

Academic Council --/--/----
Item No: _____

**SIES College of Arts, Science and Commerce,
Sion (W)**

EMPOWERED AUTONOMOUS COLLEGE



Syllabus for
Program: Second Year Bachelor of Science
(NEP) Course: Computer Science
Semester: III & IV

With effect from
Academic Year 2024 -25

Preamble

Information and Communication Technology (ICT) has today become an integral part of all industry domains as well as fields of academics and research. The industry requirements and technologies have been steadily and rapidly advancing. Organisations are increasingly opting for open source systems. The students too these days are thinking beyond careers in the industry and aiming for research opportunities.

The B.Sc. Computer Science course structure therefore needed a fresh outlook and complete overhaul. A real genuine attempt has been made while designing the new syllabus for this 3 year graduate course. Not only does it prepare the students for a career in the Software industry, it also motivates them towards further studies and research opportunities.

The core philosophy of overall syllabus is to -

- a. Form strong foundation of Computer science,
- b. Introduce emerging trends to the students in gradual way,
- c. Groom the students for the challenges of ICT industry

In the Second year i.e. for semester III & IV, the basic foundation of important skills required for software development is laid. The syllabus proposes to have 6 core subjects of Computer science and 1 Vocational Skill Course & 1 skill enhancement course of Computer science. In Semester IV the students would also be given industrial exposure via field projects/industrial visit. 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. The syllabus design for further semesters encompasses more advanced and specialized courses of Computer Science.

We sincerely believe that any student taking this course will get a 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 feedback and suggestions in order to improvise the contents, we have sincerely attempted to incorporate each of them. We further thank the Chairperson and members of the Board of Studies for their confidence in us. Special thanks to the Department of Computer Science and colleagues from various colleges, who volunteered or have indirectly helped design certain specialized courses and the syllabus as a whole.

Program Outcomes

SR.NO	Details
PO 1	Recall and explain acquired scientific knowledge in a comprehensive manner and apply the skills acquired in their chosen discipline. Interpret scientific ideas and relate its interconnectedness to various fields in science.
PO 2	Evaluate scientific ideas critically, analyse problems, explore options for practical demonstrations, illustrate work plans and execute them, organize data and draw inferences.
PO 3	Explore and evaluate digital information and use it for knowledge upgradation. Apply relevant information so gathered for analysis and communication using appropriate digital tools.
PO 4	Ask relevant questions, understand scientific relevance, hypothesize a scientific problem, construct and execute a project plan and analyze results.
PO 5	Take complex challenges; work responsibly and independently, as well as in cohesion with a team for completion of a task. Communicate effectively, convincingly and in an articulate manner.
PO 6	Apply scientific information with sensitivity to values of different cultural groups. Disseminate scientific knowledge effectively for upliftment of the society.
PO 7	Follow ethical practices at the workplace and be unbiased and critical in interpretation of scientific data. Understand the environmental issues and explore sustainable solutions for it.
PO 8	Keep abreast with current scientific developments in the specific discipline and adapt to technological advancements for better application of scientific knowledge as a lifelong learner.

Program Specific Outcomes

SR.NO	Details
PSO 1	Apply knowledge of computational mathematics, statistics and programming acquired in the field of Computer Science.
PSO 2	Identify, analyze complex problems in the real world and formulate innovative solutions to those problems.
PSO 3	Compare and apply hardware and software technologies for implementing reliable optimized solutions catering to need and available resources.
PSO 4	Apply software development, managerial, Professional, and soft skills in industry
PSO 5	Understand the global needs and prepare themselves for the changing needs worldwide adapting an ability to engage in life- long learning.
PSO 6	Become a responsible, ethical citizen and explore environmental issues to develop sustainable solutions for it.

S.Y.B.Sc. Computer Science Syllabus
Credit Based System and Grading System
Academic year 2024-2025

Semester – III

Course Code	Course Type	Course Title	Credits	Lectures/Week		
				Theory	Practical (2 lectures)	Total
Vocational Courses						
SIUCSVS131	Vocational Skill Course (VSC)	Python Web Development Framework	1	1		1
SIUCSVS131	Vocational Skill Course practical	Practicals of Python Web Development Framework	1		1	1
Total						2

Vocational Skill Course (VSC)

Course Code	Course Title	Credits	Lectures /Week						
SIUCSVS131	Python Web Development Framework	1	1						
<p>About the Course: This course will give existing Python developers great hands-on experience building robust, commercial web applications with the Django framework. This course helps students through the development of a fully functional and useful product candidate to learn test-driven development, how to write maintainable code, efficient Git branching, and much more, all while focusing on the software engineering practices that go into developing great software.</p>									
<p>Course Objectives:</p> <ul style="list-style-type: none"> ❖ To learn and understand the Django architecture & MVC Models. ❖ To build and deploy Django Web Apps. 									
<p>Learning Outcomes: After completing this course, students will have a fundamental understanding of how to:</p> <ul style="list-style-type: none"> ❖ Understand Django Architecture and its take on MVC (Models, Views & Templates) ❖ Build and deploy robust Django web apps ❖ Integrate with RESTful web services ❖ Unit Testing and Debugging Django apps 									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Unit</th> <th style="width: 60%;">Topics</th> <th style="width: 25%;">No of Lectures</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: middle;">I</td> <td> <p>Introduction to Django :What is Django? ,Django and Python , Django's take on MVC: Model, View and Template ,How to get and install Django .</p> <p>Getting started with Django:About the 3 Core Files: models.py, urls.py, views.py ,Setting up database connections , Managing Users & the Django admin tool , Installing and using 'out of the box' Django features</p> <p>Django URL Patterns and Views :Designing a good URL scheme , Generic Views ,Django Forms ,Form classes , Validation , Authentication , Advanced Forms processing techniques ,</p> <p>Django & REST APIs : Django REST framework ,Django-piston</p> <p>Unit Testing with Django : Overview / Refresher on Unit Testing and why it's good , Using Python's unittest2 library ,Test , Test Databases ,Doctests , Debugging Best Practice</p> </td> <td style="text-align: center; vertical-align: middle;">15L</td> </tr> </tbody> </table>				Unit	Topics	No of Lectures	I	<p>Introduction to Django :What is Django? ,Django and Python , Django's take on MVC: Model, View and Template ,How to get and install Django .</p> <p>Getting started with Django:About the 3 Core Files: models.py, urls.py, views.py ,Setting up database connections , Managing Users & the Django admin tool , Installing and using 'out of the box' Django features</p> <p>Django URL Patterns and Views :Designing a good URL scheme , Generic Views ,Django Forms ,Form classes , Validation , Authentication , Advanced Forms processing techniques ,</p> <p>Django & REST APIs : Django REST framework ,Django-piston</p> <p>Unit Testing with Django : Overview / Refresher on Unit Testing and why it's good , Using Python's unittest2 library ,Test , Test Databases ,Doctests , Debugging Best Practice</p>	15L
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<p>Textbooks:</p> <ol style="list-style-type: none"> Vincent, W. S. (2020). <i>Django for Beginners</i>. Apress. <p>Additional References:</p> <ol style="list-style-type: none"> https://docs.djangoproject.com/en/stable/ 									

Course Code	Course Title	Credits	Lectures /Week
SIUCSVS131	Python Web Development Framework-Practicals	1	1
1	Implement the use of URL forming scheme		
2	Implement the use of forms and its validations		
3	Implement advanced form processing techniques		
4	Implement DJANGO REST api		
5	Implement DJANGO with database connectivity		
6	Implement DJANGO unittest2 library		
