

Academic Council

Item No: \_\_\_\_\_

# UNIVERSITY OF MUMBAI



**Syllabus for M.sc. Part II**  
**Program: M.Sc.**  
**Subject: Information Technology**

(Credit Based Semester and Grading System with  
effect from Academic Year 2020-2021)

## **Preamble**

This is the second year (part II) curriculum in the subject of Information Technology. The revised structure is designed to transform students into technically competent, socially responsible and ethical Computer Science professionals. In these Semesters we have made the advancements in the subject based on the previous Semesters Knowledge.

In the second year is important to develop the intelligence regarding to various industry trends. Second year of this course making basics strong related to specialized industry and automation trends in wide diversification in technology.

The proposed curriculum contains two semesters; each Semester contains Ability to apply the knowledge of Information Technology with recent trends aligned with research and industry. Making students capable to apply IT in the field of Computational Research, Soft Computing, Big Data Analytics, Data Science, Image Processing, Artificial Intelligence, Networking and Cloud Computing. Making students aware about socially acceptable technical solutions in the domains of Information Security, Machine Learning, Internet of Things and Embedded System, Infrastructure Services as specializations.

Proposed Curriculum contains challenging and varied subjects aligned with the current trend with the application of knowledge of Intellectual Property Rights, Cyber Laws and Cyber Forensics and various standards in interest of National Security and Integrity along with IT Industry, write effective project reports, research publications and content development and to work in multidisciplinary environment in the context of changing technologies.

In essence, the objective of this syllabus is to create a pool of technologically savvy, theoretically strong, innovatively skilled and ethically responsible generation of computer science professionals. Hope that the teacher and student community of University of Mumbai will accept and appreciate the efforts.

**M.Sc. PART II**  
**(Semester III and IV)**  
**Information Technology Syllabus**  
**Credit Based Semester and Grading System**  
**To be implemented from the Academic year 2020-2021**

| <b>SEMESTER III</b> |  |                |                 |
|---------------------|--|----------------|-----------------|
| <b>Course</b>       | <b>TOPICS</b>                                      | <b>Credits</b> | <b>L / Week</b> |
| PSIT301             | Technical Writing and Entrepreneurship Development | 4              | 4               |
| PSIT302c            | Cloud Application Development                      | 4              | 4               |
| PSIT303a            | Machine Learning                                   | 4              | 4               |
| PSIT304d            | Offensive Security                                 | 4              | 4               |
|                     | <b>Practical</b>                                   |                |                 |
| PSIT3P1             | Project Documentation and Viva                     | 2              | 4               |
| PSIT3P2c            | Cloud Application Development Practical            | 2              | 4               |
| PSIT3P3a            | Machine Learning Practical                         | 2              | 4               |
| PSIT3P4d            | Offensive Security Practical                       | 2              | 4               |

| <b>SEMESTER IV</b> |                                 |                |                 |
|--------------------|---------------------------------|----------------|-----------------|
| <b>Course</b>      | <b>TOPICS</b>                   | <b>Credits</b> | <b>L / Week</b> |
| PSIT401            | Blockchain                      | 4              | 4               |
| PSIT402d           | Cyber Forensics                 | 4              | 4               |
| PSIT403a           | Deep Learning                   | 4              | 4               |
| PSIT404d           | Information Security Auditing   | 4              | 4               |
|                    | <b>Practical</b>                |                |                 |
| PSIT4P1            | Blockchain Practical            | 2              | 4               |
| PSIT4P2d           | Cyber Forensics Practical       | 2              | 4               |
| PSIT4P3a           | Deep Learning Practical         | 2              | 4               |
| PSIT4P4            | Project Implementation and Viva | 2              | 4               |

## Suggested List of Practical- SEMESTER IV

|  |  |  |
|--|--|--|
| <b>Course:</b><br>PSIT4P3a                                 | <b>(Credits : 02 Lectures/Week: 04)</b>  |  |
| <b>PSIT4P3a: Deep Learning Practical</b>                   |  |  |
| <i>Shall perform following practical using TensorFlow.</i> |  |  |
| <b>No.</b>   | <b>Name of the Practical</b>   |  |
| 1  | Performing matrix multiplication and finding eigen vectors and eigen values using TensorFlow                                       |  |
| 2  | Solving XOR problem using deep feed forward network  |  |
| 3  | Implementing deep neural network for performing binary classification task.  |  |
| 4  | A. Using deep feed forward network with two hidden layers for performing multiclass classification and predicting the class.       |  |
|  | B. Using a deep feed forward network with two hidden layers for performing classification and predicting the probability of class. |  |
|  | C. Using a deep feed forward network with two hidden layers for performing linear regression and predicting values.                |  |
| 5  | A. Evaluating feed forward deep network for regression using KFold cross validation  |  |
|  | B. Evaluating feed forward deep network for multiclass Classification using KFold cross-validation                                 |  |
| 6  | Implementing regularization to avoid overfitting in binary classification  |  |
| 7  | Demonstrate recurrent neural network that learns to perform sequence analysis for stock price.                                     |  |
| 8  | Performing encoding and decoding of images using deep autoencoder.   |  |
| 9  | Implementation of convolutional neural network to predict numbers from number images   |  |
| 10   | Denoising of images using autoencoder.   |  |

# Scheme of Examination

## 1. Theory:

### I. Internal 30 Marks : (Any one of the following):

a. Written Test

**OR**

b. SWAYAM (Advanced Course) of minimum 20 hours and certification exam completed

**OR**

c. NPTEL (Advanced Course) of minimum 20 hours and certification exam completed

**OR**

d. Valid International Certifications (Prometric, Pearson, Certiport, Coursera, Udemy and the like)

e. One certification marks shall be awarded one course only. For four courses, the students will have to complete four certifications.

### II. 10 marks:

The marks given out of 40 for publishing the research paper should be divided into four courses and should awarded out of 10 in each of the four courses.

10 marks from every course coming to a total of 40 marks, shall be awarded on publishing of research paper in UGC approved Journal with plagiarism less than 10%. The marks can be awarded as per the impact factor of the journal, quality of the paper, importance of the contents published, social value.

## 2. External Examination: 60 marks

As per university guideline.

## 3. Practical and Project Examination:

The Marking Scheme for each of the Elective is given below:

**A Certified copy journal is essential to appear for the practical examination.**

|   |                      |    |
|---|----------------------|----|
| 1 | Practical Question 1 | 20 |
| 2 | Practical Question 1 | 20 |
| 3 | Journal              | 5  |
| 4 | Viva Voce            | 5  |

**OR**

|   |                      |    |
|---|----------------------|----|
| 1 | Practical Question 1 | 40 |
| 2 | Journal              | 5  |
| 3 | Viva Voce            | 5  |

\*\*\*\*\*

