Kashi Institute of Technology, Varanasi

(An Autonomous Institute of Dr. A.P.J. Abdul Kalam Technical University, Lucknow)

Evaluation Scheme & Syllabus

For

B.Tech. First Year
(Mechanical Engineering)

(Effective from Session: 2024-25)

MS 23KM, Varanasi – Prayagraj (Allahabad) Highway, Mirzamurad Varanasi

Uttar Pradesh – 221307

B.Tech. First Year, Semester-I

[Mechanical Engineering]

S.N.	Course Category	Course Code	Course Title	Type	Periods			FA	SA	Total	Credit
					L	T	P				
1	BSC	BSC101	Applied Mathematics-I	T	3	1	0	70	30	100	4
2	BSC	BSC103	Basics of Computer	T	3	1	0	70	30	100	4
3	PCC-ME	PCCME101	Fundamental of Mechanical Engineering	T	3	1	0	70	30	100	4
4	HSMC	HSMC105	Soft Skill	T	3	0	0	70	30	100	3
5	HSMC	HSMC155	Language Lab	p	0	0	2	70	30	100	1
6	BSC	BSC153	Basic Computer Lab	p	0	0	2	70	30	100	1
7	PCC-ME	PCCME151	Fundamental of Mechanical Engineering Lab	p	0	0	2	70	30	100	1
8	ESC	ESC153	Engineering Drawing Lab	p	0	0	2	70	30	100	1
9	CCA	CCA151	Co-Curricular Activities							100	0.5
10	MC	MCGP101	General Proficiency		0	0	0			100	0.5
Total ->					**12**	**3**	**8**	**560**	**240**	**1000**	**20**

B.Tech. First Year, Semester-II

[Mechanical Engineering]

S.N.	Course Category	Course Code	Course Title	Type	Periods			FA	SA	Total	Credit
					L	T	P				
1	BSC	BSC102	Applied Mathematics-II	T	3	1	0	70	30	100	4
2	ESC	ESC102	Programming in C	T	3	1	0	70	30	100	4
3	PCC-ME	PCCME102	Basic of Mechanics	T	3	1	0	70	30	100	4
4	HSMC	HSMC106	Carrier Development Communication	T	2	0	0	70	30	100	2
5	ESC	ESC154	CAD and Digital Manufacturing	P	0	0	4	70	30	100	2
6	ESC	ESC152	C Programming Lab	p	0	0	2	70	30	100	1
7	PCC-ME	PCCME152	Basic Mechanics Lab	p	0	0	2	70	30	100	1
8	ESC	ESC156	Workshop Lab	p	0	0	2	70	30	100	1
9	CCA	CCA152	Co-Curricular Activities							100	0.5
10	MC	MCGP102	General Proficiency		0	0	0			100	0.5
Total ->					**11**	**3**	**10**	**560**	**240**	**1000**	**20**

FA: Formative Assessment, **SA:** Summative Assessment, **L:** Lecture, **T-** Tutorial, **P:** Practical

Abbreviation Used:

PCC: Professional Core Courses
HSMC: Humanities, Social Science and Management Course
MOOC: Massive Open Online Course

CCA: Co-Curricular Activities
MC: Mandatory Courses
ESC: Engineering Science Courses
BSC: Basic Science Courses

DETAILED SYLLABI
B.Tech 1St Year

- Mechanical Engineering

(Effective from Session: 2024-25)

[B.Tech- Mechanical Engineering]					
Semester : I			**Course Category Code : BSC**		
Course Code	**Course**	**Period / Week**			**Credit**
		L	**T**	**P**	**C**
BSC101	**Applied Mathematics-I**	3	1	0	4
Prerequisite	At the end of this course, the students will be able to:				**Bloom's Level**
Course Outcome	**CO1**	*Understand the concept of Eigen values, Eigen vectors and apply the concept of rank to evaluate linear simultaneous equations.*			K_2, K_5
	CO2	*Remember the concept of differentiation to find successive differentiation, Leibnitz Theorem, and find partial and total derivatives.*			K_1, K_5
	CO3	*Applying the concept of partial differentiation to evaluate extrema, series expansion and Jacobians.*			K_3, K_5
	CO4	*Remember the concept of Beta and Gamma function; analyze area and volume.*			K_1, K_4
	CO5	*Apply the concept of Vector Calculus to analyze and evaluate directional derivative, line, surface and volume integrals.*			K_3, K_4, K_5
UNIT – I	**Matrices**				**Contact Hours : 08**
Rank of matrix by elementary transformation (Echelon and Normal form); Inverse of the matrix by Gauss-Jardon's method; Consistency of linear system of equations (Homogeneous and non homogeneous equation); Eigen values and Eigen vectors; Cayley-Hamilton theorem with application.					**CO1**
UNIT – II	**Differential calculus-I**				**Contact Hours : 08**
Successive Differentiation (nth order derivatives), Leibnitz theorem, Partial derivatives, Euler's Theorem for homogeneous functions and Total derivative.					**CO2**
UNIT – III	**Differential calculus-II**				**Contact Hours : 08**
Expansion of functions by Taylor's and Maclaurin's theorems for functions of one and two variables, Maxima and Minima of functions of several variables, Jacobians.					**CO3**
UNIT – IV	**Multiple integration**				**Contact Hours : 08**
Double integral, Triple integral, Change of order of integration, Change of variables, Beta and Gama function and their properties.					**CO4**
UNIT – V	**Vector calculus**				**Contact Hours : 08**
Gradient, Curl and Divergence and their Physical interpretation, Line, Surface and Volume Integrals, Gauss's, Green's and Stoke's divergence theorems.					**CO5**
Lecture Hours : 30		**Tutorial Hours :10**			**Total : 40**

Reference Books:

1. *E. Kreyszig, Advance Engineering Mathematics, John Wiley & Sons, 2005.*
2. *Veerarajan T., Engineering Mathematics for first year, McGraw-Hill, New Delhi, 2008.*
3. *P. Sivaramakrishna Das and C. Vijayakumari, Engineering Mathematics, 1st Edition, Pearson Education.*

4. *Advanced Engineering Mathematics. Chandrika Prasad, Reena Garg, 2018.*

Text Book:

1 .*Veerarajan T., Engineering Mathematics for first year, McGraw-Hill, New Delhi, 2008.*
2. *Advanced Engineering Mathematics. Chandrika Prasad, Reena Garg, 2018.*
3. *. RK.Jain&SRK.Iyenger,AdvanceEngineeringMathematics,NarosaPublishingHouse2002.*
4. *Shanti Narayan ,A text Book of Matrices,S.Chand & Co.*
5. *N.P.Bali. , A text Book of Engineering Mathematics,N.P.Bali*
6. *H.K.Dass ,Introduction to Engineering Mathematics ,S.Chand & Co.*

Video Content:

Video Links:

Unit-1

https://youtu.be/jLP5Xs8Z8yE?si=Nk9ZxUcOZ6YP-lkU

https://youtu.be/Pgft33DBmUs?si=t0Ah50E49fnY4ZRn

Unit-2

https://youtu.be/1Cl2Pje4noo?si=8ZdDhtllyQowAjYS

https://youtu.be/gx7NQXl4NC0?si=ZgAIWJcyKpBKFqQW

Unit-3

https://youtu.be/AS1UnsPJ8e4?si=PlnSp-IaGrS1c2fC

https://youtu.be/8T7Y_nl8yF8?si=j6_Kz3gAuQwKLbMP

Unit-4

https://youtu.be/dLqKr9F2cbA?si=KgpQby-ipVsT29Lr

https://youtu.be/TccLmZ0GW7g?si=HNIhnsHJWyYi_suM

Unit-5

https://youtu.be/AGX0-tZ5rgQ?si=xoSLJ9A3Le5hayFo

https://youtu.be/WwY50hCSiSc?si=QEJuQXgwssa3VWjO

[B.Tech- Mechanical Engineering]					
Semester : I				**Course Category Code : HSMC**	
Course Code	**Course**		**Period / Week**		**Credit**
		L	**T**	**P**	**C**
HSMC 105	**Basic of Computer**	**3**	**1**	**0**	**4**
Prerequisite	**After completion of course students are able to -**				**Bloom's Level**
Course Outcome	**CO1**	*Identify computer hardware and software.*			K2
	CO2	*Understand the data representation in computers.*			K3, K2
	CO3	*Basic knowledge of computer system and its working.*			K1
	CO4	*Basic knowledge of logical thinking and problem solving.*			K2

UNIT – I		**Contact Hours : 8**
What is Computer, Basic Applications of Computer; Components of Computer System, Central Processing Unit (CPU), VDU, Keyboard and Mouse, Other input/output Devices, Computer Memory, Concepts of Hardware and Software; Concept of Computing, Data and Information; Applications of IECT; Connecting keyboard, mouse, monitor and printer to CPU and checking power supply.		**CO1**
UNIT – II		**Contact Hours : 8**
What is an Operating System; Basics of Popular Operating Systems; The User Interface, Using Mouse; Using right Button of the Mouse and Moving Icons on the screen, Use of Common Icons, Status Bar, Using Menu and Menu-selection, Running an Application, Viewing of File, Folders and Directories, Creating and Renaming of files and folders, Opening and closing of different Windows; Using help; Creating Short cuts, Basics of O.S Setup; Common utilities.		**CO2**
UNIT – III		**Contact Hours : 8**
Basic of Computer networks; LAN, WAN; Concept of Internet; Applications of Internet; connecting to internet; What is ISP; Knowing the Internet; Basics of internet connectivity related troubleshooting, World Wide Web; Web Browsing softwares, Search Engines; Understanding URL; Domain name; IP Address; Using e-governance website.		**CO3**
UNIT – IV		**Contact Hours : 8**
Word Processing Basics; Opening and Closing of documents; Text creation and Manipulation; Formatting of text; Table handling; Spell check, language setting and thesaurus; Printing of word document.		**CO3,CO4**
UNIT - V		**Contact Hours : 8**
Basics of Spreadsheet; Manipulation of cells; Formulas and Functions; Editing of Spread Sheet, printing of Spread Sheet.		**CO4**

Lecture Hours : 30	**Tutorial Hours:10**	**Total : 40**

Reference Books:

1. *Computer Fundamentals by P K Sinha ,publish by BPB publication in 2022.*

Text Books:

1. *BASIC COMPUTER COURSE by Saumya Ranjan behara ,publish by Vasan publications in 2019.*

Video Link:

1. *https://youtu.be/Ojqdty-Oh1M?si=NGR02euwHWsJOSOL*
2. *https://youtu.be/JFF2vJaN0Cw?si=XkbbbHpgkhwGoAuf*
3. *https://youtu.be/GlLRYml8mCY?si=1RNDsl0lQDFTZLx*

[B.Tech- Mechanical Engineering]					
Semester : I			**Course Category Code: PCC-ME**		
Course Code	**Course**		**Period/Week**		**Credit**
		L	**T**	**P**	**C**
PCCME101	**Fundamentals of Mechanical Engineering**	**3**	**1**	**0**	**4**
Prerequisite	*After completion of course students are able to -*				**Bloom's Level**
Course Outcome	**CO1**	*Apply the concept of force resolution and stress and strain to solve basic problems*			K3
	CO2	*Understand the working principle of different measuring instrument and Industrial application.*			K2
	CO3	*Understand the construction details and working of internal combustion engines, electric vehicle and hybrid vehicles.*			K2
	CO4	*Understand fluid properties, conservation laws and hydraulic machinery used in real life.*			K2
	CO5	*Explain the construction detail and working of refrigerator, heat pump and airconditioner.*			K2
UNIT-1					**Contact Hours:8**
Force, moment and couple Resultant of force system- concurrent and non-concurrent coplanar forces, Types of supports (Hinge, Roller) and loads (Point, UDL, UVL), free body diagram, equilibrium equations and Support Reactions. Principle of transmissibility, Varignon's theorem, Normal and shear Stress, strain, Hookes' law, Poisson's ratio, elastic constants and their relationship, stress-strain diagram for ductile and brittle materials, factor of safety.					**CO1**
UNIT-2					**Contact Hours :8**
Introduction, types of measurements, generalized measurement system with examples, static & dynamic characteristics of measurement system, types of Errors, error sources and remedies, Calibration, measurements of pressure (Bourdon Tube Pressure and U-Tube Manometer), temperature (Thermocouple and Optical Pyrometer), mass flow rate (Venturi Meter and Orifice Meter), strain (Bonded and Unbonded Strain Gauge), Concepts of accuracy, precision and resolution.					**CO2**
UNIT-3					**Contact Hours :8**
Basic definition of engine and Components, Construction and Working of Two stroke and four stroke SI & CI engine, merits and demerits, Comparison of Two stroke and Four stroke engines, Electric vehicles and hybrid vehicles: Components of an EV, EV batteries, chargers, drives, transmission and power devices. Advantages and disadvantages of EVs. Hybrid electric vehicles, HEV drive train components, advantages of HV.					**CO3**
UNIT-4					**Contact Hours :8**
Basic Concepts and Properties of Fluids, Buoyancy, Bernoulli's equation and applications, Newtonian and Non-Newtonian fluid, Pascal's Law and Continuity Equation. Working principles of hydraulic turbines (Pelton Wheel and Francis) & pumps (Centrifugal and Reciprocating) and their classifications and hydraulic lift.					**CO4**

UNIT-5		Contact Hours :8
Refrigerating effect, Ton of Refrigeration; Coefficient of performance, methods of refrigeration, construction and working of domestic refrigerator, concept of heat pump. Air-Conditioning meaning and application, humidity, dry bulb, wet bulb, and dew point temperatures, comfort conditions, construction and working of window air conditioner		CO5
Lecture Hours: 30	**Tutorial Hours :10**	**Total : 40**

Reference Books :
1. Basic Mechanical Engineering, G Shanmugam, S Ravindran, McGraw Hill
2. Basic Mechanical Engineering, M P Poonia and S C Sharma, Khanna Publishers
3. Mechatronics : Principles, Concepts and Applications, Nitaigour Mahalik, McGraw Hill
1. Basic Mechanical Engineering, G Shanmugam, S Ravindran, McGraw Hill
2. Basic Mechanical Engineering, M P Poonia and S C Sharma, Khanna Publishers
3. Mechatronics : Principles, Concepts and Applications, Nitaigour Mahalik, McGraw Hill

Text Book :
1. Bansal, A Textbook of Engineering Mechanics, Laxmi Publications.
2. Bhavikatti and Rajashekarappa, "Engineering Mechanics", New Age International (P) Limited Publishers.

Video Lecture:
https://youtu.be/q-CfzNh99sQ?si=I4KdjolFuUZEmUEk

[B.Tech- Mechanical Engineering]					
Semester : I			**Course Category Code: HSMC**		
Course Code	**Course**	**Period/Week**			**Credit**
		L	**T**	**P**	**C**
HSMC105	**Soft Skill**	**3**	**0**	**0**	**3**
Prerequisite	*After completion of course students are able to -*				**Bloom's Level**
Course Outcome	**CO1** *Introduce, converse, show interest, Respond.*				K1
	CO2 *Improve decisions through practical exercises, cases.*				K2
	CO3 *Telephone etiquette, instructions, job discussions, debates.*				K3
	CO4 *Present, write effectively and Give feedback.*				K2& K3
	CO5 *Build leadership, organize and Prepare proposals.*				K1& K4
UNIT-1	**Interactions Level I**				**Contact Hours:8**
Introducing/Meeting New People ,Giving Self Introduction ,Discussing Interests and Small Talks, Talking about Experiences ,Interview Skills					**CO1**
UNIT-2	**Interactions Level II**				**Contact Hours :8**
Mock Interview Practice ,Soft Skills and Hard Skills, Polite Conversation, Showing Interest, Apologizing					**CO2**
UNIT-3	**Interactions Level III**				**Contact Hours :8**
Relationship Building- Article Reading, Talking about Job, Formal Discussion Attending Meeting, Letter Writing, and Email Writing, and Giving Advice.					**CO3**
UNIT-4	**Interactions Level IV**				**Contact Hours :8**
Attending Meeting, Letter Writing, Email Writing, Resume/CV Writing, Texting Messages and giving feedback, Group Discussion Etiquettes, Group Discussion-Practice.					**CO4**
UNIT-5	**Interactions Level V**				**Contact Hours :8**
Giving Presentation, Telephonic Etiquettes and Practice Agreeing and Disagreeing, Exhibiting Ideas Persuading others, Debate Etiquette, Debate Practice					**CO5**
Lecture Hours: 30		**Tutorial Hours :00**			**Total :30**

Reference Books

1. How to Win Friends and Influence People by Dale Carnegie Simon and Schuster, 1936.
2. The Art of Communication by K.C. Verma, Author House, 2011.
3. Business Communication by M. Raman, Oxford University Press.
4. S.Ravindranathan, R. Perumalsamy,S. Shanmugiah, English for Effective Oral Communication. Cambridge University Press, 2015.

Text Book:

1. Soft skills by Dr.K.Alex, S.Chand & Company Ltd.,New Delhi,2009.
2. Effective Technical Communication by Dr. Bharti Kukreja and Dr. Anupama Jain, S.K. Kataria & Sons, New Delhi.
3.Communication Skills-I by Archana Sharma, Dr Ombir Singh and Dr.Gyaneshwar Pratap Singh, Asian Publishers Muzaffarnagar, 2018.

Video Content:

1. *https://www.youtube.com/watch?v=7OQHte1Eifc&list=PL8nHpqzOrbFB6X0NuSUGX495z N4SzBcd6*

[B.Tech- Mechanical Engineering]					
Semester : I			**Course Category Code: HSMC**		
Course Code	**Course**	**Period/Week**			**Credit**
		L	**T**	**P**	**C**
HSMC 155	**LANGUAGE LAB**	**0**	**0**	**2**	**1**
Prerequisite	*At the end of this course, the students will be able to:*				**Bloom's Level**
Course Outcome	**CO1**	*To facilitate software based learning to provide the required English Language proficiency to students.*			K3
	CO2	*To acquaint students with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking*			K2
	CO3	*To train students to use the correct and error-free writing by being well versed in rules of English grammar.*			K2
	CO4	*To cultivate relevant technical style of communication and presentation at their work place and also for academic uses.*			K1

LIST OF EXPERIMENT

1. Group Discussion: Practical based on Accurate and Current Grammatical Patterns.

2. Conversational Skills for Interviews under suitable Professional Communication Lab

3. Communication Skills for Seminars/Conferences/Workshops with emphasis on Paralinguistic.

4. Presentation Skills for Technical Paper/Project Reports/ proposals based on proper Stress and Intonation Mechanics.

5. Official/Public Speaking practice sessions based on suitable Rhythmic Patterns.

6. Theme Presentation/ Keynote Presentation based on correct methodologies of argumentation.

7. Individual Speech Delivery/Conferencing with skills to defend Interjections/Quizzes.

8. Argumentative Skills/Role Play Presentation with Stress and Intonation.

9. Comprehension Skills based on Reading and Listening Practical's on a model Audio.

10. Startup presentations, Video portfolio, Extempore, Role play, Just a Minute (JAM) etc.

Practical Hours: 24	**Tutorial Hours :00**	**Total Hours :24**

Reference Books

1. Word Power Made Easy by Norman Lewis, W.R. Goyal Pub. & Distributors, 2009, Delhi.
2. Manual of Practical Communication by L.U.B. Pandey; A.I.T.B.S. Publications India Ltd.,Krishan Nagar, 2013, Delhi.
3. A Course in Phonetics and Spoken English, Sethi & Dhamija:, Prentice Hall
4. English Pronouncing Dictionary, Joans Daniel, Cambridge University Press, 2007.

Text Book:

1. English Grammar, Composition and Usage by N.K. Agrawal & F.T. Wood, Macmillan India Ltd., New Delhi.
2. Effective Communication Skill, Kulbhusan Kumar, RS Salaria, Khanna Publishing House.
3. English Grammar & Composition by Wren & Martin, S.Chand & Co. Ltd., New Delhi.
4. Communication Skills for Engineers and Scientists, Sangeeta Sharma et.al. PHI Learning Pvt. Ltd, 2011, New Delhi.

Video Content:

https://youtu.be/QLqTYtka2Vg?si=9VCxzFb_h1-OB17g
https://youtu.be/vULoIGxBYA4?si=7L4H1CZIdobGxrKl
https://youtu.be/VczVqHJW0gg?si=Epq8d2jEPmzgy7Ys
https://youtu.be/BguYUJ7cWrs?si=Se3J-dRp_x3bCX43
https://youtu.be/guUOmfq303s?si=SCcNDqXAKmQRbtxU

[B.Tech- Mechanical Engineering]					
Semester: I			**Course Category Code : BSC**		
Course Code	**Course**	**Period/Week**			**Credit**
		L	**T**	**P**	**C**
BSC153	**Basic Computer Lab**	**0**	**0**	**2**	**1**
Prerequisite	*At the end of this course, the students will be able to:-*				
Course Outcome	*CO1*	*Getting the skills and work effectively on computer application.*			
	CO2	*Able to work on office automation tools and can generate report easily.*			
	CO3	*Understand the concept of internet and use of internet effectively.*			
	CO4	*Analyze the Fundamental of DOS and Linux operating system.*			
	CO5	*Understand basics of various OS related concepts, from programmer's point of view, like files, directories, kernel, inodes, APIs, system calls, processes, signals, etc.*			

List of Experiment

1. Working with computer system and identifying peripherals.	**CO1**
2. Working with files and folders.	
3. Create, Edit and Save Documents.	
4. Use of Bullets, Numbering, Page Formatting in a Word Processing.	
5. Use of Image and Save	**CO2**
6. Tables in Documents	
7. Documents Page Layout	
8. Use of mail merge	
9. Create, Open and Edit worksheet.	**CO1**
10. Working with Formula and Functions in Worksheet.	
11. Sort, Filter and Validate Data	
12. Charts for Visual Presentation	
13. Worksheet Printing	**CO3**
14. Slide Presentation	
15. Slide Presentation Using Tables and Charts	
16. Animation Effects to Text and Slides	
17. Audio and Video Files Presentation	**CO2**
18. Configuration of Internet Connection	

[B.Tech- Mechanical Engineering]					
Semester: I			Course Category Code : **PCC-ME**		
			Period/Week		Credit
Course Code	Course		L	T	P	C
PCCME151	**Fundamentals of Mechanical Engineering Lab**		**0**	**0**	**2**	**1**
Prerequisite	*At the end of this course, the students will be able to:-*					
Course Outcome	**CO1**	*Evaluate the velocity and pressure variations in various types of simple flows.*				
	CO2	*Understand the basic principles IC engines and determination of performance parameters of IC Engines.*				
	CO3	*Understand the reactions at the support of simply supported beam*				
	CO4	*Understand the moment of inertia of fly wheel apparatus.*				
	CO5	*Apply the concept of conductive heat transfer.*				

List of Experiment

1. To determine the co-efficient of viscosity of water by capillary flow.

2. Study and working of Two stroke petrol Engine.

3. Study and working of two stroke Diesel Engine.

4. Determination of resultant of parallel force system graphically.

5. Verify Lami's theorem by finding forces in various members of Jib crane.

6. Determine support reactions for simply supported beam.

7. Determine the moment of inertia of fly wheel apparatus.

8. Determine the specific heat coefficient of water.

Practical Hours : 24	**Tutorial Hours : 00**	**Total Hours : 24**

Reference Books:

1. Applied Thermodynamics by Venkanna And Swati, PHI.
2. Fluid Mechanics and Its Applications by V.K. Gupta
3. Heat and Mass Transfer by R Yadav

[B.Tech- Mechanical Engineering]					
Semester : I			**Course Category Code: ESC**		
Course Code	**Course**	**Period/Week**			**Credit**
		L	**T**	**P**	**C**
ESC153	**Engineering Drawing Lab**	0	0	2	1
Prerequisite	*At the end of this course, the students will be able to:*				**Bloom's Level**
Course Outcome	**CO1**	*Use scales and draw projections of objects*			K1
	CO2	*Explain views of solids and their sectional surfaces.*			K2
	CO3	*Analyze and draw isometric projections of objects*			K3
	CO4	*Demonstrate orthographic representation of perspective views using modern tools.*			K3
	CO5	*Apply AutoCAD software for creation of engineering drawing and models*			K2

UNIT-1	**Introduction**	**Contact Hours : 08**
Principles of Engineering Graphics and their significance. Dimensioning, Lettering. Scales: Plain, Diagonal and Engineering Scales. Orthographic Projection, Projection of Point, Projection of Lines: Projection of straight lines; Projection of lines inclined to one plane and both planes.		**CO1**
UNIT-2	**Projections**	**Contact Hours : 08**
Projection of polygonal surface and circular lamina located in first quadrant inclined to one or both reference planes. Classification of solids, Projection of solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.		**CO2**
UNIT-3	**Sections of Solids**	**Contact Hours : 08**
Sections of Solids: Right regular solids and Auxiliary views for the true shape of the sections such as Prism, Cylinder, Pyramid, and Cone. Development of surfaces for various regular solids such as Prism, Cylinder, Pyramid and Cone.		**CO3**
UNIT-4	**Isometric Projection**	**Contact Hours : 08**
Isometric Projection: Isometric scales, Isometric projections of simple and combination of solids. Perspective Projection: Orthographic representation of perspective views — Plane figures and simple solids, Conversion of pictorial view in to orthographic Projection		**CO4**
UNIT-5	**AutoCAD**	**Contact Hours : 08**
Introduction to AutoCAD: Basic commands for 2D drawing: Line, Circle, Polyline, Rectangle, Hatch, Fillet, Chamfer, Trim, Extend, Offset, Dim style, etc. Transformation of Projections: Conversion of Isometric Views to Orthographic Views and Vice-Versa in AutoCAD.		**CO5**

Practical Hours: 24	**Tutorial Hours :00**	**Total : 24**

Reference Books

1. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers.

Text Book:

1. Bhatt N.D., Panchal V.M. & Ingle P.R. (2014), Engineering Drawing, Charotar Publishing House.
2. Agrawal B. & Agrawal C.M. (2012), Engineering Graphics, TMH Publication

Video Content:

1. https://youtu.be/u4Ku-ZABzzo?si=aLaKn2-_SalyP4I4

2. https://youtu.be/e3NEHo8gzs8?si=O2dnLsl8MjheOWWo

3. https://youtu.be/iCLGQNEAs7o?si=DVng7bf4wErCDwaq

DETAILED SYLLABI
B.Tech 1St Year
(Semester –II)

- Mechanical Engineering

(Effective from Session: 2024-25)

[B.Tech- Mechanical Engineering]					
Semester: II				**Course Category Code: BSC**	
Course Code	**Course**	**Period/Week**			**Credit**
		L	**T**	**P**	**C**
BSC102	**Applied Mathematics II**	**3**	**1**	**0**	**4**
Prerequisite	*After completion of course students are able to -*				**Bloom's Level**
Course Outcome	**CO1**	*Remember the concept differentiation to evaluate LDE of nth order with constant coefficient and LDE with variable coefficient of 2nd order.*			K2 & K5
	CO2	*Understand and apply the concept of Laplace Transform to evaluate differential equations*			K1& K5
	CO3	*Understand the concept of convergence to analyze the convergence of series and expansion of the function for Fourier series.*			K3 &K5
	CO4	*Apply the concept of analyticity and Harmonic function*			K1 & K4
	CO5	*Apply the concept of Cauchy Integral theorem, Cauchy Integral formula, singularity and calculus of residue to evaluate integrals*			K3, K4 & K5
UNIT-1	**Ordinary Differential Equation of Higher Order**				**Contact Hours: 8**
Linear differential equation of nth order with constant coefficients, Simultaneous linear differential equations, Second order linear differential equations with variable coefficients, Method of variation of parameters, Cauchy-Euler equation.					**CO1**
UNIT-2	**Laplace Transform**				**Contact Hour : 8**
Laplace transform, Properties of Laplace Transform, Laplace transform of periodic function, Inverse Laplace transform, Convolution theorem.					**CO2**
UNIT-3	**Sequence and Series**				**Contact Hours: 8**
Definition of Sequence and series with examples, Convergence of series, Tests for convergence of series, Ratio test, D' Alembert's test, Raabe's test, Comparison test. Fourier series, Half range Fourier sine and cosine series.					**CO3**
UNIT-4	**Complex Variable–Differentiation**				**Contact Hours: 8**
Functions of complex variable, Analytic functions, Cauchy- Riemann equations (Cartesian and Polar form), Harmonic function, Method to find Analytic functions, Milne's Thompson Method.					**CO4**
UNIT-5	**Complex Variable –Integration**				**Contact Hours: 8**
Complex integration, Cauchy- Integral theorem, Cauchy integral formula, singularities and its classification, zeros of analytic functions, Residues, Cauchy's Residue theorem.					**CO5**
Lecture Hours: 30		**Tutorial Hours :10**			**Total : 40**

Reference Books

1. *E. Kreyszig, Advance Engineering Mathematics, John Wiley & Sons, 2005.*
2. *Peter V. O'Neil, Advance Engineering Mathematics, Thomson (Cengage) Learning, 2007.*
3. *Veerarajan T., Engineering Mathematics for first year, McGraw-Hill, New Delhi, 2008.*
4. *Charles E Roberts Jr, Ordinary Differential Equations, Application, Model and Computing, CRC Press T&F Group*

Text Book:

1. *A text book of Engineering Mathematics by N.P. Bali, University Science Press, New Delhi.*
2. *Introduction to Engineering Mathematics by H K DASS, S Chand And Company Limited, New Delhi.*

Video Content:
https://youtu.be/OET0qwat15o?si=2fje0tet7DxN7U33
https://youtu.be/EDVJotmT584?si=_kvwB2V3OSL6jI8t
https://youtu.be/B-6b28uC0NU?si=D0PQJP7UtFTxYBax
https://www.youtube.com/live/IMIwvd0UGjM?si=oZhMq2CA4PwfuyFL
https://youtu.be/gLXNGl3FsuM?si=X3A6ejxtvm9osL7C

[B.Tech- Mechanical Engineering]					
Semester : II			**Course Category Code : ESC**		
Course Code	**Course**		**Period / Week**		**Credit**
		L	**T**	**P**	**C**
ESC102	**Programming in C**	**3**	**1**	**0**	**4**
Prerequisite	*At the end of this course, the students will be able to:*				**Bloom's Level**
Course Outcome	**CO1**	*Understood the phases of problem solving techniques for simple problems.*			K_2, K_3
	CO2	*Able to write programs using the basic language constructs.*			K_3
	CO3	*Able to build a larger programs using function oriented approaches.*			K_3
	CO4	*Could write efficient programs using advanced concepts to optimize the memory.*			K_2
	CO5	*Could write programs to access data from the secondary storage efficiently.*			K_2, K_3

UNIT – I	**Algorithm Problem Solving**	**Contact Hours :8**
History and Classifications of Computers – Components of Computer – Working Principle of Computer – Hardware – Software and its Types – Applications of Computers. Generations of Programming Languages – Introduction to Number System. Problem solving techniques: Program development life-cycle – Algorithms – building blocks of algorithms - Algorithmic problem solving-Flowchart– Pseudo code		**CO1**

UNIT – II	**Data, Expressions, Statements**	**Contact Hours :8**
Introduction to C –C Program Structure – C Tokens: Keyword, Identifiers, Constants, Variables and Data types (simple and user-defined) – Operators and its types – Operator Precedence – Expression Evaluation – Type Conversion –Managing Input/output operations-Branching Statements – Looping Statements.		**CO2**

UNIT – III	**Arrays and Functions**	**Contact Hours: 8**
Arrays – Two dimensional arrays, Multidimensional arrays. Character arrays.Functions: Function Prototype, Passing Arguments to Function – Call by Value and Call by Reference – Nested function call – Library Functions – User-defined Functions – Recursion.Strings – String I/O functions, String Library functions – Storage classes.		**CO3**

UNIT – IV	**Structures, Unions and Pointers**	**Contact Hours: 8**
Structures – Arrays and structures – Nested structures – Structure as argument to functions–Union. Pointers – Declaration, Initialization and Accessing Pointer variable – Pointers and arrays – pointers as argument and return value – Pointers and strings - Pointers and structures.		**CO4**

UNIT – V	**File Management**	**Contact Hours: 8**
Introduction to File Concepts in C – File types – I/O operations on files – File modes – Random access to files – Command line arguments. Dynamic Memory Allocation: MALLOC, CALLOC, FREE, REALLOC. Introduction to preprocessor: Macro substitution directives – File inclusion directives –Compiler Control directives – Miscellaneous directives.		**CO5**

Lecture Hours : 30	**Tutorials Hours – 10**	**Total : 40**

Reference Books :
1.   *Byron Gottfried & Jitender Chhabra, "Programming with C", Schaum's Outlines Series, 2017.*   2.   *Brian W. Kernighan & Dennis Ritchie. "The C Programming Language", Pearson Education India.*
Text Book:
1.   *Balagurusamy. E, "Programming in ANSI C", Tata McGraw Hill, Seventh Edition, 2017*
Video Content:

1.   *https://youtu.be/irqbmMNs2Bo?si=d9HO8clLvVLuxDxd*
 	
   2.   *https://youtu.be/si-KFFOW2gw?si=Zf3V8klsbEoE_1Rn*
 	
   3.   *https://youtu.be/rLf3jnHxSmU?si=QqZoZo96sF34DwQ8*

[B.Tech- Mechanical Engineering]					
Semester : II			**Course Category Code: PCC-ME**		
Course Code	**Course**	**Period/Week**			**Credit**
		L	**T**	**P**	**C**
PCCME 102	**Basic of Mechanics**	**3**	**1**	**0**	**4**
Prerequisite	*After completion of course students are able to -*				**Bloom's Level**
Course Outcome	**CO1**	*Understand the force systems and application of force equilibrium to various two-dimensional problems.*			K1
	CO2	*Understand the concept of friction & equilibrium condition*			K1
	CO3	*Understand the concept of cetre of gravity & centroid for various crossection.*			K1
	CO4	*Understand the various hoisting machine and industrial application.*			K1
	CO5	*Apply the concepts Kinematics and kinetics motion of bodies*			K3

UNIT-1		**Contact Hours:8**
Review of two-dimensional force systems, free body diagram, equilibrium of force systems, Resolution of a force, resolution of a given force into two components in two assigned direction, determination of resolved parts of a force, significance of the resolved parts of a force, Force - force system, units of force, effect of force, system of forces, pull and push, action and reaction, free body diagram, external force and internal force, tension, representation of a force, principle of transmissibility of forces, principle of superposition of forces.		**CO1**
UNIT-2		**Contact Hours :8**
Frictional force, static, dynamic & limiting friction, normal reaction, angle of repose, coefficient of friction, laws of static friction, laws of kinetic or dynamic friction, advantages of friction , disadvantages of friction. Equilibrium of bodies on level plane, rough horizontal plane, rough inclined plane - equilibrium of a body on a rough inclined plane subjected to a force acting along the inclined plane, equilibrium of a body on a rough inclined plane subjected to a force acting horizontally, equilibrium of a body on a rough inclined plane subjected to a force acting at some angle with the inclined plane.		**CO2**
UNIT-3		**Contact Hours :8**
Introduction, Centre of gravity (C.G), centroid definition, methods for centre of gravity, centre of gravity by moments, centre of gravity by moments, axis of reference, centre of gravity of plane figures, centroid of various crossections, centroids of solid bodies, centre of gravity of symmetrical sections, centre of gravity of unsymmetrical sections, Introduction, calculation of moment of inertia by integration method, theorem of perpendicular axis, theorem of parallel axis, moment of inertia of a rectangular section, a circular section, a hollow circular section, a composite section, a triangular section,		**CO3**
UNIT-4		**Contact Hours :8**
Introduction simple machine, compound machine, simple gear drive, simple gear train, velocity ratio of a simple gear train, velocity ratio, compound gear train, terminology in simple lifting machine- (M.A, V.R. & Efficiency and relation between them), maximum mechanical advantage (max. M.A.), maximum efficiency, wheel and axle, worm and worm wheel, screw jack,		**CO4**

Hoisting machine - pulley and sheave block, chain hoists, cranes, mobile crane, truck mounted crane, tower crane, overhead crane	
UNIT-5	**Contact Hours :8**
Kinematics and kinetics, principles of dynamics- Newton''s laws of motion (first law of motion, second law of motion, third law of motion). Motion of particle acted upon by a constant force, equations of motion, D'' Alembert''s principle, recoil of gun, Work, power, energy - potential energy, kinetic energy. Momentum and Impulse, law of conservation of linear momentum, law of conservation of energy, collision of elastic bodies, Newton''s law of collision of elastic, bodies and coefficient of restitution, direct collision of two bodies, direct impact of a body with a fixed plane,	**CO5**

Lecture Hours: 30	Tutorial Hours :10	Total : 40

Reference Books :

1. Hibbeler, Mechanics of Materials, Pearson education.
2. Pytel, Mechanics of Materials, Cengage learning
3. Mechatronics : Principles, Concepts and Applications, Nitaigour Mahalik, McGraw Hill

Text Books

1. Bansal, A Textbook of Engineering Mechanics, Laxmi Publications.
2. Bhavikatti and Rajashekarappa, "Engineering Mechanics", New Age International (P) Limited Publishers .
3. Gupta S C, Strength of Materials, Pearson Education

Video Link

1. https://youtu.be/nGfVTNfNwnk?si=7rB5HjDILIAjEMeV
2. https://youtu.be/nkg7VNW9UCc?si=yWuWuOVsL0U4U0xu
3. https://youtu.be/aiT5mcuXf5Y?si=8LHLhNI9yDwhjEq_

[B.Tech- Mechanical Engineering]					
Semester : I			**Course Category Code: HSMC**		
Course Code	**Course**	**Period/Week**			**Credit**
		L	**T**	**P**	**C**
HSMC 106	**Career Development Communication**	**2**	**0**	**0**	**2**
Prerequisite	*After completion of course students are able to -*				**Bloom's Level**
Course Outcome	**CO1**	*Explain the concept, effect, Importance and role of communication in career enhancement and develop the strategies to overcome common communication barriers.*			K3
	CO2	*Apply leadership principles to real-world scenarios and Enhance ability to lead teams and manage change.*			K2
	CO3	*Enhance Non-Verbal Communication Skills. Learn body postures during an interview.*			K2
	CO4	*Improve personality, Enhance self awareness, Increase Self confidence.*			K2
	CO5	*Enhance Public speaking skills, improve time management and handle Q&A Sessions.*			K3
UNIT-1	**Introduction of Communication skills for Career Development**				**Contact Hours:8**
Basic Concepts and Importance of Communication skills in Career Development, Nature and Scope of Communication, Barriers to Communication & how to overcome them.					**CO1**
UNIT-2	**Non- Verbal Communication for Career Development**				**Contact Hours :8**
Body Language and Personal Appearance:- Gestures and Postures, Kinesics and Proxemics, Tips for Improving Non Verbal Communication, Self-Grooming.					**CO2**
UNIT-3	**Communication and Leadership Development**				**Contact Hours :8**
Tips for Improving Non Verbal Communication, Self-Grooming. Leadership:-Roles and Qualities of good leaders, Listening in Professional Contexts, Barriers to listening.					**CO3**
UNIT-4	**Personality Development**				**Contact Hours :8**
Personality Analysis, SWOT Analysis, Personality and other factors that contribute towards Career Developmant.					**CO4**
UNIT-5	**Presentation skill**				**Contact Hours :8**
Preparation of PowerPoint presentation, Presentation skills, Seminars and Webinars, Etiquettes & Netiquettes to be followed in:- Personal Interview , Telephonic Interviews, Video conferencing & Seminar.					**CO5**
Lecture Hours: 20		**Tutorial Hours :00**			**Total : 20**

Reference Books :

1. *Effective Communication by John Adair London: Pan Macmillan Ltd., 2003.*
2. *Personality Development and Soft skills by Barun K Mitra , OUP,2012,New Delhi.*
3. *Soft Skills and Employability ,Sabina Pillai and Agna Fernandez Cambridge University Press 2018*

Text Book :

1. *Technical communication by Malti Agrawal,Krishna Prakashan Media(P) Ltd.*
2. *Communication Skill-1 by Archana Sharma, ASIAN Publisher.*
3. *Business Communication by Dr. Vinod Mishra & Dr. Narendra Shukla, SBPD Publishing House.*

Video Content:

1. https://youtu.be/K9sDoqOIl18?si=z50-uqUBzKyXCgzy
2. https://youtu.be/VJ7bw3K-9TA?si=DDbDFbBeldexBDcU
3. https://www.youtube.com/live/NVm-t-zFjqo?si=H5el4P-Xch3Qa-TQ
4. https://youtu.be/1NmSdHP7CRI?si=i1IAu9Ssyn80iXqz

[B.Tech- Mechanical Engineering]					
Semester : II				**Course Category Code: ESC**	
Course Code	**Course**	**Period/Week**			Credit
		L	T	P	C
ECS154	**Cad and Digital Manufacturing Lab**	**0**	**0**	**4**	**2**
Prerequisite	*At the end of this course, the students will be able to:*				**Bloom's Level**
Course Outcome	**CO1**	*Understand and interpret machine manufacturing drawings*			K3
	CO2	*Develop 2D and 3D models using high end modeling software's*			K2
	CO3	*Apply engineering drawing standards as per BIS conventions*			K2
	CO4	*Understand the CNC control in modern manufacturing system*			K1
LIST OF EXPERIMENT					
1. Study of CAD in product design process on Limits, Fits, Basics. 2. Detailing and assembly of flange coupling. 3. Detailing and assembly of universal coupling.					**CO1**
4. Detailing and assembly of Cotter Joint. 5. Detailing and assembly of Knuckle Joint.					**CO2**
6. Study of reverse engineering, additive manufacturing & rapid prototyping 7. Study of CAM Manual part programming & basics. 8. NC code generation for drilling operation.					**CO3**
9. NC code generation for step turning operation. 10. Study of principle and working of 3D printers.					**CO4**
Practical Hours: 24		**Tutorial Hours :00**			**Total : 24**

Reference Books:

1.Pham D T and Dimov S, "Rapid Manufacturing: The Technologies and Applications of Rapid Prototyping", Springer-Verlag, 2001.
2. Ibrahim Zeid and Sivasubramanian R, "CAD/CAM - Theory and Practice", Tata McGraw Hill Education, 2011.

Text Book:

1. Chua C.K., Leong K.F. and Lim C.S., Rapid Prototyping: Principles and Applications, 3rd Edition, World scientific publications, 2014.

Video Content:

1. https://youtu.be/QuR-VKis3jU?si=JU-zuIpILm5j1s35
2. https://youtu.be/wJ80uZVaXqo?si=NCn4F6qPdaf6QOb9
3. https://youtu.be/4xW2Tir_-qY?si=uN4NxiLk5Zkc_SHH

[B.Tech- Mechanical Engineering]					
Semester : II			**Course Category Code: ESC**		
Course Code	**Course**	**Period/Week**			**Credit**
		L	**T**	**P**	**C**
ESC152	**C Programming Lab**	0	0	2	1
Prerequisite	*At the end of this course, the students will be able to:*				**Bloom's Level**
Course Outcome	**CO1**	*Understood the program editing and compilation environment.*			K3
	CO2	*Able to write simple C programs using most frequently used control structures.*			K2
	CO3	*Apply the methods problems using arrays and functions.*			K1
	CO4	*Learnt to handle data processing using structures for simple applications.*			K2
	CO5	*Write programs that could handle file i/o and pointers.*			K4
LIST OF EXPERIMENT					
1. Study of Compilation and execution of simple C programs 2. Basic C Programs, Arithmetic Operations, Area and Circumference of a circ. Swapping with and without Temporary Variables					**CO1**

3. Programs using Branching statements
    a. To check the number as Oddor Even.
    b. Greatest of Three Numbers.
    c. Counting Vowels.
    d. Grading based on Student's Mark.
4. Programs using Control Structures
    e. Computing Factorial of a number
    f. Fibonacci Series generation
    g. Prime Number Checking
Computing Sum of Digit
					CO2

5. Programsusing Arrays
    a. Sum of'n' numbers
    b. Sorting an Array
    c. Matrix Addition, Subtraction, Multiplication and Transpose
6. Programsusing Functions
    d. Computing nCr
    e. Factorial using Recursion
Call by Value and Call by Reference
					CO3

7. Programs using String Operations
    a. Palindrome Checking
    b. Searching and Sorting Names
8. Programs using Structure
    c. Student Information System
    d. Employee PaySlip Generation
Electricity Bill Generation
					CO4

9. Programs using Pointers
    a. Pointe rand Array
    b. Pointers as argument and return value
					CO5

c. Pointer and Structure		
10. Programs using File Operation		
d. Counting No.of Lines,Characters and Black Spaces		
e. Content copy from one file to another		
Reading and Writing Data in File		
Practical Hours: 24	**Tutorial Hours :00**	**Total : 24**

Reference Books

1. *Byron Gottfried & Jitender Chhabra, "Programming with C", Schaum's Outlines Series, 2017.*

2. *Brian W. Kernighan & Dennis Ritchie. "The C Programming Language", Pearson Education India.*

Video Content:

1. *https://youtu.be/irqbmMNs2Bo?si=d9HO8clLvVLuxDxd*
2. *https://youtu.be/si-KFFOW2gw?si=Zf3V8klsbEoE_1Rn*
3. *https://youtu.be/rLf3jnHxSmU?si=QqZoZo96sF34DwQ8*

[B.Tech- Mechanical Engineering]					
Semester: II		**Course Category Code : PCC-ME**			
		Period/Week			**Credit**
Course Code	**Course**	**L**	**T**	**P**	**C**
PCCME 152	**Basic Mechanics Lab**	**0**	**0**	**2**	**1**
Prerequisite	*At the end of this course, the students will be able to:-*				
Course Outcome	**CO1**	Use various engineering materials, tools, machines and measuring equipments.			
	CO2	Perform manufacturing operations on components in fitting and carpentry shop.			
	CO3	Perform operations in welding and gas cutting			
	CO4	Perform operations in moulding & casting			
	CO5	Perform machine operations on lathe			
List of Experiment					

1. To verify the law of Moments using Parallel force apparatus.(simply supported type)

2. To determine the co-efficient of friction between wood and various surface (like Leather, Wood, Aluminum) on an inclined plane.

3. To find the forces in the members of jib Crane.

4. To fine CG and moment of Inertia of an irregular body.

5. To verify the law of moments using Bell-crank lever.

6. Determination of coefficient of friction using coil friction set up.

7. To determine law of machine for differential axle and wheel.

8. Determination of coefficient of friction using inclined plane set up.

Reference Books:

1. Bansal, A Textbook of Engineering Mechanics, Laxmi Publications.
2. Bhavikatti and Rajashekarappa, "Engineering Mechanics"
3. Meriam and Kraige, "Engineering Mechanics

[B.Tech- Mechanical Engineering]					
Semester : II				**Course Category Code: ESC**	
Course Code	**Course**	**Period/Week**			**Credit**
		L	**T**	**P**	**C**
ESC156	**Workshop Lab**	**0**	**0**	**2**	**1**
Prerequisite	At the end of this course, the students will be able to:				**Bloom's Level**
Course Outcome	**CO1**	*Use various engineering materials, tools, machines and measuring equipments.*			K2
	CO2	*Perform manufacturing operations on components in fitting and carpentry shop.*			K1
	CO3	*Perform operations in welding and gas cutting*			K3
	CO4	*Perform operations in mounding & casting*			K1
	CO5	*Perform machine operations on lathe.*			K2
LIST OF EXPERIMENT					
1. Introduction to Mechanical workshop material, tools and machines					**CO1**
2. Perform operations on Lathe - Facing, Plane Turning , step turning, taper turning, threading, knurling and parting.					**CO2**
3. Preparation of U or V -Shape Male Female Work piece which contains: Filing, Sawing, Drilling, Grinding. 4.Mould preparation and Aluminum casting					**CO3**
5. Study of Carpentry Tools, Equipment and different joints & Making of Cross Half lap joint, Half lap Dovetail joint and Mortise Tenon Joint. 6. Introduction to BI standards and reading of welding drawings.					**CO4**
7. Practice of Making following operations Butt Joint Lap Joint TIG Welding MIG Welding 8. Introduction to Patterns, pattern allowances, ingredients of moulding sand and melting furnaces. Foundry tools and their purposes.					**CO5**
Practical Hours: 24		**Tutorial Hours :00**			**Total : 24**
Reference Books :					
Workshop Practice Vol 1, and Vol 2, by HazraChoudhary , Media promoters and Publications *Mechanical Workshop Practice, K C John, PHI .*					
Text Book:					
1. Workshop Practice, H S Bawa, McGraw Hill					
Video Link:					
1. *https://youtu.be/Ft7zxW6Vsls?si=d7Ss5mi4R3WhW3ef* 2. *https://youtu.be/xQc8EdLwqRc?si=O_MTDoJ72c6AMvxp*					