

UNIVERSITY OF MUMBAI



Syllabus for Sem V & VI
Program: Bachelor of Science
Course: Computer Science

Credit Based Semester and Grading System with
effect from
Academic Year 2018-2019

Preamble

This is the third year curriculum in the subject of Computer Science. 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 first year basic foundation of important skills required for software development is laid. Second year of this course is about studying core computer science subjects. The third year is the further advancement which covers developing capabilities to design formulations of computing models and its applications in diverse areas.

The proposed curriculum contains two semesters, each Semester contains two Electives: Elective-I and II. Every Elective contains three papers based on specific areas of Computer Science. It also includes one Skill Enhancement paper per semester, helps the student to evaluate his/her computer science domain specific skills and also to meet industry expectations. This revised curriculum has not only taken the specific areas of computer science into consideration but will also give the opportunity to the student to prove his/her ability in the subject practically through the Project Implementation. In Semester V and Semester VI student has to undertake a Project. It can boost his/her confidence and also can encourage the student to perform innovations in the subject as the choice of the Project topic is kept open covering most of the areas of Computer Science subject as per the students interest and the subject they have learned during the Course.

Proposed Curriculum contains challenging and varied subjects aligned with the current trend with the introduction of Machine Intelligence specific subject such as Artificial Intelligence, Information Retrieval. Data Management related subjects such as Cloud Computing and Data Science. Image processing topics such as Game Programming, Digital Image Processing. Introduction of physical world through Architecting of IoT and Wireless Sensor Networks and Mobile Communication. Security domain is also evolved by the introduction of Ethical Hacking, Cyber Forensic and Information and Network Security. To get the hands on experience Linux Server Administration and Web Services topics are included.

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.

T.Y.B.Sc. (Semester V and VI)
Computer Science Syllabus
Credit Based Semester and Grading System
To be implemented from the Academic year 2018-2019

SEMESTER V			
Course	TOPICS	Credits	L / Week
	Elective-I (Select Any Two)		
USCS501	Artificial Intelligence	3	3
USCS502	Linux Server Administration	3	3
USCS503	Software Testing and Quality Assurance	3	3
	Elective-II (Select Any Two)		
USCS504	Information and Network Security	3	3
USCS505	Architecting of IoT	3	3
USCS506	Web Services	3	3
	Skill Enhancement		
USCS507	Game Programming	2	3
	Practical		
USCSP501	Practical of Elective-I	2	6
USCSP502	Practical of Elective-II	2	6
USCSP503	Project Implementation	1	3
USCSP504	Practical of Skill Enhancement : USCS507	1	3

SEMESTER VI			
Course	TOPICS	Credits	L / Week
	Elective-I (Select Any Two)		
USCS601	Wireless Sensor Networks and Mobile Communication	3	3
USCS602	Cloud Computing	3	3
USCS603	Cyber Forensics	3	3
	Elective-II (Select Any Two)		

USCS604	Information Retrieval	3	3
USCS605	Digital Image Processing	3	3
USCS606	Data Science	3	3
	Skill Enhancement		
USCS607	Ethical Hacking	2	3
	Practical		
USCSP601	Practical of Elective-I	2	6
USCSP602	Practical of Elective-II	2	6
USCSP603	Project Implementation	1	3
USCSP604	Practical of Skill Enhancement : USCS607	1	3

SEMESTER V
THEORY

Course: USCS503	TOPICS (Credits : 03 Lectures/Week:03) Software Testing and Quality Assurance	
Objectives: To provide learner with knowledge in Software Testing techniques. To understand how testing methods can be used as an effective tools in providing quality assurance concerning for software. To provide skills to design test case plan for testing software		
Expected Learning Outcomes: Understand various software testing methods and strategies. Understand a variety of software metrics, and identify defects and managing those defects for improvement in quality for given software. Design SQA activities, SQA strategy, formal technical review report for software quality control and assurance.		
Unit I	<p>Software Testing and Introduction to quality : Introduction, Nature of errors, an example for Testing, Definition of Quality , QA, QC, QM and SQA , Software Development Life Cycle, Software Quality Factors</p> <p>Verification and Validation : Definition of V &V , Different types of V & V Mechanisms, Concepts of Software Reviews, Inspection and Walkthrough</p> <p>Software Testing Techniques : Testing Fundamentals, Test Case Design, White Box Testing and its types, Black Box Testing and its types</p>	15L
Unit II	<p>Software Testing Strategies : Strategic Approach to Software Testing, Unit Testing, Integration Testing, Validation Testing, System Testing</p> <p>Software Metrics : Concept and Developing Metrics, Different types of Metrics, Complexity metrics</p> <p>Defect Management: Definition of Defects, Defect Management Process, Defect Reporting, Metrics Related to Defects, Using Defects for Process Improvement.</p>	15L
Unit III	<p>Software Quality Assurance : Quality Concepts, Quality Movement, Background Issues, SQA activities, Software Reviews, Formal Technical Reviews, Formal approaches to SQA, Statistical Quality Assurance, Software Reliability, The ISO 9000 Quality Standards, , SQA Plan , Six sigma, Informal Reviews</p>	15L

Quality Improvement : Introduction, Pareto Diagrams, Cause-effect Diagrams, Scatter Diagrams, Run charts	
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Quality Costs : Defining Quality Costs, Types of Quality Costs, Quality Cost Measurement, Utilizing Quality Costs for Decision-Making	
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Textbook(s):

1. Software Engineering for Students, A Programming Approach, Douglas Bell, 4th Edition,, Pearson Education, 2005
2. Software Engineering – A Practitioners Approach, Roger S. Pressman, 5th Edition, Tata McGraw Hill, 2001
3. Quality Management, Donna C. S. Summers, 5th Edition, Prentice-Hall, 2010.
4. Total Quality Management, Dale H. Besterfield, 3rd Edition, Prentice Hall, 2003.

Additional Reference(s):

1. Software engineering: An Engineering approach, J.F. Peters, W. Pedrycz , John Wiley,2004
2. Software Testing and Quality Assurance Theory and Practice, Kshirsagar Naik, Priyadarshi Tripathy , John Wiley & Sons, Inc. , Publication, 2008
3. Software Engineering and Testing, B. B. Agarwal, S. P. Tayal, M. Gupta, Jones and Bartlett Publishers, 2010

Suggested List of Practical- SEMESTER V

USCS503: Software Testing and Quality Assurance

1. Install Selenium IDE; Write a test suite containing minimum 4 test cases for different formats.
2. Conduct a test suite for any two web sites.
3. Install Selenium server (Selenium RC) and demonstrate it using a script in Java/PHP.
4. Write and test a program to login a specific web page.
5. Write and test a program to update 10 student records into table into Excel file
6. Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects).
7. Write and test a program to provide total number of objects present / available on the page.
8. Write and test a program to get the number of items in a list / combo box.
9. Write and test a program to count the number of check boxes on the page checked and unchecked count.
10. Load Testing using JMeter, Android Application testing using Appium Tools, Bugzilla Bug tracking tools.

Scheme of Examination

1. Theory:

I. Internal 25 Marks :

a) Test – 20 Marks

20 marks Test – Duration 40 mins

It will be conducted either using any open source learning management system like Moodle (Modular object-oriented dynamic learning environment)

OR

A test based on an equivalent online course on the contents of the concerned course (subject) offered by or build using MOOC (Massive Open Online Course) platform.

b) 5 Marks – Active participation in routine class instructional deliveries

Overall conduct as a responsible student, manners, skill in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.

II. External 75 Marks as per University Guidelines

11. Practical and Project Examination:

There will be separate Practical examination for Elective-I, II, Skill enhancement and project of these Elective-I 100, Elective-II: 100 and Skill Enhancement: 50 and Project Implementation: 50.

In the Practical Examination of Elective-I and II, the student has to perform practical on each of the subjects chosen. The Marking Scheme for each of the Elective is given below:

	Subject Code	Experiment-I	Experiment-II	Total Marks
Elective-I	USCSP501/ USCSP601	Experiment-40+Journal-5 +viva-5 Total:50M	Experiment-40+Journal-5+viva-5 Total:50M	100 M
Elective-II	USCSP502/ USCSP602	Experiment-40+Journal-5 +viva-5 Total:50M	Experiment-40+Journal-5+viva-5 Total:50M	100 M
Project Implementation	USCSP503/ USCSP603	**Project Evaluation Scheme		50M
Skill Enhancement	USCSP504/ USCSP604	Experiment-40+Journal:5+viva-5 Total-50M		50M
Total Marks				300M

(Certified Journal is compulsory for appearing at the time of Practical Examination)

**Project Evaluation Scheme:

Presentation	Working of the Project	Quality of the Project	Viva	Documentation
10Marks	10 Marks	10 Marks	10 Marks	10Marks

(Certified Project Document is compulsory for appearing at the time of Project Presentation)
