UNIVERSITY OF MUMBAI

Syllabus

For the

Program: F.Y.B.Sc. Sem -I CBCS

Course: Computer Science

(Choice Based and Credit System with effect from the academic year 2021-22)

Preamble

The rise of Information and Communication Technology (ICT) has profoundly affected modern society. Increasing applications of computers in almost all areas of human endeavor has led to vibrant industries with concurrent rapid change in technology.

As the computing field advances at a rapid pace, the students must possess a solid foundation that allows and encourages them to maintain relevant skills as the field evolves. Specific languages and technology platforms change over time. Thus students must continue to learn and adapt their skills throughout their careers. To develop this ability, students will be exposed to multiple programming languages, tools, paradigms and technologies as well as the fundamental underlying principles throughout this programme.

The programme offers required courses such as programming languages, data structures, computer architecture and organization, algorithms, database systems, operating systems, and software engineering; as well as specialized courses in artificial intelligence, computer-based communication networks, distributed computing, information security, graphics, human-computer interaction, multimedia, scientific computing, web technology, and other current topics in computer science.

The core philosophy of this programme is to –

- ☐ Form strong foundations of Computer Science
- ☐ Nurture programming, analytical & design skills for the real world problems.
- ☐ Introduce emerging trends to the students in gradual way.
- ☐ Groom the students for the challenges of ICT industry

The students these days not only aspire for a career in the industry but also look for research opportunities. The main aim of this programme is to deliver a modern curriculum that will equip graduates with strong theoretical and practical backgrounds to enable them to excel in the workplace and to be lifelong learners. Not only does it prepare the students for a career in Software industry, it also motivates them towards further studies and research opportunities. Graduating students, can thus take up postgraduate programmes in CS leading to research as well as R&D, can be employable at IT industries, or can adopt a business management career.

In the first year i.e. for semester I & II, basic foundation of important skills required for software development is laid. The syllabus proposes to have four core subjects of Computer science and two core courses of Mathematics-Statistics. All core subjects are proposed to have theory as well as practical tracks. While the Computer Science courses will form fundamental skills for solving computational problems, the Mathematics & Statistics course will inculcate research-oriented acumen. Ability Enhancement Courses on Soft Skill Development will ensure an overall and holistic development of the students. The syllabus design for further semesters encompasses more advanced and specialized courses of Computer Science.

We sincerely believe that any student taking this programme will get very strong foundation and exposure to basics, advanced and emerging trends of the subject. We hope that the students" community and teachers" fraternity will appreciate the treatment given to the courses in the syllabus.

We wholeheartedly thank all experts who shared their valuable feedbacks and suggestions in order to improvise the contents; we have sincerely attempted to incorporate each of them. We further thank Chairperson and members of Board of Studies for their confidence in us.

Special thanks to Department of Computer Science and colleagues from various colleges, who volunteered or have indirectly, helped designing certain specialized courses and the syllabus as a whole.

F.Y.B.Sc. Computer Science Syllabus

Choice Based Credit System (CBCS)

with effect from

Academic year 2021-2022

Semester – II				
Course Code	**Course Type**	**Course Title**	**Credits**	**Lectures/Week**
USCS201	Core Subject	Design & Analysis of Algorithms	2	3
USCSP201	Core Subject Practical	Design & Analysis of Algorithms – Practical	1	3
USCS202	Core Subject	Advanced Python Programming	2	3
USCSP202	Core Subject Practical	Advanced Python Programming – Practical	1	3
USCS203	Core Subject	Introduction to OOPs using C++	2	3
USCSP203	Core Subject Practical	Introduction to OOPs using C++ – Practical	1	3
USCS204	Core Subject	Database Systems	2	3
USCSP204	Core Subject Practical	Database Systems – Practical	1	3
USCS205	Core Subject	Calculus	2	3
USCSP205	Core Subject Practical	Calculus – Practical	1	3
USCS206	Core Subject	Statistical Methods	2	3
USCSP206	Core Subject Practical	Statistical Methods – Practical	1	3
USCS207	Ability Enhancement Course	E-Commerce & Digital Marketing	2	3

Semester II

Course Code	Course Title	Credits	Lectures /Week
USCS207	**E-Commerce & Digital Marketing**	**2**	**3**

About the Course:
This course introduces the fundamental concepts of e-commerce, its types, the various legal and ethical issues of e-commerce and different e-commerce applications. The course also aims to introduce basic principles and types of digital marketing and web and Google analytics

Course Objectives:
- ☐ To understand increasing significance of E-Commerce and its applications in Business and Various Sectors
- ☐ To provide an insight on Digital Marketing activities on various Social Media platforms and its emerging significance in Business
- ☐ To understand Latest Trends and Practices in E-Commerce and Digital Marketing, along with its Challenges and Opportunities for an Organization

Learning Outcomes:
After successful completion of this course, students would be able to
- ☐ Understand the core concepts of E-Commerce.
- ☐ Understand the various online payment techniques
- ☐ Understand the core concepts of digital marketing and the role of digital marketing inbusiness.
- ☐ Apply digital marketing strategies to increase sales and growth of business
- ☐ Apply digital marketing through different channels and platforms
- ☐ Understand the significance of Web Analytics and Google Analytics and apply thesame.

Unit	Topics	No of Lectures
I	**Introduction to E-Commerce and E- Business:** Definition and competing in the digital economy, Impact of E-Commerce on Business Models, Factors Driving e-commerce and e-Business Models, Economics and social impact of e-Business, opportunities and Challenges, e-Commerce vs m- Commerce. Different e-Commerce Models (B2B, B2C, C2B, C2C, B2E), e- Commerce Applications: e-Trading, e-Learning, e-Shopping, Virtual Reality & Consumer Experience, Legal and Ethical issues in e-Commerce. **Overview of Electronic Payment system**s: Types of Electronic payment schemes (Credit cards, Debit cards, Smartcards, Internet banking), E- checks, E-Cash Concepts and applications of EDI and Limitation **Introduction & origin of Digital Marketing**: Traditional v/s Digital Marketing. Digital Marketing Strategy, The P-O-E-M Framework, Segmenting & Customizing Messages, The Digital landscape, Digital Advertising Market in India. Skills required in Digital Marketing. Digital Marketing Plan.	**15**
II	**Social Media Marketing:** Meaning, Purpose, types of social media websites, Social Media Engagement, Target audience, Facebook Marketing: Business through Facebook Marketing, Creating Advertising Campaigns,	**15**

	Adverts, Facebook Marketing Tools, LinkedIn Marketing: Importance of LinkedIn Marketing, Framing LinkedIn Strategy, Lead Generation through LinkedIn, Content Strategy, Analytics and Targeting, Twitter Marketing: Framing content strategy, Twitter Advertising Campaigns, YouTube Marketing: Video optimization, Promoting on YouTube, Monetization, YouTube Analytics **Email Marketing:** Types of Emails, Mailing List, Email Marketing tools, Email Deliverability & Email Marketing automation **Mobile Marketing**: Introduction, Mobile Usage, Mobile Advertising, Mobile Marketing Types, Mobile Marketing Features, Mobile Campaign Development, Mobile Advertising Analytics **Content Marketing:** Introduction, Content marketing statistics, Types of Content, Types of Blog posts, Content Creation, Content optimization, Content Management & Distribution, Content Marketing Strategy, Content creation tools and apps, Challenges of Content Marketing.	
III	**Search Engine Optimization:** Meaning, Common SEO techniques, Understanding Search Engines, basics of Keyword search, Google rankings, Link Building, Steps to optimize website, On-page and off-page optimization **Search Engine Marketing:** Introduction to SEM, Introduction to Ad Words - Google Ad Words, Ad Words fundamentals, Ad Placement, Ad Ranks, Creating Ad Campaigns, Campaign Report Generation, Display marketing, Buying Models: Cost per Click (CPC), Cost per Milli (CPM), Cost per Lead (CPL), Cost per Acquisition (CPA). **Web Analytics:** Purpose, History, Goals & objectives, Web Analytic tools & Methods. Web Analytics Mistakes and Pitfalls. **Google Analytics:** Basics of Google Analytics, Installing Google Analytics in website, Parameters of Google Analytics, Reporting and Analysis	15

Textbooks:
1. "E-Commerce Strategy, Technologies and Applications", Whitley, David, Tata McGraw Hill, 2017
2. Digital Marketing, Seema Gupta, McGraw Hill Education, 2nd Edition

Additional References:
1. E-Commerce by S. Pankaj, A.P.H. Publication, New Delhi
2. Fundamentals of Digital Marketing, Punit Singh Bhatia, Pearson, 2nd Edition
3. "Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation", Damian Ryan, Calvin Jone. Kogan Page, 4th Edition

Evaluation Scheme

I. Internal Evaluation for Theory Courses – 25 Marks

(i) Mid-Term Class Test– 15Marks

- ☐ It should be conducted using any **learning management system** such as **Moodle** (Modular object-oriented dynamic learning environment)
- ☐ The test should have **15 MCQ's** which should be solved in a time duration of **30 minutes.**

(ii) Assignment/ Case study/ Presentations– 10 Marks

- ☐ Assignment / Case Study Report / Presentation can be uploaded on any **learning management system**.

II. External Examination for Theory Courses – 75 Marks
☐ Duration: **2.5 Hours**

☐ Theory question paper pattern:

	All questions are compulsory.		
Question	**Based on**	**Options**	**Marks**
Q.1	Unit I	*Any 4 out of 6*	20
Q.2	Unit II	*Any 4 out of 6*	20
Q.3	Unit III	*Any 4 out of 6*	20
Q.4	Unit I,II and III	*Any 5 out of 6*	15

☐ All questions shall be compulsory with internal choice within the questions.

☐ Each Question maybe sub-divided into sub questions as a, b, c, d, etc. & the allocation of Marks depends on the weightage of the topic.