**LESSON PLAN**

**CLASS: - M.Sc. (Maths) SEMESTER:- 2nd Sem**

**Name : - Dr. Pushpander Kadian Designation: Professor**

**Paper: - Partial Differential Equations**

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| Time Period | Syllabus to be covered |
| January, 2024 | Method of separation of variables to solve Boundary Value Problems (B.V.P.) associated with one dimensional heat equation. Steady state temperature in a rectangular plate, Circular disc, Semi-infinite plate. The heat equation in semi-infinite and infinite regions. Solution of three dimensional Laplace equations, Heat Equations, Wave Equations in cartesian, cylindrical and spherical coordinates. Method of separation of variables to solve B.V.P. associated with motion of a vibrating string. Solution of wave equation for semi-infinite and infinite strings. |
| February, 2024 | Partial differential equations: Examples of PDE classification. Transport equation – Initial value problem. Non-homogeneous equations. Laplace equation – Fundamental solution, Mean value formula, Properties of harmonic functions, Green function. |
| March, 2024 | Heat Equation – Fundamental solution, Mean value formula, Properties of solutions, Energy methods. Wave Equation – Solution by spherical means, Non-homogeneous equations, Energy methods. |
| April, 2024 | Non-linear first order PDE – Complete integrals, Envelopes, Characteristics, Hamilton Jacobi equations , Calculus of variations, Hamilton ODE, Legendre transform, Hopf-Lax formula, Weak solutions, Uniqueness. |

**LESSON PLAN**

**CLASS: - M.Sc. (Maths) SEMESTER:- 4th Sem**

**Name : - Dr. Pushpander Kadian Designation: Professor**

**Paper: - Information and Communication Technology**

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| Time Period | Syllabus to be covered |
| January, 2024 | Data, Information and knowledge, ICT – definition, Scope, Importance & Nature of Information & Communication Technology, Applications. Computer System: Classification of digital computers, System hardware, Memory units and auxiliary storage devices, Peripheral devices (Input and output devices), Software, Open source software and open standards. Computer networks, Networking Instruments, Communication devices, Transmission media (Bound links and Unbound links) and Switches. |
| February, 2024 | World Wide Web – History, Difference between Internet and www, Search engines. Web Servers: What is a server; Server software, Services provided by servers and their types. Website: Definition, Portal, Components of website, Building a website, Elements of website, Software to create website. Web pages: Definition, Working, Static and dynamic areas, Website vs. webpage, Web Browser: the tool bar, SSL, Names of various web browsers. Blogs- Definition of blog and bloggers, Advantages and disadvantages of blogging. URL: definition, Elements absolute and relative URL. Protocols: definition, TCP/IP, HTTP, FTP which one to use when and why, Applications and examples |
| March, 2024 | Concept of web services, Email: Definition, Protocols used in email services, Mail account and address, Sending and receiving an email, Features like cc, Bcc, Spam and junk, Email etiquettes- proper structure and layout, Case sensitivity, disclaimer to email, Care with abbreviations and emotions, Chat : Definition, Chat room, Commonly used types of chat. Video conferencing: definition, Areas of application, Advantages and disadvantages of videoconferencing. e-learning: definition, Benefits, Application areas, E-learning software. e-shopping: definition, Advantages and dis-advantages, Sites available, Threats and security concerns. E-reservation: definition, Benefits, Application areas, Reservation process, Live and non-livereservation e-group: definition, Features, Benefits. Social Networking: definition, Names of various social networking web sites, Merits and demerits, Service providers, Features available, Ethics. |
| April, 2024 | Virus- definition, Types, Virus spread, Protection, Current threats. Worms- definition, Types, Spread, Protection, Current threats. Trojans- definition, Trojan spread, Protection Spyware- definition, Symptoms, Prevention and protection. Malware- definition, Types,  Prevention. Spams- definition, Detection and prevention. Hackers and Crackers- definition, Tools available, Types of hacking, Difference between hackersand crackers. Antivirus tools- free and paid tools, Latest tools, There style of working, Importance of regular update. |

**LESSON PLAN**

**CLASS: - M.Sc. (Maths) SEMESTER:- 2nd Sem**

**Name : - Dr. Sandeep Kumar Designation: Associate Professor**

**Paper: - Measure and Integration Theory**

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| Time Period | Syllabus to be covered |
| January, 2024 | Set functions, Intuitive idea of measure, Elementary properties of measure, Measurable sets and their fundamental properties. Lebesgue measure of aset of real numbers, Algebra of measurable sets, Borel set, Equivalent formulation of measurable set sin terms of open, Closed, F(Sigma)and G(delta) sets, Nonmeasurable sets. |
| February, 2024 | Measurable functions and their equivalent formulations. Properties of measurable functions. Approximation of a measurable function by a sequence of simple functions, Measurable functions as nearly continuous functions, Egoroff theorem, Lusin theorem, Convergence in measure and F. Riesz theorem. Almostun iform convergence. |
| March, 2024 | Short comings of Riemann Integral, Lebesgue Integral of a bounded function over a set of finite measure and its properties. Lebesgue integral as a generalization of Riemann integral, Bounded convergence theorem, Lebesgue theorem regarding points of discontinuities of Riemann integrable functions, Integral of non-negative functions, Fatou Lemma, Monotone convergence theorem, General Lebesgue Integral, Lebesgue convergence theorem. |
| April, 2024 | Vitali covering lemma, Differentiation of monotonic functions, Function of bounded variation and its representation as difference of monotonic functions, Differentiation of indefinite integral, Fundamental theorem of calculus, Absolutely continuous functions and their properties. |

**LESSON PLAN**

**CLASS: - M.Sc. (Maths) SEMESTER:- 4th Sem**

**Name : - Dr. Sandeep Kumar Designation: Associate Professor**

**Paper: - Graph Theory**

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| Time Period | Syllabus to be covered |
| January, 2024 | Definition and types of graphs, Walks, Paths and Circuits, Connected and Disconnected graphs, Applications of graphs, operations on Graphs, Graph Representation, Isomorphism of Graphs. |
| February, 2024 | Eulerian and Hamiltonian paths, Shortest Path in a Weighted Graph, The Travelling Salesperson Problem, Planar Graphs, Detection of Planarity and Kuratowski Theorem, Graph Colouring. |
| March, 2024 | Directed Graphs, Trees, Tree Terminology, Rooted Labeled Trees, Prefix Code, Binary Search Tree, Tree Traversal. |
| April, 2024 | Spanning Trees and Cut Sets, Minimum Spanning Trees, Kruskal Algorithm, Prim Algorithm, Decision Trees, Sorting Methods. |