


# CURRICULUM STRUCTURE

**Program: B.Sc**

**Subject: Computer Science**

Semester	Course No.	Theory/ Practical*	Hrs/Week	Credits	Paper Title	Marks	
						S.A.	I.A.
V	DSC5	Theory	4-0-0	4	Programming in Python	60	40
	DSC5-Lab	Practical	0-0-4	2	Python Programming Lab	30	20
	DSC6	Theory	4-0-0	4	Computer Networks	60	40
	DSC6-Lab	Practical	0-0-4	2	Computer Networks Lab	30	20
	SEC-4	Theory	2-0-2	3	Employability Skills/ Cyber Security	30	20
VI	DSC8	Theory	4-0-0	4	Web Technologies	60	40
	DSC8-Lab	Practical	0-0-4	2	Web Technologies Lab	30	20
	DSC9	Theory	4-0-0	4	Operating System Concepts	60	40
	DSC9-Lab	Practical	0-0-4	2	Operating System Lab	30	20
	INT-1	Internship	-	2	Internship	30	20

*\*Note: Same subjects are applicable to Minor (5<sup>th</sup> and 6<sup>5</sup><sup>th</sup> sem)*



  
**Registrar**  
**Davangere University**  
**Shivangotri, Davangere**

Program Name	B.Sc.	Semester	V
Course Title	<b>Programming in Python (Theory)</b>		
Course Code:	DSC5	No. of Credits	04
Contact hours	52 Hours	Duration of SEA/Exam	2 hours
Formative Assessment Marks	40	Summative Assessment Marks	60

**Course Outcomes (COs):** After the successful completion of the course, the student will be able to:

CO1	Setup python to develop simple applications
CO2	Understand the basic concepts in Python Programming
CO3	Learn how to write, debug and execute Python programs
CO4	Understand and demonstrate the use of advanced data types such as tuples, dictionaries and lists, Tuples and Sets
CO5	Design solutions for problems using object-oriented concepts in Python
CO6	Use and apply the different Python Libraries for GUI Interface, Data Analysis and Data Visualization.
CO7	Extend the knowledge of python programming to build successful career in software development.

Contents	52 Hrs
<b>UNIT-1:</b> Introduction to Features and Applications of Python; Python Versions; Installation of Python; Python Command Line mode and Python IDEs; Simple Python Program. <b>Python Basics:</b> Identifiers; Keywords; Statements and Expressions; Variables; Operators; Precedence and Association; Data Types; Indentation; Comments; Built-in Functions- Console Input and Console Output, Type Conversions; Python Libraries; Importing Libraries with Examples. <b>Python Control Flow:</b> Types of Control Flow; Control Flow Statements- if, else, elif, while loop, break, continue statements, for loop Statement; range () and exit () functions.	10
<b>UNIT-2: Exception Handling:</b> Types of Errors; Exceptions; Exception Handling using try, except and finally. <b>Python Functions:</b> Types of Functions; Function Definition- Syntax, Function Calling, Passing Parameters/arguments, the return statement; Default Parameters; Command line Arguments; Key Word Arguments; Recursive Functions; Scope and Lifetime of Variables in Functions. <b>Strings:</b> Creating and Storing Strings; Accessing String Characters; the str() function; Operations on Strings- Concatenation, Comparison, Slicing and Joining, Traversing; Format Specifiers; Escape Sequences; Raw and Unicode Strings; Python String Methods.	10
<b>UNIT-3: Lists:</b> Creating Lists; Operations on Lists; Built-in Functions on Lists; Implementation of Stacks and Queues using Lists; Nested Lists. <b>Dictionaries:</b> Creating Dictionaries; Operations on Dictionaries; Built-in Functions on Dictionaries; Dictionary Methods; Populating and Traversing Dictionaries. <b>Tuples and Sets:</b> Creating Tuples; Operations on Tuples; Built-in Functions on Tuples; Tuple Methods; Creating Sets; Operations on Sets; Built-in Functions on Sets; Set Methods.	10
<b>UNIT-4:</b> File Handling; File Types; Operations on Files- Create, Open, Read, Write, Close Files; File Names and Paths; Format Operator.	10

**Object Oriented Programming:** Classes and Objects; Creating Classes and Objects; Constructor Method; Classes with Multiple Objects; Objects as Arguments; Objects as Return Values; Inheritance- Single and Multiple Inheritance, Multilevel and Multipath Inheritance; Encapsulation- Definition, Private Instance Variables; Polymorphism- Definition, Operator Overloading.

**UNIT-5:GU Interface:** The Tkinter Module; Window and Widgets; Layout Management- pack, grid and place.

**Python SQLite:** The SQLite3 module; SQLite Methods- connect, cursor, execute, close; Connect to Database; Create Table; Operations on Tables- Insert, Select, Update. Delete and Drop Records.

**Data Analysis:** NumPy- Introduction to NumPy, Array Creation using NumPy, Operations on Arrays; Pandas- Introduction to Pandas, Series and DataFrames, Creating DataFrames from Excel Sheet and .csv file, Dictionary and Tuples. Operations on DataFrames.

**Data Visualisation:** Introduction to Data Visualisation; Matplotlib Library; Different Types of Charts using Pyplot- Line chart, Bar chart and Histogram and Pie chart.

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### Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

**Pedagogy:** Lecture/ PPT/ Videos/ Animations/ Role Plays/ Think-Pair-Share/ Predict-Observe-Explain/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/ Activity/ Flipped Classroom/ Jigsaw/ Field based Learning/ Project Based Learning/ Mini Projects/ Hobby Projects/ Forum Theatre/ Dance/ Problem Based Learning/ Game Based Learning/ Group Discussion/ Collaborative Learning/ Experiential Learning / Self Directed Learning etc.

Formative Assessment for Theory	
Assessment Occasion/ type	Marks
Internal Assessment Test 1	10
Internal Assessment Test 2	10
Quiz/ Assignment/ Small Project	10
Seminar	10
<b>Total</b>	<b>40 Marks</b>
<i>Formative Assessment as per guidelines.</i>	

Course Title	Python Programming Lab (Practical)		Practical Credits	02
Course Code	DSC5-Lab		Contact Hours	04 Hours
Formative Assessment	20 Marks	Summative Assessment		30 Marks
Practical Content				
Part-A				
1. WAP to Check if a number belongs to the Fibonacci Sequence				
2. WAP to Solve Quadratic Equations				
3. WAP to Find the sum of n natural numbers				
4. WAP to Display Multiplication Tables				
5. WAP to Check if a given number is a Prime Number or not				
6. WAP to Implement a sequential search				
7. WAP to Create a calculator program				
8. WAP to Explore string functions				
9. WAP to Implement Selection Sort				
10. WAP to Implement Stack				
11. WAP to Read and write into a file				
Part-B				
1. WAP to Demonstrate usage of basic regular expression				
2. WAP to Demonstrate use of advanced regular expressions for data validation.				
3. WAP to Demonstrate use of List				
4. WAP to Demonstrate use of Dictionaries				
5. WAP to Create SQLite Database and Perform Operations on Tables				
6. WAP to Create a GUI using Tkinter module				
7. WAP to Demonstrate Exceptions in Python				
8. WAP to Drawing Line chart and Bar chart using Matplotlib				
9. WAP to Drawing Histogram and Pie chart using Matplotlib				
10. WAP to Create Array using NumPy and Perform Operations on Array				
11. WAP to Create Data-Frame from Excel sheet using Pandas and Perform Operations on DataFrames				
Note: A minimum of 08 Programs should be done in each Part.				

<b>Formative Assessment for Practical</b>	
<b>Assessment Occasion/ type</b>	<b>Marks</b>
Lab Records	5
Attendance	5
Internal Assessment Test	10
<b>Total</b>	<b>20 Marks</b>
<i>Formative Assessment as per guidelines.</i>	

## References

1	<b>Think Python How to Think Like a Computer Scientist</b> , Allen Downey et al., 2 <sup>nd</sup> Edition, 2015, Green Tea Press. Freely available online @ <a href="https://www.greenteapress.com/thinkpython/thinkCSpy.pdf">https://www.greenteapress.com/thinkpython/thinkCSpy.pdf</a>
2	<b>Introduction to Python Programming</b> , Gowrishankar S et al., 2019, CRC Press
3	<b>Python Data Analytics: Data Analysis and Science Using Pandas, matplotlib, and the Python Programming Language</b> , Fabio Nelli, 2015, Apress®
4	<b>Advance Core Python Programming</b> , Meenu Kohli, 2021, BPB Publications
5	<b>Core PYTHON Applications Programming</b> , Wesley J. Chun, 3 <sup>rd</sup> Edition, 2012, Prentice Hall
6	<b>Automate the Boring Stuff</b> , Al Sweigart, 2015, No Starch Press, Inc.
7	<b>Data Structures and Program Design Using Python</b> , D Malhotra et al., 2021, Mercury Learning and Information LLC
8	<a href="http://www.ibiblio.org/g2swap/byteofpython/read/">http://www.ibiblio.org/g2swap/byteofpython/read/</a>
9	<a href="https://docs.python.org/3/tutorial/index.html">https://docs.python.org/3/tutorial/index.html</a>

Program Name	B.Sc.	Semester	V
Course Title	<b>Computer Networks (Theory)</b>		
Course Code:	DSC6	No. of Credits	04
Contact hours	52 Hours	Duration of SEA/Exam	2 hours
Formative Assessment Marks	40	Summative Assessment Marks	60

**Course Outcomes (COs):** After the successful completion of the course, the student will be able to:

CO1	Define various data communication components in networking.
CO2	Describe networking with reference to different types of models and topologies.
CO3	Understand the need for Network and various layers of OSI and TCP/IP reference model.
CO4	Explain various Data Communications media.
CO5	Describe the physical layer functions and components
CO6	Identify the different types of network topologies and Switching methods.
CO7	Describe various Data link Layer Protocols.
CO8	Identify the different types of network devices and their functions within a network.
CO9	Analyze and Interpret various Data Link Layer and Transport Layer protocols.
CO10	Explain different application layer protocols.

Contents	52 Hrs
<b>UNIT-1:Introduction:</b> Computer Network: Definition, Goals, Structure; Broadcast and Point-To-Point Networks; Network Topology and their various Types; Types of Network, Network software, Design issues for the layers, Connection-oriented vs. Connectionless service, Applications of Computer network, Protocols and Standards, The OSI Reference Model, The TCP/IP Protocol suite, Comparison between OSI and TCP/IP Reference model.	10
<b>UNIT-2:Physical Layer:</b> Functions of Physical Layer, Analog signals, Digital signals, Transmission Impairment, Data Rate Limits, and Performance. Data Transmission Media: Guided Transmission Media, Magnetic Media, Twisted Pairs, Coaxial Cable, Power Lines, Fiber Optics, Wireless Transmission, Electromagnetic Spectrum, Radio Transmission, Microwave Transmission, Infrared Transmission, Light Transmission, Digital Modulation and Multiplexing, Public Switched Telephone Networks. Switching: Circuit switching, Message switching & Packet switching	12
<b>UNIT-3:Data Link Layer:</b> Functions of Data Link Layer, Data Link Control: Framing, Flow and Error Control, Error Detection and Correction, High-Level Data Link Control (HDLC) & point — to — Point protocol (PPP), Channel Allocation Problem, Multiple Access: Random Access (ALOHA, CSMA, CSMA/CD, CSMA/CA), Controlled Access (Reservation, Polling, Token Passing), Channelization (FDMA, TDMA, CDMA),	10
<b>UNIT-4:Wired LAN:</b> Ethernet Standards and FDDI, Wireless LAN: IEEE 802.11 and Bluetooth Standards. <b>Transport Layer:</b> Functions of Transport Layer, Elements of Transport Protocols: Addressing, Establishing and Releasing Connection, Flow Control & Buffering, Error Control, Multiplexing & De-multiplexing, Crash Recovery,	10
<b>UNIT-5:User Datagram Protocol (UDP):</b> User Datagram, UDP Operations, Uses of UDP, RPC, Principles of Reliable Data Transfer: Building a Reliable Data Transfer Protocol,	10

Pipelined Reliable Data Transfer Protocol, Go Back-N(GBN), Selective Repeat(SR).  
**Application layer :** Functions of Application layer, Application Layer Protocols: DNS, DHCP, WWW, HTTP, HTTPs, TELNET, FTP, SMTP, POP, IIMAP

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)**

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

**Pedagogy:** Lecture/ PPT/ Videos/ Animations/ Role Plays/ Think-Pair-Share/ Predict-Observe-Explain/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/ Activity/ Flipped Classroom/ Jigsaw/ Field based Learning/ Project Based Learning/ Mini Projects/ Hobby Projects/ Forum Theatre/ Dance/ Problem Based Learning/ Game Based Learning/ Group Discussion/ Collaborative Learning/ Experiential Learning / Self Directed Learning etc.

Formative Assessment for Theory	
Assessment Occasion/ type	Marks
Internal Assessment Test 1	10
Internal Assessment Test 2	10
Quiz/ Assignment/ Small Project	10
Seminar	10
<b>Total</b>	<b>40 Marks</b>
<i>Formative Assessment as per guidelines.</i>	

Course Title	<b>Computer Networks Laboratory (Practical)</b>	Practical Credits	<b>02</b>
Course Code	<b>DSC6 Lab</b>	Contact Hours	<b>04 Hours</b>
Formative Assessment	<b>20 Marks</b>	Summative Assessment	<b>30 Marks</b>

#### Practical Content

##### Part A:

1. Prepare hardware and software specification for basic computer system and Networking.
2. Study of different types of Network cables and practically implement the cross-wired cable and straight through cable using clamping tool.
3. Identifying the networking devices on a network.
4. Configure the IP address of the computer.
5. Create a basic network and share file and folders.
6. Study of basic network command and Network configuration commands.
7. Installation process of any open source network simulation software.
8. Study 'Networking Commands': NSLOOKUP, HOSTNAME, PING, TRACERT, NETSTAT, SYSTEMINFO.

##### Part B:

1. Implement connecting two nodes using network simulator.
2. Implement connecting three nodes considering one node as a central node using network simulator. Implement a network to connect three nodes considering one node as a central node using network simulator
3. Implement bus topology using network simulator.
4. Implement star topology using network simulator.
5. Implement ring topology using network simulator.
6. Demonstrate the use of wireless LAN using network simulator.
7. Implement FTP using TCP bulk transfer using network simulator.
8. Implement connecting multiple routers and nodes and building a Hybrid topology network simulator.

##### *Links for open source simulation software:*

- NS3 software: <https://www.nsnam.org/releases/ns-3-30/download/>
- Packet Tracer Software: <https://www.netacad.com/courses/packet-tracer>
- GNS3 software: <https://www.gns3.com/>

**Note: A minimum of 08 Programs should be done in each Part**

**Pedagogy:** Demonstration, Hands on Simulation.

Formative Assessment for Practical	
Assessment Occasion/ type	Marks
Lab Records	5
Attendance	5
Internal Assessment Test	10
<b>Total</b>	<b>20 Marks</b>
<i>Formative Assessment as per guidelines.</i>	



## References

### Reference Books:

1	Andrew S Tanenbaum, David. J. Wetherall, -Computer NetworksI, Pearson Education, 5 <sup>th</sup> Edition,
2	Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw-Hill, FourthEdition
3	Kurose and Ross, Computer Networking- A Top-Down approach, Pearson, 5 <sup>th</sup> edition
4	William Stallings, Data and Computer Communications, 7th Edition,PHI.
4	<a href="http://highered.mheducation.com/sites/0072967757/index.html">http://highered.mheducation.com/sites/0072967757/index.html</a>
7	Larry L. Peterson, Bruce S. Davie, -Computer Networks: A Systems ApproachII, Morgan Kaufmann Publishers, Fifth Edition, 2011.
8	Brijendrasingh, Data Communication and Computer Networks,PHI.

Program Name	B.Sc.	Semester	V
Course Title	Cyber Security(Theory)/ Employability Skills		
Course Code:	SEC-4	No. of Credits	02
Contact hours	30Hrs	Duration of SEA/Exam	01hrs
Formative Assessment Marks	20	Summative Assessment Marks	30

**Course Outcomes(COs):** After the successful completion of the course, the student will be able to:

CO1	After completion of this course, students would be able to understand the concept of Cyber security and issues and challenges associated with it.
CO2	Students, at the end of this course, should be able to understand the cybercrimes, their nature, legal remedies and as to how report the crimes through available platforms and procedures.
CO3	On completion of this course, students should be able to appreciate various privacy and security concerns on online Social media and understand the reporting procedure of inappropriate content, underlying legal aspects and best practices for the use of Social media platforms.

Contents	30Hrs
<b>UNIT-I.</b> Introduction to Cyber security: Defining Cyberspace and Overview of Computer and Web-technology, Architecture of cyberspace, Communication and web technology, Internet, World wide web, Advent of internet, Internet infrastructure for data transfer and governance, Internet society, Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber security.	10
<b>UNIT-II.</b> Cyber crime and Cyber law: Classification of cyber crimes, Common cyber crimes- cyber crime targeting computers and mobiles, cyber crime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks, Cybercriminals modus-operandi, Reporting of cyber crimes, Remedial and mitigation measures, Legal perspective of cyber crime, IT Act 2000 and its amendments, Cyber crime and offences, Organizations dealing with Cyber crime and Cyber security in India, Case studies.	10
<b>UNIT-III.</b> Social Media Overview and Security: Introduction to Social networks. Types of Social media, Social media platforms, Social media monitoring, Hashtag, Viral content, Social media marketing, Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media, Case studies.	10

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes**

Course Out comes(COs) /Program Outcomes (POs)	Program Outcomes (POs)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Quickly understand the given problem and come up with the correct answer															
Identify, construct and compute numerical situations by work with numbers															
Conceive and develop a methodology for analyzing data and solving a problem.															
Define, modify and apply critical thinking to real time situations.															

**Pedagogy:** Problem Solving

Formative Assessment for Theory	
Assessment Occasion/type	Marks
Internal Test I	10
Assignment/Surprise Test	10
<b>Total</b>	<b>20 Marks</b>
<i>Formative Assessment as per guidelines.</i>	

Text/References	
1	Cyber Crime Impact in the New Millennium, by R. C Mishra , Author Press. Edition 2010
2	Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
3	Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13 <sup>th</sup> November, 2001)
4	Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
5	Fundamentals of Network Security by E. Maiwald, McGraw Hill.
6	Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.

**Note: The classes of Cyber Security (SEC-4) will be conducted by the faculties of Computer Science.**

Program Name	B.Sc.	Semester	VI
Course Title	Web Technologies (Theory)		
Course Code:	DSC8	No. of Credits	04
Contact hours	52 Hours	Duration of SEA/Exam	2 hours
Formative Assessment Marks	40	Summative Assessment Marks	60

**Course Outcomes (COs):** After the successful completion of the course, the student will be able to:

CO1	Understand basics of web technology
CO2	Recognize the different Client-side Technologies and tools like, HTML, CSS, JavaScript
CO3	Learn Java Servlets and JDBC
CO4	Web Technology for Mobiles and Understand web security

Contents	52 Hrs
<b>UNIT-1:Introduction and Web Design:</b> Introduction to Internet, WWW and Web 2.0, Web browsers, Web protocols and Web servers, Web Design Principles and Web site structure, client-server technologies, Client side tools and technologies, Server side Scripting, URL, MIME, search engine, web server- Apache, IIS, proxy server, HTTP protocol. Introduction to HTML. HTML5 Basics tags, Formatting tags in HTML, HTML5 Page layout and Navigation concepts, Semantic Elements in HTML, List, type of list tags, tables and form tags in HTML, multimedia basics, images, iframe, map tag, embedding audio and video clips on webpage.	11
<b>UNIT-2:Introduction to XML:</b> XML Syntax, XML Tree, Elements, Attributes, Namespace, Parser, XSLT DOM, DTD, Schema. Introduction to CSS, CSS syntax, CSS selectors, CSS Background Cursor, CSS text fonts, CSS-List Tables, CSS Box Modeling, Display Positioning, Floats, CSS Gradients, Shadows, 2D and 3 Transform, Transitions, CSS Animations.	10
<b>UNIT-3:Introduction to JavaScript:</b> JavaScript Data type and Variables, JavaScript Operators, Conditional Statements, Looping Statements, JavaScript Functions, Number, Strings, Arrays, Objects in JavaScript, Window and Frame objects, Event Handling in JavaScript, Exception Handling, Form Object and DOM, JSON, Browser Object Model.	11
<b>UNIT-4:Introduction to Servlets:</b> Common Gateway Interface (CGI), Lifecycle of a Servlets, deploying a Servlets, The Servlets API, Reading Servlets parameters, reading initialization parameters, Handling HTTP Request & Responses, Using Cookies and sessions, connecting to a database using JDBC.	10
<b>UNIT-5:Web Security:</b> Authentication Techniques, Design Flaws in Authentication, Implementation Flaws in Authentication, Securing Authentication, Path Traversal Attacks. Injecting into Interpreted Contexts, SQL Injection, NoSQL Injection, XPath Injection, LDAP Injection, XML Injection, HTTP Injection, Mail Service Injection. Types of XSS, XSS in Real World, Finding and Exploiting XSS Vulnerabilities, Preventing XSS Attacks.	10

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)**

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

**Pedagogy:** Lecture/ PPT/ Videos/ Animations/ Role Plays/ Think-Pair-Share/ Predict-Observe-Explain/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/ Activity/ Flipped Classroom/ Jigsaw/ Field based Learning/ Project Based Learning/ Mini Projects/ Hobby Projects/ Forum Theatre/ Dance/ Problem Based Learning/ Game Based Learning/ Group Discussion/ Collaborative Learning/ Experiential Learning / Self Directed Learning etc.

Formative Assessment for Theory	
Assessment Occasion/ type	Marks
Internal Assessment Test 1	10
Internal Assessment Test 2	10
Quiz/ Assignment/ Small Project	10
Seminar	10
<b>Total</b>	<b>40 Marks</b>
<i>Formative Assessment as per guidelines.</i>	

**References**

1	Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dremtech
2	Java Server Pages – Hans Bergsten, SPD O'Reilly
3	Java Script, D.Flanagan, O'Reilly, SPD
4	Beginning Web Programming-Jon Duckett WROX.
5	Web Applications : Concepts and Real World Design, Knuckles, Wiley-India
6	Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

Program Name	B.Sc.	Semester	VI
Course Title	Web Technologies Lab		
Course Code:	DSC8-Lab	No. of Credits	02
Contact hours	04 Hours per week	Duration of SEA/Exam	2 hours
Formative Assessment Marks	20	Summative Assessment Marks	30

#### Part A

1. Design web pages for your college containing college name and Logo, departments list using href, list tags.
2. Create a class timetable using table tag.
3. Write a HTML code to design Student registrations form for your college Admission
4. Design Web Pages with includes Multi-Media data (Image, Audio, Video, GIFs etc)
5. Create a web page using frame.
6. Write code in HTML to develop a webpage having two frames that divide the webpage into two equal rows and then divide the row into equal columns fill each frame with a different background color.
7. Write CSS code to Use Inline CSS to format your ID Card.
8. Using HTML, CSS create display a text called —Hello India !! on top of an image of India- Map using an overlay.

#### Part B

1. Write a JavaScript Program to perform Basic Arithmetic operations
2. JavaScript Program to Check Prime Number
3. JavaScript Program to implement Javascript Object Concept
4. JavaScript Program to Create Array and inserting Data into Array
5. JavaScript Program to Validate an Email Address
6. Write a Program for printing System Date & Time using SERVLET
7. Write a server side SERVLET program for accepting number from HTML file and Display.
8. Write a program to Creating the Life-Cycle Servlet Application

**Note: A minimum of 08 Programs should be done in each Part**

Formative Assessment for Practical	
Assessment Occasion/ type	Marks
Lab Records	5
Attendance	5
Internal Assessment Test	10
<b>Total</b>	<b>20 Marks</b>
<i>Formative Assessment as per guidelines.</i>	



Program Name	B.Sc.	Semester	VI
Course Title	Operating System (Theory)		
Course Code:	DSC9	No. of Credits	04
Contact hours	52 Hours	Duration of SEA/Exam	2 hours
Formative Assessment Marks	40	Summative Assessment Marks	60

**Course Outcomes (COs):** After the successful completion of the course, the student will be able to:

CO1	Explain the fundamentals of the operating system.
CO2	Comprehend multithreaded programming process management, process synchronization, memory management and storage management.
CO3	Compare the performance of Scheduling Algorithms
CO4	Identify the features of I/O and File handling methods.

Contents	52 Hrs
<b>UNIT-1:INTRODUCTION TO OPERATING SYSTEM:</b> What Operating Systems Do? Computer -System organization; Computer-System Architecture; Operating-System Operations;Operating-System Services; User and Operating-System Interface; System Calls; System Services.	10
<b>UNIT-2:PROCESS MANAGEMENT:</b> Process Concept; Process scheduling; Operations on Processes; Inter process communication; IPC in Shared- Memory Systems; IPC inMessage-Passing Systems.	10
<b>UNIT-3:CPU SCHEDULING:</b> Basic concepts; Scheduling Criteria; Scheduling Algorithms;Multiple-processor scheduling; Real-Time CPU Scheduling. <b>PROCESS SYNCHRONIZATION:</b> Critical Section Problem and Peterson's Solution; Semaphores; Monitors; Classic Problems of Synchronization; Synchronization within the Kernel.	12
<b>UNIT-4:DEADLOCKS:</b> System Model; Deadlocks Characterization; Methods for Handling Deadlocks; Deadlock Prevention; Deadlock Avoidance; Deadlock Detection.	10
<b>UNIT-5:MEMORY MANAGEMENT:</b> Contiguous Memory Allocation; Paging; Structure of the Page Table; Swapping.	10

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)**

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

**Pedagogy:** Lecture/ PPT/ Videos/ Animations/ Role Plays/ Think-Pair-Share/ Predict-Observe-

Explain/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/ Activity/ Flipped Classroom/ Jigsaw/ Field based Learning/ Project Based Learning/ Mini Projects/ Hobby Projects/ Forum Theatre/ Dance/ Problem Based Learning/ Game Based Learning/ Group Discussion/ Collaborative Learning/ Experiential Learning / Self Directed Learning etc.

<b>Formative Assessment for Theory</b>	
<b>Assessment Occasion/ type</b>	<b>Marks</b>
Internal Assessment Test 1	10
Internal Assessment Test 2	10
Quiz/ Assignment/ Small Project	10
Seminar	10
<b>Total</b>	<b>40 Marks</b>
<i>Formative Assessment as per guidelines.</i>	

**Text Books:**

- |    |   |
|----|---|
| 1. | Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin, Greg Gagne <sup>8th</sup> Edition, Wiley, 2009. |
|----|---|

**References Books:**

- |   |   |
|---|---|
| 1 | Understanding Operating Systems, McHoes A et al., 7 <sup>th</sup> Edition, CengageLearning, 2014. |
| 2 | Operating Systems - Internals and Design Principles, William Stallings, 9th Edition, Pearson.     |
| 3 | Operating Systems – A Concept Based Approach, Dhamdhare, 3rd Edition, McGrawHill Education India. |
| 4 | Modern Operating Systems, Andrew S Tanenbaum, 4th Edition, Pearson.                               |
| 5 | Operating System Concepts - Engineering Handbook, Ghosh PK, 2019.                                 |



Program Name	<b>B.Sc.</b>	Semester	<b>VI</b>
Course Title	<b>Operating System Lab</b>		
Course Code:	<b>DSC9 Lab</b>	No. of Credits	<b>02</b>
Contact hours	<b>04 Hours per week</b>	Duration of SEA/Exam	<b>2 hours</b>
Formative Assessment Marks	<b>20</b>	Summative Assessment Marks	<b>30</b>

#### PART-A

1. Program to implement FCFS CPU scheduling Algorithm.
2. Program to implement SJF CPU scheduling Algorithm.
3. Program to implement Priority CPU scheduling Algorithm.
4. Program to implement RR CPU scheduling Algorithm.
5. Program to illustrate Deadlock.
6. Write a program to simulate paging technique of memory management.
7. Programs demonstrating Multi threads.
8. Write a program to simulate Bankers algorithm for the purpose of deadlock avoidance.
9. Write a program to simulate page replacement algorithm FIFO
10. Write a program to simulate page replacement algorithms LRU

#### PART-B

1. Write a program to simulate page replacement algorithms LFU
2. Write a Shell script to find the Maximum and Minimum value of a given set of numbers.
3. Write a Shell script to print the number of vowels in a given string.
4. Write a Shell script to print the student details in proper order.
5. Write a Shell script to print the permissions are exists or not.
6. Write a Shell script to print the results of *bc* and *expr* commands.
7. Write a Shell script to print the results of *grep* command.
8. Write a Shell script to print the even numbers between 1 and 20.
9. Write a Shell script to access permissions of a file.

**Note: A minimum of 08 Programs should be done in each Part.**

<b>Formative Assessment for Practical</b>	
<b>Assessment Occasion/ type</b>	<b>Marks</b>
Lab Records	5
Attendance	5
Internal Assessment Test	10
<b>Total</b>	<b>20 Marks</b>
<i>Formative Assessment as per guidelines.</i>	

Program Name	BSc		Semester	VI
Course Title	Internship			
Course Code:			No. of Credits	02
Contact hours	90 Hrs		Duration of SEA/Exam	01 hrs
Formative Assessment Marks	20		Summative Assessment Marks	30
<b>Course Outcomes (COs):</b> After the successful completion of the course, the student will be able to:				
CO1	Internship/Project Skills			
CO2	Learn Industry Standards			
CO3	Adaptive Programming Skills			
<b>Contents</b>				
<p align="center"><b><u>Internship for graduate Programme (As Per UGC &amp; AICTE)</u></b>  <b><i>Methods of Evaluation: Presentations/Report submission/Activity etc.</i></b></p> <ul style="list-style-type: none"> <li>❖ Internship shall be Discipline Specific of 90 hours (2 credits) with a duration 4-6 weeks.</li> <li>❖ Internship may be full-time/part-time (full-time during semester holidays and part-time in the academic session)</li> <li>❖ Internship mentor/supervisor shall avail work allotment during 6 th semester for a maximum of 20 hours.</li> <li>❖ The student should submit the final internship report (90 hours of Internship) to the mentor for completion of the internship.</li> <li>❖ The detailed guidelines and formats shall be formulated by the universities separately as prescribed in accordance to UGC and AICTE guideline</li> </ul>				

**IA Theory(FORMATIVE) TEST MODEL QUESTION PAPER-1**

Fifth/Six Semester B.Sc. Degree Examination July/Aug 2023  
(NEP –Syllabus-Semester Scheme)  
COMPUTER SCIENCE

SUBJECT: <Name of the Subject>

Time: 2hrs

Max.Marks: 40

I. Answer any Five of the Following

5\*2=10 Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

II. Answer any Two of the Following

2\*5=10 Marks

- 1.
- 2.
- 3.

III. Answer any Two of the Following

2\*10=20 Marks

- 1.
- 2.
- 3.

**IA Theory(FORMATIVE) TEST MODEL QUESTION PAPER-2**

Fifth/Six Semester B.Sc. Degree Examination July/Aug 2023  
(NEP –Syllabus-Semester Scheme)  
COMPUTER SCIENCE

SUBJECT: Cyber Security/ Logical Reasoning

Time: 1hrs

Max.Marks: 20

I. Answer any Five of the Following

5\*2= 10 Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

II. Answer any Two of the Following

2\*5=10 Marks

- 1.
- 2.
- 3.
- 4.

QP Code:

**Theory(Summative) EXAM MODEL QUESTION PAPER-2**

Fifth/Six Semester B.Sc. Degree Examination July/Aug 2023  
(NEP –Syllabus-Semester Scheme)  
**COMPUTER SCIENCE**

**SUBJECT: Cyber Security/ Logical Reasoning**

Time: 1hrs

Max. Marks: 30

**PART-A:**

1. Answer all three of the following questions

3\*5=15

- a.  
b.  
c.

OR

2. Answer all three of the following questions

3\*5=15

- a.  
b.  
c.

**PART-B:**

3. Answer all three of the following questions

3\*5=15

- a.  
b.  
c.

OR

4. Answer all three of the following questions

3\*5=15

- a.  
b.  
c.

  
**Chairman**

**DOS in Computer Science  
Davangere University,  
Shivagangotri, Davangere-07.**

  
**DR. RAMALINGAPPA**

**Professor and Dean,  
Faculty of Science & Technology  
Davangere University Shivagangothri  
DAVANGERE - 57 007**

  
**Registrar**

**Davangere University  
Shivagangotri, Davangere**



QP Code:

**Theory(Summative) EXAM MODEL QUESTION PAPER-1**

Fifth/Six Semester B.Sc. Degree Examination July/Aug 2023  
(NEP –Syllabus-Semester Scheme)  
COMPUTER SCIENCE

SUBJECT: <Name of the Subject>

Time: 2hrs

Max.Marks: 60

I. Answer any FIVE of the Following

5\*2=10 Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

II. Answer any FIVE of the Following

5\*4=20 Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

III. Answer any THREE of the Following

3\*10=30 Marks

- 1.
- 2.
- 3.
- 4.
- 5.