• Projects based on PHP and MySQL to be implemented.

• Domains: Healthcare, Criminal, resource management projects, etc.

**Essential/recommended readings**


1. Data Communication and Networking, Forouzan, B.A., Tata McGraw-Hill. 2013
2. Internet and World Wide Web: How to Program, 5th Edition, Deitel and Deitel, Pearson Education. 2008
3. List of Web links prescribed by instructor


**Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.**

## DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE):

### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

| Course title & Code | Credits | Credit distribution of the course | | | Eligibility criteria | Pre-requisite of the course (if any) |
|---|---|---|---|---|---|---|
| | | Lecture | Tutorial | Practical/ Practice | | |
| **Partial Differential Equations (DSE)** | **4** | **3** | **1** | **0** | **Class XII pass** | **Ordinary differential equations** |

**Learning Objectives**

This course helps to develop Partial differential equation models, in the context of modeling heat and mass transport and, in particular, wave phenomena, such as sound and water waves. This course develops students' skills in the formulation; find a solution, understanding and interpretation of PDE models. As well as developing analytic solutions, this course establishes general structures and characterizations of PDEs. The course will also expose the students to various applications of the partial differential equations.

**Learning outcomes**

- Understand how partial differential equations (PDEs) represent real-world problems.
- Able to use computational tools to solve problems and applications of PDEs.
- Understand the importance of Laplace's equation, heat equation, wave equation,

conduction of heat, gravitational potential, telegraph equation, dispersion of contaminants, Fourier series, Fourier transforms, etc. in the theory of PDEs.

**SYLLABUS**

**Theory**

Unit I: Familiarities with different type of first order linear and non-linear PDEs - Examples of PDEs arising in transport equation, conservation laws, spread of epidemic cholera - Cauchy problem for first order PDE (12 hours)

Unit II: Method of characteristics, Classical methods for simple PDE models (12 hours)

Unit III: Second order PDE arising in wave equations, conduction of heat, gravitational potential, telegraph equation, dispersion of contaminants - classification of second order PDE and their solution (12 hours)

Unit IV: Fourier Series and Fourier transforms - Boundary Value Problem: Dirichlet and Neumann Problems (12 hours)

**Essential/recommended readings**


1. *Partial Differential Equations*, E.DiBenedetto, Birkhauser, Boston,1995.
2. *Partial Differential Equations*,Fritz John,NarosaPubl.Co.,NewDelhi,1979.
3. *Linear Partial Differential Equation for Scientists and Engineers*, TynMyint-U and Lokenath Debnath, Springer, Indian reprint, 2006.
4. *Partial Differential Equations: An Introduction with Mathematica and MAPLE*, Ioannis P Stavroulakis and Stepan A Tersian, World Scientific, 2004


**Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.**

## DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE):

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

| Course title & Code | Credits | Credit distribution of the course | | | Eligibility criteria | Pre-requisite of the course (if any) |
|---|---|---|---|---|---|---|
| | | Lecture | Tutorial | Practical/ Practice | | |
| **Brain and Cognition: Computational Neurosciences (DSE)** | **4** | **1** | **0** | **3** | **12th Pass** | **Understanding in Python, Networks** |