK College of Engineering, Nagpur
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B. Tech.

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Semester IV	Subject Code: 4BOE02T - G	Name of Subject: Intercultural Communication	
Total Distribution per week			
Total Credit: 2	Lecture (L): 2	Tutorial (T): 0	Practical (P): 0
Examination Scheme			
Continuous Assessment	Mid Semester Examination	End Semester Examination	Total Marks	Examination Duration:
10 Marks	15 Marks	25 Marks	50 Marks	2 Hrs

Course Objectives	
1	To introduce foundational concepts and models of intercultural communication.
2	To explore the influence of cultural values, norms, and dimensions on communication behavior.
3	To develop verbal and non-verbal communication skills for effective cross-cultural interaction.
4	To equip students with strategies for managing intercultural barriers, conflicts, and enhancing global collaboration.

Course Outcomes	
After completion of syllabus, the student will be able to	
1	Define and explain the basic concepts, models, and significance of intercultural communication.
2	Analyze the impact of cultural frameworks and dimensions on communication styles.
3	Demonstrate verbal and non-verbal communication competence in multicultural settings.
4	Identify communication barriers and apply conflict-resolution strategies in diverse cultural contexts.

Course Competencies	
1	Understand and explain key concepts, models, and the role of culture in shaping communication behaviors.
2	Analyze and interpret cultural values, beliefs, and communication patterns across diverse societies.
3	Demonstrate and apply effective verbal and non-verbal communication strategies in multicultural environments.
4	Develop and use conflict resolution and collaboration skills in intercultural and global contexts.

CO_PO Mapping											
	Programme Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	2	3	2	3	-	2
CO2	-	-	-	-	-	3	3	2	3	-	2
CO3	-	-	-	-	-	2	3	2	3	-	2
CO4	-	-	-	-	-	3	3	2	3	-	3

Course Contents		Mapped with CO
Unit I: Fundamentals of Intercultural Communication	8	CO1
Definition and nature of intercultural communication. Importance in a globalized world. Basic models of communication (linear, transactional, interactive). Culture and communication: interdependence. Key terms: ethnocentrism, cultural relativism, stereotype, perception		
Unit II: Cultural Frameworks and Communication Styles	8	CO2
Hofstede's Cultural Dimensions (individualism vs collectivism, power distance, etc.). Edward T. Hall's High-Context vs. Low-Context Cultures. Value orientations and worldviews. Impact of cultural norms and beliefs on verbal communication. Case studies from global business and diplomacy		
Unit III: Verbal and Non-verbal Intercultural Competence	8	CO3
Verbal styles: direct vs. indirect, expressive vs. restrained. Non-verbal cues: kinesics, proxemics, paralanguage, haptics. Listening skills in intercultural contexts. Cross-cultural presentations and meetings. Role plays and practice in multicultural teams		
Unit IV: Barriers, Conflict Management & Global Collaboration	8	CO4
Types of intercultural communication barriers: linguistic, perceptual, attitudinal. Strategies for overcoming anxiety and uncertainty. Conflict resolution approaches across cultures. Building intercultural sensitivity and emotional intelligence. Intercultural competence in teams and organizations		

	Text Books
1	"Intercultural Communication in Contexts" – Judith N. Martin & Thomas K. Nakayama McGraw Hill Education, Latest Edition
2	Intercultural Communication: A Critical Introduction" – Ingrid Piller Edinburgh University Press

	Reference Books
1	Culture and Interpersonal Communication" – William B. Gudykunst & Stella Ting-Toomey
2	"The Culture Map" – Erin Meyer
3	"Bridging the Culture Gap" – Penny Carté & Chris Fox
4	NPTEL Course: Intercultural Communication by IIT Kharagpur

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KDK College of Engineering, Nagpur
B. Tech.
(Ability Enhancement Course AEC-2)

Semester: IV	Subject Code: 4BAE-01T-A	Name of Subject: Introduction to German Language		
Total Hours Distribution per week				
Total Credit: 2	Lecture (L): 2Hrs		Tutorial (T) : --	Practical (P): --
Examination Scheme				
Mid Semester Examination	Continual Assessment	End Semester Examination	Total Marks	Examination Duration:
15	10	25	50	2

Course Objectives	
1	Information about life, Jobs, and Universities in Germany
2	Introduction to German culture

Course Outcomes	
After completion of syllabus, the students will be able to	
CO1	Understand everyday phrases and simple expressions
CO2	Use basic expressions in daily situations
C03	Introduce yourself and other people
CO$	Ask and answer basic questions with confidence

Course Competency	
1	Develop grammatical accuracy and vocabulary for effective sentence construction and verbal expression.
2	Demonstrate effective communication in German language

CO-PO Articulating Matrix

Programme Outcome and Programme Specific Outcomes											
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	-	-	-	-	-	-	-	3	-	3
CO2	1	-	-	-	-	-	-	1	3	-	3
CO3	-	-	-	-	-	-	-	1	3	-	3
CO4	-	-	-	-	2	-	-	-	3	-	3

SYLLABUS

Details of Topic	Hours	Mapped CO
Unit 1: Basic Grammar	6	CO1
The Alphabet		
Colors		
Number		
Family		
Body		
Clothing		
At home		
Food & Beverages		
Animals		
Professions		
Weather		
Leisure Time Activities		
Unit 2: Reading &Listening skills	8	CO2
Emotions & Adjectives		
Countries & Nations		
Means of Transport		
Conjugation Of Regular Verbs		
The Nominative		
Numbers		
Gender Rules		
Plural		
Irregular Verbs		
Formal Salutation		
Unit 3: Speaking & Writing skills	8	CO3
Word Order Of Main Clauses		
Separable And Inseparable Verbs		
Modal Verbs		
Negation		
How To Form Questions		
Conjunctions		
The imperative		
Pronunciation Rules		
How To Introduce Yourself		

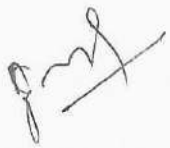
Unit4: Soft Skills	8	CO4
How To Make Appointments		
Using Public Transport		
Looking For Apartments		
Asking For / Giving Directions		
How To Say The Time And Date		
Doctor's Visit		
How To Order Food In A Restaurant		

Text Books:

1. A course in Technical English, Cambridge, K N Shoba, D Praveen Sam.
2. Practical English Usage, Oxford, Michael Swan.
3. English Language and Communication skills for Engineers, Oxford, Sanjay Kuma /Pushp Lata,
4. Writing that Works, Kenneth Roman and & Joe Raphaelson

Reference Books:

1. Raymond Murphy – English Grammar in Use
2. G. Radhakrishna Pillai & K. Rajeevan – English for Employability
3. Meenakshi Raman & Sangeeta Sharma – Technical Communication: Principles and Practice

			June 2025	1.00	Applicable for AY 2025-26 onwards
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B. Tech.

(Ability Enhancement Course AEC-2)

Semester IV	Subject Code: 4BAE02T-B	Name of Subject: Stress Management		
Total Hours Distribution per week				
Total Credit: 2	Lecture (L): 2 Hrs		Tutorial (T) : --	Practical (P): --
Examination Scheme				
Mid Semester Examination	Continuous Assessment	End Semester Examination	Total Marks	Examination Duration:
15 Marks	10 Marks	25 Marks	50 Marks	2 Hours

Course Objectives	
1	To understand the nature and consequences of stress
2	To understand the impact of stress on work
3	To recognize the stressors, Adaptive and Maladaptive behaviour

Course Outcomes	
After completion of syllabus, the student will be able to	
CO1	Understand the cognitive variables of stress
CO2	Learn Managing Work-Life Balance
CO3	Understand role of communication and emotional intelligence, conflict management
CO4	Preparing for better future by reducing the stress using the various techniques

Course Competency	
1	Analyze cognitive and physiological aspects of stress and its effect on performance
2	Develop emotional intelligence and conflict management strategies
3	Promote well-being through lifestyle modifications and preventive practices.

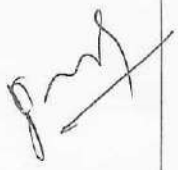
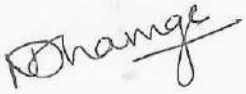
CO-PO Articulating Matrix

Programme Outcome and Programme Specific Outcomes											
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	-	-	-	-	-	-	-	-	1	2
CO2	1	-	-	-	-	-	-	1	-	3	3
CO3	1	-	-	-	-	-	2	3	3	2	2
CO4	-	-	-	-	2	-	-	-	-	1	3

Details of Topic	Hours	Mapped CO
Unit – I **Meaning and nature of stress:** Difference between eustress and distress; Frustration, conflict and pressure; Meaning of stressors; Sources of stress (i) Psychological, Social, Environmental (ii) Academic, Family and Work stress common stressors at work place; Stressors unique to age and gender, stress Response- 'Fight or Flight' Response, Stress warning signals	8	CO1
Unit – II **Cognitive appraisal of stress:** General adaptation to stress; Consequences of stress; Physiological and psychological changes associated with the stress response. Stress and Memory; Stress and Other Cognitive Variables; Stressful environmental conditions on performance.	7	CO2
Unit – III **Stress and Work performance:** Role of communication in managing stress and work performance: Emotional regulation and coping; Emotional intelligence and conflict management: Emotional Basis and Stress; Stress and Conflict in Relationships.	7	CO3
Unit – IV **Strategies of Stress Management and Preparing for future** Coping Mechanisms- Coping Mechanisms: Appraisal focused, Emotional focused and Problem focused. Stress warning signals Care of the Self: Nutrition and Other Lifestyle Issues Stress reduction practices: Time management; Exercise; Relaxation techniques; yoga; meditation.	8	CO4

Suggested Text Books:

1. Baron, L & Feist, J (2000) Health Psychology 4th edition, USA Brooks/Cole
2. Barlow, Rapee, and Perini (2014), 10 Steps to Mastering Stress: A Lifestyle Approach, USA
3. Clayton, M. (2011). Brilliant stress management How to manage stress in any situation's 1st Edition, Great Britain Pearson Education
4. Cooper, C. & Palmer, S. (2000) Conquer Your Stress, London: Institute of personal Development Universities Press.

			June 2025	1.00	Applicable for AY 2025-26 onwards
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KDK College of Engineering, Nagpur
B. Tech.
(Ability Enhancement Course AEC-2)

Semester IV	Subject Code: 4BAE02T-C	Name of Subject: Critical Thinking		
Total Hours Distribution per week				
Total Credit: 2	Lecture (L): 2 Hrs		Tutorial (T) : --	Practical (P): --
Examination Scheme				
Mid Semester Examination	Continuous Assessment	End Semester Examination	Total Marks	Examination Duration:
15 Marks	10 Marks	25 Marks	50 Marks	2 Hours

Course Objectives	
1	Understand and apply fundamental principles of logical reasoning and argumentation.
2	Identify, analyze, and evaluate arguments and evidence in engineering contexts.
3	Develop problem-solving strategies using critical thinking methodologies.
4	Apply critical thinking skills to real-world engineering problems and case studies.

Course Outcomes	
After completion of syllabus, the student is able to	
CO1	Demonstrate the ability to construct and deconstruct arguments effectively.
CO2	Apply logical reasoning to identify and solve engineering problems.
CO3	Evaluate the credibility of sources and the validity of information in engineering scenarios.
CO4	Make informed decisions by integrating critical thinking with technical knowledge.

Course Competency	
1	Understand the core principles of critical thinking, identify elements of reasoning, and recognize logical fallacies and biases in engineering context
2	Apply deductive and inductive reasoning techniques and structured problem-solving frameworks to make logical engineering decisions.
3	Analyze engineering data and reports critically, assess risk and ethical concerns in technical decisions.
4	Integrate critical thinking into engineering design, promote collaboration, and adopt reflective practices for continuous improvement.

CO-PO Articulating Matrix

Programme Outcome											
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	-	2	-	2	2	3
CO2	-	2	-	-	-	-	-	-	-	2	3
CO3	-	-	1	-	-	2	-	-	-	2	2
CO4	-	-	-	2	-	1	-	2	3	3	3

Details of Topic	Hours	Mapped CO
Unit I: **Foundations of Critical Thinking:** Introduction to critical thinking and its importance in engineering. Elements of reasoning: purpose, question, information, interpretation, concepts, assumptions, implications, and point of view. Common logical fallacies and cognitive biases.	8	CO1
Unit II: **Logical Reasoning and Problem Solving:** Deductive and inductive reasoning. Problem-solving frameworks: means-end analysis, root cause analysis. Decision-making models in engineering.	6	CO2
Unit III: **Critical Analysis in Engineering Contexts:** Evaluating technical reports and data. Assessing risk and uncertainty in engineering decisions. Ethical considerations and their impact on engineering solutions.	6	CO3
Unit IV: **Application of Critical Thinking in Engineering Projects:** Integrating critical thinking in the engineering design process. Collaborative problem-solving and communication. Reflective practices for continuous improvement.	8	CO4

SUGGESTED TEXT BOOKS:

1. Critical Thinking: A Student's Introduction, Gregory Bassham, William Irwin, Henry Nardone, James Wallace, Publisher: McGraw-Hill Education
2. Thinking Skills: Critical Thinking and Problem Solving by John Butterworth, Geoff Thwaites, Publisher: Cambridge University Press
3. Critical Thinking and Communication: The Use of Reason in Argument by Edward S. Inch, Barbara Warnick, Publisher: Pearson.

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KDK College of Engineering, Nagpur
B.Tech.
(Ability Enhancement Courses AEC-02)

Semester III/ IV	Subject Code: 4BAE02T-D	Name of Subject: Employability Skills		
Total Hours Distribution per week				
Total Credit: 2	Lecture (L): 2 Hrs		Tutorial (T) : --	Practical (P): --
Examination Scheme				
Mid Semester Examination	Continuous Assessment	End Semester Examination	Total Marks	Examination Duration:
15 Marks	10 Marks	25 Marks	50 Marks	2 Hours

Course Objectives	
1	To develop essential soft skills, including teamwork, leadership, and professional communication.
2	To enhance problem-solving abilities and aptitude skills relevant to engineering contexts.
3	To improve verbal communication, public speaking, and formal writing skills.
4	To prepare students for job interviews, resume writing, and other recruitment processes.

Course Outcomes	
After completion of syllabus, the student is able to	
CO1	Demonstrate effective teamwork and leadership qualities in professional settings.
CO2	Apply analytical and logical reasoning skills to solve complex problems.
CO3	Communicate proficiently in both verbal and written forms, suitable for professional environments.
CO4	Prepare impactful resumes and perform confidently in interviews.

Course Competency	
1	Develop essential soft skills including teamwork, leadership, professional networking, and interview preparation.
2	Apply quantitative, logical, and analytical reasoning techniques to solve aptitude-based problems effectively.
3	Enhance verbal communication, grammar, logical reasoning, and public speaking skills for professional scenarios.
4	Demonstrate proficiency in formal writing, digital communication, and professional etiquette in workplace settings.

CO-PO Articulating Matrix

Programme Outcome and Programme Specific Outcomes											
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	-	-	3	3	3	3
CO2	-	2	-	-	-	-	-	1	1	2	3
CO3	-	-	-	-	-	-	-	-	3	3	2
CO4	-	-	-	-	-	-	-	-	3	2	2

Details of Topic	Hours	Mapped CO
Unit I: **Soft Skills Development:** Teamwork: Importance, dynamics, and effective collaboration, Leadership: Initiating and managing change, problem-solving, and professional networking, Interview Preparation: Resume writing, digital profiles, video resumes, communication skills, and professional etiquette.	7	CO1
Unit II: **Aptitude and Problem-Solving Skills:** Quantitative Aptitude: Arithmetic, algebra, statistics, sequences, and series, Logical Reasoning: Clocks, calendars, cubes, non-verbal reasoning, and symbol-based reasoning, Data Sufficiency and Analysis: Techniques and practice questions, Time Management: Strategies for efficient problem-solving.	8	CO2
Unit III: **Verbal Communication and Public Speaking:** Vocabulary Enhancement: One-word substitutions and precise diction, Grammar and Sentence Improvement: Understanding and applying grammatical rules, Reasoning Skills: Syllogisms, critical reasoning, and logical sentence ordering, Reading Comprehension: Strategies for tackling advanced passages, Public Speaking: Overcoming glossophobia and effective audience engagement.	8	CO3
Unit IV: **Professional Writing and Workplace Communication:** Formal Writing: Email etiquette, job application letters, and professional correspondence, Report Writing: Structuring and presenting technical information, Digital Communication: Crafting effective digital profiles and understanding online professional presence, Workplace Etiquette: Understanding and practicing professional behavior and communication.	7	CO4

SUGGESTED TEXT BOOKS:

1) Employability Skills: Brush up Your Engineering by Clive W. Humphris
2) Soft Skills Training: A Workbook to Develop Skills for Employment by Frederick H. Wentz
3) Employability Skills Manual by Kalamazoo RESA Career & Technical Education.

REFERENCE BOOKS:

1) Life Skills for Engineers IV - Amrita Vishwa Vidyapeetham Amrita Vishwa Vidyapeetham.

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KDK College of Engineering, Nagpur
B.Tech.
(Ability Enhancement Course AEC-2)

Semester: IV	Subject Code: 4BAE-01T-E	Name of Subject: Technical English Writing		
Total Hours Distribution per week				
Total Credit: 2	Lecture (L): 2Hrs		Tutorial (T) : --	Practical (P): --
Examination Scheme				
Mid Semester Examination	Continual Assessment	End Semester Examination	Total Marks	Examination Duration:
15	10	25	50	2

Course Objectives	
1	To enable students to develop foundational grammar proficiency
2	To enhance students' reading comprehension, listening skills and Analytical ability
3	To improve students' spoken and written English skill
4	To cultivate essential workplace soft skills to enhance overall personality and employability.

Course Outcomes	
After completion of syllabus, the students will be able to	
CO1	apply rules of grammar, sentence structure, and vocabulary effectively.
CO2	interpret written texts analytically and demonstrate active listening skills.
CO3	express ideas clearly in spoken and written forms.
CO4	demonstrate professional behavior, conduct formal meetings, deliver effective short presentations.

Course Competency	
1	Develop grammatical accuracy and vocabulary for effective sentence construction and verbal expression.
2	Improve analytical reading and active listening skills for academic and professional comprehension..
3	Demonstrate effective public speaking and technical writing skills, including group discussions and reports..
4	Apply professional etiquette, self-presentation, and communication techniques in workplace scenarios.

CO-PO Articulating Matrix

Programme Outcome and Programme Specific Outcomes											
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	-	-	-	-	-	-	-	3	-	3
CO2	1	-	-	-	-	-	-	1	3	-	3
CO3	-	-	-	-	-	-	-	1	3	-	3
CO4	-	-	-	-	2	-	-	-	3	-	3

SYLLABUS

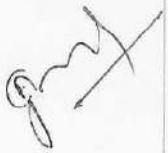
Details of Topic	Hours	Mapped CO
Unit 1: Basic Grammar	6	CO1
Subject -Verb Agreement, Errors in sentences (errors related vocabulary, preposition, pronoun)		
Transformation of sentence (types of sentences tenses, voice, degree, prepositions, articles,)		
Word formation, one word substitute		
Use of Phrases, Idioms & Proverbs (sentence construction)		
Unit 2: Reading &Listening skills		
Reading ability, types of reading, importance of reading	8	CO2
Reading Analytical comprehensions (Activity based)		
Introduction to Listening, Types, Importance, Barriers of listening		
Overcoming barriers of Listening, Audio (Creating Podcast& listening)		
Unit 3: Speaking & Writing skills		
Public Speaking skills, types of speaking., Overcoming stage fear	8	CO3
Techniques of Group Discussion & Interviews (Activity based)		
Techniques of written communication (essay & precis.).		
Features of Technical Writing, Technical Report writing (Accident, Feasibility, Trouble, Progress,) Writing Research papers.		
Unit4: Soft Skills		
Business etiquette, grooming, workplace etiquette,	8	CO4
Self-assertiveness & Personality development		
Meeting & conference: Planning meeting, agenda, minutes, anchoring, report writing		
Short presentation (2-3 mins) on any topic. (Activity based)		

Text Books:

1. A course in Technical English, Cambridge, K N Shoba, D Praveen Sam.
2. Practical English Usage, Oxford, Michael Swan.
3. English Language and Communication skills for Engineers, Oxford, Sanjay Kuma /Pushp Lata.
4. Writing that Works, Kenneth Roman and & Joe Raphaelson

Reference Books:

1. Raymond Murphy – English Grammar in Use
2. G. Radhakrishna Pillai & K. Rajeevan – English for Employability
3. Meenakshi Raman & Sangeeta Sharma – Technical Communication: Principles and Practice

			June 2025	1.00	Applicable for AY 2025-26 onwards
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K. D. K. College of Engineering, Nagpur
Faculty of Science and Technology
B. Tech. Mechanical Engineering
VSEC-II

Semester IV	Subject Code: 4BME03P	Name of Subject: Manufacturing Techniques		
Total Hours Distribution per week				
Total Credits: 2	**Lectures (L): --**	**Tutorial (T): --**	**Practical (P): 4**	
Examination Scheme				
Mid Sem Examination	**Continuous Assessment**	**End Sem Examination**	**Total Marks**	**Examination Duration**
--	50	50	100	--

	Course Objectives
1	To study Pattern Making Tools
2	To study foundry tools
3	To study sand moulding preparation using single piece and split patterns
4	To explore melting and poring of metal in sand mould
5	To do casting inspection

	Course Outcomes
After completion of syllabus, the student is able	
1	To identify and use pattern making tools
2	To identify and use foundry tools
3	To prepare sand mould and cores.
4	To do melting and poring of metal in sand mould
5	To do casting inspection and find defects causes and remedies.

	Course Competency
1	Able to identify, utilize, and operate pattern making and foundry tools
2	proficient in preparing sand molds and cores
3	capable of performing metal melting and pouring processes
4	competent in conducting casting inspections, identifying defects, and implementing remedies to ensure quality castings

CO-PO Articulating Matrix:

CO	Program Outcomes & Program Specific Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	-	-	-	2	-	-	2	-	-	3	3	2
CO2	3	-	-	-	2	-	-	2	-	-	3	3	2
CO3	3	1	1	-	2	-	-	2	-	-	3	3	2
CO4	3	-	-	-	2	-	-	2	-	-	3	3	2
CO5	3	2	-	1	2	-	-	2	-	-	3	3	2

Syllabus

Details of Topic	Mapped with CO
Excercise1	
Study of Pattern Making Tools and Equipment • *Study*: Types and functions of tools like cutting tools, planning tools, chiesels, etc. *Performance*: Identification and demonstration of usage.	CO1
Exercise 2	
Preparation of model (pattern) using Drawing software (AutoCAD,Creo etc.)	CO1
Exercise 3	CO2
Study of Foundry Tools and Equipment • *Study*: Types and functions of tools like rammers, trowels, lifters, etc. • *Performance*: Identification and demonstration of usage.	
Exercise 4	CO3
Preparation of a Green Sand Mould Using a Single Piece Pattern • *Study*: Moulding sand properties, pattern materials, and moulding boxes. • *Performance*: Making a mould using a simple wooden pattern.	
Exercise 5	CO3
Mould Preparation Using a Split Pattern • *Study*: Concept of parting line and core prints. • *Performance*: Moulding process with cope and drag using a split pattern.	
Exercise 6	CO3
Making a Pattern (Wooden or Foam) • *Study*: Pattern materials, allowances, and types. • *Performance*: Fabricating a simple pattern (like a pulley or bush) using basic woodworking tools	
Exercise 7	CO3
Core Making and Core Box Study • *Study*: Core types, materials, and core prints. • *Performance*: Making a simple dry sand core using a core box	
Exercise 8	CO4
Melting and Pouring of Metal in Sand Mould • *Study*: Safety procedures and furnace operations. • *Performance*: Pouring molten metal (aluminum or zinc) into a prepared mould.	
Exercise 9	CO4
Cleaning and Finishing of a Casting • *Study*: Defects in casting and finishing processes.	

• *Performance*: Removing gating system and surface finishing of the cast product.	
Exercise 10	CO5
Study of Casting Defects and Remedies • *Study*: Visual and microscopic analysis of casting defects like blow holes, misruns, and shrinkage. • *Performance*: Identifying and documenting defects in sample castings.	
Exercise 11	
Inspection and Measurement of Cast Components • *Study*: Dimensional tolerances and quality control tools. • *Performance*: Measuring and inspecting dimensions of cast parts using calipers, gauges, etc.	CO5

Text Books**
1. "Foundry Technology" – O.P. Khanna, Dhanpat Rai Publications 2. "Manufacturing Processes" – R.K. Rajput, Laxmi Publications 3. "Production Technology" – R.K. Jain, Khanna Publishers
Reference Books**
1. "A Textbook of Foundry Technology" – M.L. Begeman & A.K. Chakrabarti, Oxford & IBH Publishing Co. Pvt. Ltd. 2. "Workshop Technology (Vol I & II)" – S.K. Hajra Choudhury, A.K. Hajra Choudhury, Media Promoters & Publishers Pvt. Ltd.

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