# VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAVI

**SYLLABUS FOR 2018 -2020**

**I Semester M.Tech. (CSE)**

# MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

**Course Code : 18XXX11** **CIE Marks : 40**
**Contact Hours/Week : 04** **SEE Marks: 60**
**Total Hours:50** **Exam Hours:03**
**Semester : I** **Credits: 04 (4:0:0)**

---

**Course Learning Objectives**: This course will enable the students:

- To acquaint the students with mathematical/logical fundamentals including numerical techniques,
- To understand probability, sampling and graph theory that serve as an essential tool for applications of computer and information sciences.

| MODULE | No.of Hrs |
|---|---|
| **MODULE-I**<br>**Numerical Methods:**<br>Significant figures, Error definitions, Approximations and round off errors, accuracy and precision. Roots of Equations: Bairstow-Lin's Method, Graeffe's Root Squaring Method. Computation of eigen values of real symmetric matrices: Jacobi and Givens method.<br>(RBT Levels: **L1 & L2)** | **10 Hrs** |
| **MODULE-II**<br>**Statistical Inference**: Introduction to multivariate statistical models: Correlation and Regression analysis, Curve fitting (Linear and Non linear)<br>(RBT Levels: **L2 & L3)** | **10 Hrs** |
| **MODULE- III**<br>**Probability Theory:** Probability mass function (p.m.f), density function (p.d.f), Random variable: discrete and continuous, Mathematical expectation, Sampling theory: testing of hypothesis by **t**-test and chi - square distribution.<br>(RBT Levels: **L1 & L2)** | **10 Hrs** |
| **MODULE IV**<br>**Graph Theory**: Isomorphism, Planar graphs, graph coloring, Hamilton circuits and Euler cycle. Specialized techniques to solve combinatorial enumeration problems.<br>(RBT Levels: **L1 & L2)** | **10 Hrs** |
| **MODULE-V**<br>**Vector Spaces:** Vector spaces; subspaces; Linearly independent and dependent vectors ; Bases and dimension; coordinate vectors-Illustrative examples. Linear transformations; Representation of transformations by matrices; linear functional; Non singular Linear transformations**;** inverse of a linear transformation- Problems.<br>(RBT Levels: **L3 & L4)** | **10 Hrs** |

**Course Outcomes:** On completion of this course, students are able to:

1. Understand the numerical methods to solve and find the roots of the equations.
2. Utilize the statistical tools in multi variable distributions.
3. Use probability formulations for new predictions with discrete and continuous RV's.
4. To understand various graphs in different geometries related to edges.
5. Understand vector spaces and related topics arising in magnification and rotation of images.

**Question Paper Pattern:**

**The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 60.**

- The question paper will have **ten** full questions carrying equal marks.
- Each full question consisting of **20** marks.
- There will be **two** full questions (with a **maximum** of **four** sub questions) from each module.
- Each full question will have sub question covering all the topics under a module.
- The students will have to answer **five** full questions, selecting **one** full question from each module.

**Text Books:-**


1. **Steven C. Chapra and Raymond P Canale**: " Numerical Methods for Engineers, 7th Edition, McGraw-Hill Publishers, 2015.
2. **T.Veerarajan**: "Probability, Statistics and Random Process",3rd Edition,Tata Mc-Graw Hill Co.,2016.
3. **David C.Lay, Steven R.Lay and J.J.McDonald:** Linear Algebra and its Applications, 5th Edition, Pearson Education Ltd., 2015.


**Reference Books***:-*


1. **B.S. Grewal**: Higher Engineering Mathematics, Khanna Publishers, 44th Ed., 2017.
2. **John Vince :** "Foundation Mathematics for Computer Science", Springer International Publishing, Switzerland, 2015
3. **M.K.Jain, S.R.K.Iyengar and R.K.Jain:** Numerical Methods for Scientific and Engineering Computation. 6th Ed.,New Age Int.Publishers.2012.
4. **Norman L.Biggs**: Discrete Mathematics, 2nd Ed., Oxford University Press, 2017.


**Web links and Video Lectures:**

1. *http://nptel.ac.in/courses.php?disciplineId=111*
2. *http://www.class-central.com/subject/math(MOOCs)*
3. *http://ocw.mit.edu/courses/mathematics/*