Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Technology and Science

Choice Based Credit System (CBCS) Scheme in light of NEP-2020

B. Tech/B.Tech+MBA in Mechanical Engineering

(2023-2027) Revised Syllabus

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTME105	BEC	FUNDAMENTALS OF MECHANICAL ENGINEERING AND APPLIED MECHANICS	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

The objective of the course is to develop basic knowledge of **(A)** engineering materials **(B)** thermodynamics, I.C. engines & boilers **(C)** Forces and Equilibrium **(D)** centroid & moments of inertia.

Course Outcomes:

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes:

1. Student would be able to understand the need of engineering materials and its properties.
2. Student would be able to understand the basics of thermodynamics and boilers.
3. Student would be able to understand working principle of IC engines.
4. Students will be able to demonstrate various types of forces and their analysis.
5. Students will be able to calculate the centre of gravity and moment of inertia of different geometrical shaped figures.

Syllabus:

UNIT I **(8 Hrs)**

Introduction to Engineering Materials: Introduction, Classification of Engineering Materials, Mechanical properties like strength, hardness, toughness, ductility, brittleness, malleability etc. of materials, Tensile Test-Stress-strain diagram of ductile and brittle materials, Hooks law and modulus of elasticity, Hardness, and Impact testing of materials, BHN etc.

UNIT II **(9 Hrs)**

Thermodynamics: Thermodynamic system, properties, state, process, Zeroth, First and second law of thermodynamics, thermodynamic processes at constant pressure, volume, enthalpy & entropy.

Steam & Boilers: Formation of steam, steam processes, classification and working of boilers, mountings and accessories of boilers, efficiency and performance analysis of boilers, height of chimney.

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UNIT III **(8 Hrs)**

IC Engines: Working principle of IC Engine, Terminology of IC engine, Carnot, Otto, and Diesel cycles P-V & T-S diagrams and its efficiency, working of two stroke & four stroke Petrol & Diesel engines.

Unit - IV **(10 Hrs)**

Forces and Equilibrium: Graphical and Analytical Treatment of Concurrent and non-concurrent, Co- planner forces, free Diagram, Force Diagram and Bow's notations, Types of supports and their reactions. Analysis of plane Trusses: Method of joints, Method of Sections. Frictional forces in equilibrium problems.

UNIT V **(10 Hrs)**

Centre of Gravity and moment of Inertia: Centroid and Centre of Gravity, Moment Inertia of Area and Mass, Radius of Gyration, Introduction to product of Inertia and Principle Axes. Support Reactions, Shear force and bending moment Diagram for Cantilever & simply supported beam with concentrated, distributed load and Couple.

Text and Reference Books:

1. "Basic Mechanical Engineering" by Dr. V. M. Domkundwar and S. S. Bhavikatti, Nirali Prakashan, 2018.
2. "Mechanical Engineering" by R.K. Rajput, S. Chand & Co. Delhi, 2019.
3. "An Introduction to Mechanical Engineering" by Jonathan Wickert and Kemper Lewis, CENGAGE Learning, 2012.
4. "Engineering Mechanics" by Shames and Rao, Pearson Edu(I), 2005.
5. "Engineering Mechanics (Statics & Dynamics)" by R.C. Hibler, Pearson Edu(I), 2015.
6. "A Text book of Applied Mechanics" by R.K. Rajput, Laxmi Pub. 2016.
7. "A Textbook of Engineering Mechanics" by R K Bansal, Laxmi Pub. 2005.

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTME105	BEC	FUNDAMENTALS OF MECHANICAL ENGINEERING AND APPLIED MECHANICS	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

List of Experiments:

1. To perform tensile test, plot the stress- strain diagram and evaluate the tensile property of a given specimen.
2. Study of different IC Engines.
3. Study of various types of Boilers.
4. Study of different types of Boilers Mountings and accessories.
5. Problems relating to centroid of composite areas.
6. Problems on moment of inertia, polar moment of inertia, radius of gyration, polar radius of gyration of composite areas.
7. Problems involving frictional forces.
8. Analysis of simple trusses by method of joints, method of sections & graphical method.
9. Problems on shear force and bending moment diagrams.

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Shri Vaishnav Institute of Science
Department of Physics
Choice Based Credit System (CBCS)
B. Tech. (Common for All branches)

Subject Code	Category	Subject Name	Teaching and Evaluation Scheme								
			Theory			Practical		Th	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment *	End Sem University Exam	Teachers Assessment*				
BTPH101	DC	Applied Physics	60	20	20	30	20	3	1	2	5

Course Objectives	1. To develop the comprehensive understanding of laws of physics. 2. To develop ability to apply laws of physics for various engineering applications. 3. To develop the experimental skills, ability to analyze the data obtained experimentally to reach substantiated conclusions.
Course Outcomes	1. Student will be able to comprehend laws of physics. 2. 2. Student will be able to apply laws of physics for various engineering applications. 3. 3. Student will be able to determine physical parameter experimentally and will be able to analyze the data obtained experimentally to draw substantiate conclusions.

Abbreviation		Teacher Assessment (Theory) shall be based on following components: Quiz / Assignment/ Project / Participation in class (Given that no component shall be exceed 10 Marks).
Th	Theory	
T	Tutorial	Teacher Assessment (Practical) shall be based on following components: Viva / File / Participation in Lab work (Given that no component shall be exceed 50% of Marks).
P	Practical	

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Department of Physics
Choice Based Credit System (CBCS)

BTPH101: Applied Physics

UNIT I: Quantum Physics

Introduction to Quantum hypothesis, Matter wave concept, Wave Group and Particle velocity and their relations, Uncertainty principle with elementary proof and applications to microscope and single slit, Compton Effect, Wave function and its physical significance, Development of time dependent and time independent Schrodinger wave equation, Applications of time independent Schrodinger wave equation.

UNIT II: Solid State Physics

Free electron model, Qualitative Analysis of Kronig Penney Model, Effective mass, Fermi level for Intrinsic and Extrinsic semiconductors, P-N junction diode, Zener diode, Tunnel diode, Photodiode, Solar-cells, Hall Effect, Introduction to Superconductivity, Meissner effect, Type I & II Superconductors.

UNIT III: Nuclear Physics

Nuclear Structure & Properties Nuclear models: Liquid drop with semi-empirical mass formula & shell model. Particle accelerators: Cyclotron, Synchrotron, Betatron. Counters and Detectors: Giger-Muller counters, Bainbridge Mass Spectrograph and Auston Mass Spectrograph.

UNIT VI: Laser & Fiber Optics

Stimulated and Spontaneous Emission, Einstein's A&B Coefficients, Population Inversion, Pumping, Techniques of Pumping, Optical Resonator, Properties and Applications of Laser, Ruby, Nd:Y AG, He-Ne lasers. Introduction to Optical fibre, Acceptance angle and cone, Numerical Aperture, V-Number, Ray theory of propagation through optical fibre, Pulse dispersion, applications of optical fibre.

UNIT V: Wave Optics

Introduction to Interference, Fresnel's Bi-prism, Interference in Thin films, Newton's rings experiment, Michelson's interferometer and its application, Introduction to Diffraction and its Types, Diffraction at single slit, double slit, resolving power, Rayleigh criterion, Resolving power of grating, Concept of polarized light, Double refraction, quarter and halfwave plate, circularly & elliptically polarized light.

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Department of Physics
Choice Based Credit System (CBCS)

BTPH101: Applied Physics

REFERENCES

1. "Engineering Physics", by Dr. S. L. Gupta and Sanjeev Gupta, Dhanpat Rai Publication, New Delhi.
2. "Engineering Physics", by Navneet Gupta, Dhanpat Rai Publication, New Delhi.
3. "Engineering Physics", by H. J Sawant, Technical Publications, Pune, Maharashtra.
4. "Engineering Physics". by MN. Avdhanulu & P. G. Kshirsagar, S. Chand & Co.Edition (2012).
5. "Fundamentals of Physics", by Halliday, Wiley, India.
6. "Concepts of Modern Physics", by Beiser, TMH, New Delhi.
7. "Atomic and Nuclear physics", by Brijlal and Subraminiyan.
8. "LASERSs and Electro Optics". by Christopher C. Davis, Cambridge Univ. Press (1996).
9. "Optoelectronics an Introduction", by J Wilson & JF.B.Hawkes, "" Prentice-Hall II Edition.
10. "LASER theory and applications", by A. K. Ghatak & Tyaga raja n, TMH (1984).

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BTPH101: Applied Physics

List of experiments

1. Measurement of radius of curvature "R" of convex lens by Newton's ring experiment.
2. Measurement of Numerical aperture of fiber by LASER.
3. Determination of Energy band gap .Eg" ofGe using Four Probe method.
4. Measurement of Frequency of A.C. mains by electrically maintained vibrating rod.
5. Measurement of Resolving Power of Telescope.
6. Measurement of "'A" of LASER light source using Diffraction Grating.
7. Determination of Planck's constant by using photocell.
8. Determination of Energy band gap (Eg) using PN Junction Diode.
9. To determine the mass of cane sugar dissolved in water using half shade polarimeter.
10. To study forward and reverse characteristics of Zener diode.
11. To study forward and reverse characteristics of P-N diode.
12. To study characteristics of Photo diode.
13. To study characteristics of LDR.
14. μ and ω of given prism using spectrometer.
15. Measuring height of a given object using Sextant.

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Program Name: Bachelor of Technology

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
		THEORY			PRACTICAL		Th	T	P	CREDITS
		END SEM	MST	Q/A	END SEM	Q/A				
BTMA201N	Mathematics II	60	20	20	-	-	3	1	-	4

Course Objective

To introduce the students to the fundamentals of integral calculus, differential equations, and numerical methods.

Course Outcomes

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

1. *know the fundamental principles of integral calculus;*
2. *apply the techniques of integral calculus to the problems of rectification, volume and surface of revolution of curves;*
3. *construct and solve the differential equations of higher order;*
4. *use the concept of finite differences and interpolation in evaluation of value of functions.*

Course Content:

UNIT – I: Calculus of finite differences: Operators, forward difference operator, backward difference operator, E-operator, relation between them, difference of a polynomial, factorial polynomial, Inverse operator. forward difference table, Backward difference Table.

UNIT – II: Interpolation: Introduction to Interpolation; Interpolation with equally spaced interval, forward and backward interpolation formula, Interpolation with unequally spaced intervals, Newton divided difference interpolation, langrage's formula for interpolation and inverse interpolation.

UNIT – III: Integral calculus: fundamental theorem of integral calculus, length of curves, volume, and surface area of revolution of curves.

UNIT – IV: Evaluation of integrals using gamma function. Multiple integral: Double integral, area by double integral. Evaluation of triple integrals.

UNIT – V: Linear differential equations of n^{th} order: Linear differential equations of n^{th} order, method of variation of parameter and Cauchy's homogenous linear equations.

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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Program Name: Bachelor of Technology

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
		THEORY			PRACTICAL		Th	T	P	CREDITS
		END SEM	MST	Q/A	END SEM	Q/A				
BTMA201N	Mathematics II	60	20	20	-	-	3	1	-	4

Texts:

- T. M. Apostol, Calculus, Volume I, 2nd Ed, Wiley, 1967.
- T. M. Apostol, Calculus, Volume II, 2nd Ed, Wiley, 1969.
- K. E. Atkinson, Numerical Analysis, John Wiley, Low Price Edition (2004).
- S. D. Conte and C. de Boor, Elementary Numerical Analysis - An Algorithmic Approach, McGraw-Hill,2005.
- B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi
- Erwin Kreyszig, Advanced Engineering Mathematics, 10th Ed, John Wiley Publisher.

References:

- J. Stewart, Calculus: Early Transcendentals, 5th Ed, Thomas Learning (Brooks/ Cole), Indian Reprint, 2003.
- J. Stoer and R. Bulirsch, Introduction to Numerical Analysis, 2nd Edition, Texts in Applied Mathematics, Vol. 12, Springer Verlag, 2002.
- J. D. Hoffman, Numerical Methods for Engineers and Scientists, McGraw-Hill, 2001.
- M.K Jain, S.R.K Iyengar and R.K Jain, Numerical methods for scientific and engineering computation (Fourth Edition), New Age International (P) Limited, New Delhi, 2004.
- S. C. Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, McGraw-Hill 2008.

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Choice Based Credit System (CBCS) in the Light of NEP-2020
B.Tech. in Electronics and Instrumentation
(Common to EC/EC-IOT/EE/EX/EI/MX/RA/RA-AI/EC-VLSI)
(2024-2028)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEE207	DCC	Computer System Architecture	60	20	20	30	20	3	1	2	5

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***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course educational objectives (CEOs)

1.To provide fundamental concepts of computer organization and architecture.
2.Analyse the functionality and design of the processor, memory, and input/output systems.
3.Explain the principles of pipelining, parallel processing, and multiprocessor systems.

Course Outcomes (COs)

At the end of the course student will have ability to:
1.Explain the concept of Computer Architecture.
2. Differentiate between different Processor architectures.
3. Explain the memory types, pipelining, multiprocessor and input/output.

Syllabus

UNIT I **8Hrs.**

Introduction to Computer Architectures:

Evolution of Computers, Von Neumann vs. Harvard Architecture, Components of Computer system: CPU, Memory, Input/Output devices, Types of bus, Types of Registers and their functions, Register Transfer Language.

UNIT II **10Hrs.**

Central Processing Unit:

RISC vs. CISC Architectures, Instruction Cycle, Instruction format, Types of instruction, Control Unit: Hardwired and Microprogrammed control unit, Microprogramming and microoperations, ALU: Addition, Subtraction, Multiplication, Division, Shift operations.

UNIT III **8 Hrs.**

Input-Output Organisation:

I/O Interfaces, Synchronous and Asynchronous data transfer, Modes of transfer: Programmed I/O, Interrupt-Initiated I/O, Direct Memory Access (DMA).

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BTEE207	DCC	Computer System Architecture	60	20	20	30	20	3	1	2	5

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UNIT IV **8 Hrs.**

Memory Organisation:

Memory Hierarchy, Main Memory: ROM, RAM, Auxiliary Memory: Magnetic Disks Magnetic Tape, Optical Disk, Cache Memory and Mapping Techniques, Virtual Memory and Paging.

UNIT V **10Hrs.**

Pipelining and Parallel Processing:

Parallel Processing, Pipelining, Arithmetic and Instruction-Level Pipelining, Vector Processing and Array processors, Characteristics of Multiprocessor, Interconnection Structures.

Text Books:

1. M. Morris Mano, "Computer System Architecture", Prentice Hall, 3/e, 2017.
2. John L. Hennessy and David A. Patterson, "Computer Architecture: A Quantitative Approach", Morgan Kaufmann, 6th Edition, 2017.
3. Sarah L. Harris & David Money Harris, "Digital Design and Computer Architecture: ARM Edition", Morgan Kaufmann, 1st Edition, 2015.
4. Charles Fox, "Computer Architecture", No Starch Press, 1st Edition, 2024.

References:

1. Aharon Yadin, "Computer Systems Architecture", Chapman & Hall/CRC, 1st Edition, 2016.
2. Charles Petzold, "Code: The Hidden Language of Computer Hardware and Software", Microsoft Press, 2nd Edition, 2022.

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***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

List of Experiment:

1. Study of 8085 microprocessor architecture.
2. Study of Instruction set of 8085.
3. Write programs to move data between different registers or from memory to registers (and vice versa).
4. Implement addition and subtraction of two 8-bit numbers and then extend it to multi-byte numbers.
5. Write a program to perform AND, OR, XOR, and NOT operations on two 8-bit numbers.
6. Write a program to compare two numbers and jump to different parts of the program based on the result (e.g., if equal, jump).
7. Write a program to increment a value in a register and perform looping to count up to a certain number.
8. Write a program to push data onto the stack and then pop it off, demonstrating basic stack operations.
9. Write a program that handles an interrupt and executes a specific subroutine when the interrupt occurs.
10. Write an assembly program to multiply two 8-bit numbers using repeated addition and bit-shifting.

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B.Tech. in Electronics and Communication
(2021-2025)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC103	AECC	Electronics Workshop	0	0	0	30	20	0	0	2	1

Legends: L - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):
This course will help the student to use and test different types of electronics components, different basic electrical and Electronics instruments used in electrical & electronics circuits and systems.

Course Outcomes (COs):
1. To gain the Knowledge of Various electronics component.
2. Students will understand how to measures / characterize components through measuring instruments.
3. Students will test various electrical and electronics components, and measure circuit parameters.
4. Students will: Learn how to develop and employ circuit models for elementary electronic components

Syllabus

UNIT I
Cables and Switches: Differentiate various Cables, Connectors, Differentiate the various Switches& their usage. Connect and use cables, connectors and switches.
Protective devices: Electrical Protective devices –fuses, relay and MCB

UNIT II
Electrical and Electronics Components: Resistors, capacitors, inductors and transformers.
Integrated circuits and it Packaging Technique. Soldering technique, tools and PCB

UNIT III
Measuring Instruments: Overview of Voltmeter, Ammeter, Multimeter, CRO.

UNIT IV
Electrical Drawing: Wiring diagram and control circuit: point D. C. motor starter, point D.C. motor starter, DOL starter, Star delta starter, Auto Transformer Starter, Rotor resistance starter, Control of lamp from positions.

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COURSE CODE	CATE-GORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC103	AECC	Electronics Workshop	0	0	0	30	20	0	0	2	1

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

UNIT V

Different types of Diodes: P-N Junction diode, Zener diode , Schottky Diode,

List of Experiments:

1. Identify different types of cables & test it.
2. Identify different types of connectors & Discover their application.
3. Identify different types of Switches and discover its usage.
4. Identify different types of fuses & test it.
5. Identify different types of Relays and discover its usage.
6. Identify, find value using colour code chart and test different types of Resistors.
7. Identify, find value and test different types of capacitors.
8. Identify, find value and test different types of Inductors.
9. Connect Resister ,capacitor, inductor in series and parallel circuits
10. Draw front panel control of analog and digital multimeter label it.
11. Demonstrate external controls of CRO & function Generator.
12. Measure amplitude & frequencies of different sine waveform using CRO & Function Generator.
13. Test resistor, capacitor, inductor, P-N junction Diode using CRO & Multimeter.
14. Identify Various IC packages.
15. Identify various SMD components.

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