Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

DEGREE PROGRAM

B. Sc. V Sem

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				
BSPH 502	DC	Thermodynamics	60	20	20	0	0	3	1	0	4

Course Objectives	1. To develop the comprehensive understanding of laws of physics related to Thermodynamics and ability to apply them for laying the foundation for research and development. 2. To work ethically as member as well as leader in a diverse team.
Course Ourcomes	1. Student will be able to understand and solve the problems related to Thermodynamics. 2. Student will be able to determine physical parameter experimentally with optimal usage of resources and complete the assignments in time.

Abbreviation		
Th	Theory	**Teacher Assessment (Theory) shall be based on following components: Quiz / Assignment/ Project / Participation in class (Given that no component shall be exceed 10 Marks).**
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	

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
INDORE (M.P.)

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

BSPH 502: Thermodynamics

UNIT I: Introduction to Thermodynamics Zeroth and First Law of Thermodynamics: Extensive and intensive Thermodynamic Variables, Thermodynamic Equilibrium, Concept of Temperature, Concept of Work & Heat, State Functions, Internal Energy, and Applications of First Law: General Relation between C_P and C_V, Work Done during Isothermal and Adiabatic Processes, Compressibility and Expansion Co-efficient.

UNIT II: Second Law of Thermodynamics: Reversible and Irreversible process with examples. Conversion of Work into Heat and Heat into Work.Heat Engines.Carnot's Cycle, Carnot engine & efficiency, Refrigerator & coefficient of performance, 2nd Law of Thermodynamics: Kelvin-Planck and Clausius Statements and their Equivalence. Carnot's Theorem. Applications of Second Law of Thermodynamics: Thermodynamic Scale of Temperature and its Equivalence to Perfect Gas Scale.

UNIT III: Etropy: Concept of Entropy, Clausius Theorem. Clausius Inequality, Second Law of Thermodynamics in terms of Entropy.Entropy of a perfect gas.Principle of Increase of Entropy, Entropy Changes in Reversible and Irreversible processes with examples, Entropy of the Universe.Entropy Changes in Reversible and Irreversible Processes.Principle of Increase of Entropy, Temperature–Entropy diagrams for Carnot's Cycle. Third Law of Thermodynamics, Unattainability of Absolute Zero

UNIT IV: Thermodynamic Potentials: relation between thermodynamical potential, Internal Energy, Enthalpy, Helmholtz Free Energy, Gibb's Free Energy, Cooling due to adiabatic demagnetization, First and second order Phase Transitions with examples, Clausius Clapeyron Equation and Ehrenfest equations.

UNIT V: Maxwell's Thermodynamic Relations: Derivations and applications of Maxwell's Relations, Maxwell's Relations:(1) ClausiusClapeyron equation, (2) Values of Cp-Cv, (3) TdS Equations, (4) Joule-Kelvin coefficient for Ideal and Van der Waal Gases, (5) Energy equations, (6) Change of Temperature during Adiabatic Process.

References:

1. Heat and Thermodynamics, M.W. Zemansky, Richard Dittman, 1981, McGraw-Hill.
2. A Treatise on Heat, MeghnadSaha, and B.N.Srivastava, 1958, Indian Press
3. Thermal Physics, S. Garg, R. Bansal and Ghosh, 2nd Edition, 1993, Tata McGraw-Hill
4. Modern Thermodynamics with Statistical Mechanics, Carl S. Helrich, 2009, Springer.

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Dr. UTTAM SHARMA
Professor
Department
Shri Vaishnav

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalay
Indore

ShriVaishnavVidyapeethVishwavidyalaya Indore

ShriVaishnav Institute of Computer Applications

Name of Program: B.Sc.(Computer Science)

Subject Code	Category	Subject Name	Teaching & Evaluation Scheme								
			Theory			Practical		L	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teacher Assessment	End Sem University Exam	Teacher Assessment				
BSCS503	Compulsory	Operating System Concepts	60	20	20			3	1	0	4

Course Education Objectives (CEOs):

In this course students should understand how the operating system effectivelymanages system resources.

Course Outcomes (COs):

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

- Understand the types of Operating systems and analyze the process scheduling Algorithms and Case study on processing Scheduling.
- Understand the resource sharing among the processes in the system.
- Understand how to manage the memory during the process execution (Memory Management) and File Management system.

UNIT – I

Introduction: What is an Operating System, Simple Batch Systems, Multiprogrammed Batch Systems, Time-Sharing Systems, Personal-computer systems, Parallel systems, Distributed Systems, Real-Time Systems.

UNIT - II

Processes: Process Concept, Process Scheduling, Operation on Processes

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling.

Process Synchronization: Background, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization

UNIT – III

Memory Management: Background, Logical versus Physical Address space, swapping,Contiguous allocation, Paging, Segmentation.

Virtual Memory: Demand Paging, Page Replacement, Page-replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Other Considerations.

UNIT – IV

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

Device Management: Techniques for Device Management, Dedicated Devices, Shared Devices, Virtual Devices; Input or Output Devices, Storage Devices, Buffering, Secondary-Storage

Structure: Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Reliability.

UNIT – V

Overview of Linux : What is Linux, Linux's, Common Linux Features, advantage of Linux, Overview of Unix and Linux architectures, Linux files system, hardware requirements for Linux, Linux Internals: Introduction, Process management, System Calls.

Linux File system : Logging in, getting familiar with Linux desktop, shell interface, understanding Linux Shell, Types of Text Editors, using vi editor, prompt character, correcting typing errors, simple shell commands-date, cal, who, tty, uname, passwd, bc, script, echo, logging out, Environment variables, wild card characters, *, ?, absolute and relative path, listing files and directories commands, navigating file system- pwd, cd, mkdir, rmdir, ls, pr, Handling ordinary files- cat, cp, mv, wc, rm, comm.., amp, diff, Basic files attributes – file permissions, changing permissions.

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Principles", 7th edition, John Wiley & Sons Inc, 2006.

REFERENCES:

1. William Stallings, "Operating Systems – Operating System: Internals and Design Principles", 6th edition, Prentice Hall, 2005.
2. Andrew S Tanenbaum,"Modern Operating Systems", 3rd edition, Prentice Hall, 2007.

ShriVaishnavVidyapeethVishwavidyalaya Indore

ShriVaishnav Institute of Computer Applications

Name of Program: B.Sc.(Computer Science)

Subject Code	Category	Subject Name	Teaching & Evaluation Scheme								
			Theory			Practical		L	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teacher Assessment	End Sem University Exam	Teacher Assessment				
BSCL507	Compulsory	Operating System Lab using Linux	0	0	0	30	20	0	0	4	2

Course Education Objectives (CEOs):

In this course students should understand how the operating system effectively manages system resources.

Course Outcomes (COs):

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

- Understand the types of Operating systems and analyze the process scheduling Algorithms and Case study on processing Scheduling.
- Understand the resource sharing among the processes in the system.
- Understand how to manage the memory during the process execution (Memory Management) and File Management system.

List of Experiments:

1. Study how to log in and get familiar with linux desktop.
2. Understand linux shell.
3. Study different types of text editors.
4. Study how to use vi editor.
5. Study how to correct typing errors.
6. Study simple shell commands like date, cal, who, tty, uname, passwd. bc.
7. Study the use of commands pwd, cd, mkdir, rmdir, ls, pr.
8. Study how to use commands cat, cp, mv, wc, rm.

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Principles”, 7th edition, John Wiley & Sons Inc, 2006.

REFERENCES:

1. William Stallings, “Operating Systems – Operating System: Internals and Design Principles”, 6th edition, Prentice Hall, 2005.
2. Andrew S Tanenbaum,”Modern Operating Systems”, 3rd edition, Prentice Hall, 2007.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of the Program: B. Sc. (Plain)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSMA 504	DC	**Numerical Methods & Linear Programming**	60	20	20	-	-	3	1	-	4

Course Objective

To introduce the students with the Fundamentals of the Numerical Methods & Linear Programming.

Course Outcomes

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

1. *understand and solve problems of the straight lines in 3D.*
2. *solve the problems of the planes.*
3. *know the solution of the problems of the spheres.*
4. *understand and apply the concepts of the algebra of the Right circular cone.*

Course Content:

UNIT – I

Approximate numbers, Significant figures, Rounding off numbers. Error – Absolute, Relative and Percentage. **Operators** - Δ , ∇ and E (Definitions and some relations among them).**Interpolation :** The problem of Interpolation, Equispaced arguments – Difference Tables, Deduction of Newton's Forward Interpolation Formula. Remainder term (expression only). Newton's Backward Interpolation formula (statement only) with remainder term. Unequally – spaced arguments –Lagrange's Interpolation Formula (statement only). Numerical problems on Interpolation with both equi- and unequally-spaced arguments.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of the Program: B. Sc. (Plain)

UNIT – II

Number Integration: Trapezoidal and Simpson's ⅓rd formula (statement only). Problems on Numerical Integration. **Numerical Solution of Equation:** To find a real root of an algebraic or transcendental equation. Location of root (Tabular method), Bisection method. Newton-Raphson method with geometrical significance. Numerical problems.

UNIT – III

Linear Programming: Motivation of Linear Programming problem. Statement of L.P.P. formulation of L.P.P. Slack and Surplus variables. L.P.P. is matrix form. Convex set, Hyperplane, Extreme points, Convex Polyhedron, Basic solutions and Basic Feasible Solutions (B.F.S.) Degenerate and Non-degenerate B.F.S. The set of all feasible solutions of an L.P.P. is a convex set. The objective function of an L.P.P. assumes its optimal value at an extreme point of the convex set of feasible solutions. A B.F.S. to an L.P.P. corresponds to an extreme point of the convex set of feasible solutions.

UNIT – IV

Fundamental Theorem of L.P.P. (Statement only). Reduction of a feasible solution to a B.F.S. Standard form of an L.P.P. Solution by graphical method (for two variables), by simplex method and method of penalty. Concept of duality. Duality theory. The dual of the dual is the primal. Relation between the objective values of dual and the primal problems. Dual problems with at most one unrestricted variable, one constraint of equality.

UNIT – V

Transportation and Assignment problems and their optimal solutions.

Texts:

1. Numerical methods – E. Balagurusamy (Tata McGraw Hill).
2. Introduction to numerical analysis – F. B. Hilderbrand (TMH Edition).
3. Numerical Analysis – J. Scarborough.
4. Introduction to numerical analysis – Carl Erik Froberg (Addison Wesley Publishing).
5. Numerical methods for science and engineering – R. G. Stanton (Prentice Hall).
6. Linear Programming : Method and Application – S. I. Gass.
7. Linear Programming – G. Hadley.

8. An Introduction to Linear Programming & Theory of Games – S. Vajda.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of the Program: B. Sc. (Plain)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSMA 505	DC	**Any one of the following groups : Group A : Analytical Dynamics Group B : Probability & Statistics**	60	20	20	-	-	3	1	-	4

Group A: Analytical Dynamics

Course Objective

To introduce the students with the Fundamentals of the Analytical Dynamics.

Course Outcomes

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

1. *understand and solve problems of the motion of a particle.*
2. *solve the problems of the motion under forces.*
3. *understand and apply the concepts of the motion in 2D.*

Course Content:

UNIT – I

Velocity and Acceleration of a particle. Expressions for velocity and acceleration in rectangular Cartesian and polar co-ordinates for a particle moving in a plane. Tangential and normal components of velocity and acceleration of a particle moving along a plane curve.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of the Program: B. Sc. (Plain)

UNIT – II

Concept of Force: Statement and explanation of Newton's laws of motion. Work, power and energy. Principles of conservation of energy and momentum. Motion under impulsive forces. Equations of motion of a particle (i) moving in a straight line, (ii) moving in a plane.

UNIT – III

Study of motion of a particle in a straight line under (i) constant forces, (ii) variable forces (S.H.M., Inverse square law, Damped oscillation, Forced and Damped oscillation, Motion in an elastic string). Equation of Energy. Conservative forces.

UNIT – IV

Motion in two dimensions : Projectiles in vacuo and in a medium with resistance varying linearly as velocity. Motion under forces varying as distance from a fixed point.

UNIT – V

Central orbit. Kepler's laws of motion. Motion under inverse square law.

Texts:

1. An Elementary Treatise on the Dynamics of a Particle & of Rigid bodies – S. L. Loney (Macmillan).
2. Dynamics of Particle and of Rigid Bodies – S. L. Loney.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of the Program: B. Sc. (Plain)

Group B: Probability & Statistics

Course Objective

To introduce the students with the Fundamentals of the Probability & Statistics.

Course Outcomes

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

1. *understand and solve problems of the motion of a particle.*
2. *solve the problems of the motion under forces.*
3. *understand and apply the concepts of the motion in 2D.*

Course Content:

UNIT – I

Elements of Probability Theory: Random experiment, Outcome, Event, Mutually Exclusive Events, Equality like and Exhaustive, Classical definition of Probability, theorems of Total Probability, Conditional Probability and Statistical Independence. Bayes' theorem. Problems. Shortcomings of the classical definition. Axiomatic approach –Problems. Random Variable and its Expectation. Theorems on mathematical expectation. Joint distribution of two random variables. Theoretical Probability Distribution – Discrete and Continuous (p.m.f. pd.d.f.) Binomial, Poisson and Normal distributions and their properties.

UNIT – II

Elements of Statistical Methods. Variables, Attributes, Primary data and secondary data. Population and sample. Census and Sample Survey. Tabulation – Chart and Diagram, graph, Bar diagram, Pie diagram etc. Frequency Distribution – Un-grouped and grouped cumulative frequency distribution. Histogram, Frequency curve, Measure of Central Tendencies – Average : AM, GM, HM, Mean, Median and Mode (their advantages and disadvantages). Measures of Dispersions – Range, Quartile Deviation, Mean Deviation, Variance/S.D., Moments, Skewness and Kurtosis.

UNIT – III

Sampling Theory: Meaning and objects of sampling. Some ideas about the methods of selecting samples. Statistic and Parameter, Sampling Distribution – standard error of a statistic (e.g. sample mean, sample proportion). Four fundamental distributions derived from the normal **:** (i) Standard Normal Distribution, (ii) Chi-square distribution, (iii) Student's distribution, (iv) Snedecor's F-distribution.

UNIT – IV

Estimation and Test of Significance. Statistical Inference. Theory of estimation – Point estimation and Interval estimation. Confidence Inter/Confidence Limit. Statistical Hypothesis – Bull Hypothesis and Alternative Hypothesis. Level of significance. Critical Region. Type I and Type II error. Problems. Bivariate Frequency Distribution. Scatter Diagram, Correlation co-efficient –Definition and properties. Regression lines.

UNIT – V

Time Series : Definition. Why to analyze Time series data? Components. Measurement of Trend – (i) Moving Average Method, (ii) Curve Fittings (linear and quadratic curve). (Ideas of other curves, e.g. exponential curve etc.). Ideas about the measurement of other components. **Index Number :** Meaning of Index Number. Construction of Price Index Number. Consumer Price Index Number. Calculation of Purchasing Power of Rupee.

Texts:

1. The elements of probability theory and some of its applications - H. Cramer.

2. An introduction to probability theory and its applications (Vol. 1) – W. Feller.

3. Mathematical methods of statistics – H. Cramer.

4 Theory of probability – B. V. Gnedenko.

5. Mathematical probability – J. V. Uspensky.