



॥ तमसो मा ज्योतिर्गमय ॥

VISION

To provide equal opportunities for value based global education for creating an Enlightened Society

MISSION

To establish and facilitate educational institutions in the region for providing affordable value based global education to all who aspire to study and to create opportunities to educators, social workers and philanthropists to serve society



SARVAJANIK
UNIVERSITY

INCLUSIVE | INTEGRATED | INNOVATIVE

creating an enlightened society...

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CURRICULUM FOR

“BACHELOR OF SCIENCE (HONS.)”

B.Sc. (Hons.) Computer
Science

SEM - 6

w.e.f. Academic Year 2025-26

Constituent Institute:

**Shree Ramkrishna Institute of
Computer Education and Applied
Sciences (SRKI)**

SARVAJANIK UNIVERSITY
FACULTY OF SCIENCE



**SARVAJANIK
UNIVERSITY**

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Faculty of Science

B. Sc. (Honors)

Computer Science

SEM - 6

DETAILED CURRICULUM
(W.E.F. 2025-26)

SARVAJANIK UNIVERSITY
FACULTY OF SCIENCE



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MAJOR SUBJECTS

SEM 6

DETAILED CURRICULUM

(W.E.F. 2025-26)

SARVAJANIK UNIVERSITY
FACULTY OF SCIENCE
Bachelor of Science (Hons.) Computer Science Sem-6

Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	B.Sc. (Computer Science)		
Year	3		Version	3.0		
Semester	6		Effective From	December, 2025		
Course Code	BSCS31627	Course Name	Programming for Smart Devices			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CA)	Term end examinations (TEE)	Total
3	3	0	0	40	35	75

SARVAJANIK UNIVERSITY
FACULTY OF SCIENCE
Bachelor of Science (Hons.) Computer Science Sem-6

Purpose of Course	To introduce the most demanding and developing mobile app technology. Fundamentals of android open-source technology
Course Objective	- To make students understand the fundamentals of mobile app technology. - To make students understand various inbuilt features of android. - To make students understand the android design essentials. - To make students understand android user interface design basics.
Pr-requisite	Fundamentals of java programming.
Course Out come	Students will have knowledge about android which is widely used Mobile OS and open-source technology and its concepts. Various features of android like Application Design Essentials, User Interface Design Essentials, Use of Common data storage using SQLite.
Course Content	Unit 1 : Introduction to Android and it's tool chain 1.1 Evolution and Versions of Android 1.2 Architecture of Android 1.3 Android Development Tools 1.3.1 Android SDK and SDK Manager 1.3.2 The Android Virtual Device, Emulator 1.3.4 Android Debug Bridge (ADB) Unit 2 : Android - Key Components 2.1 Components of Android Application - Activities, Services, Broadcast Receivers, Content Providers 2.2 Directory Structure of Android Application 2.1.1 AndroidManifest.xml

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	2.1.2 Layouts & Drawable Resources 2.1.3 Activity Java file 2.1.4 Gradle 2.3 Activity Life Cycle Unit-3 : Designing Android User Interface 3.1 Basic UI elements – EditText, TextView, Button, RadioButton, CheckBox, Spinner, Listview, Imageview 3.2 Designing User Interfaces with Layouts 3.2.1 Relative Layouts 3.2.2 Linear Layouts 3.2.3 Constraint Layouts Unit-4 : Navigating across activities 4.1 Intent and IntentFilter 4.2 Menus – Context menu, Option menu 4.3 Toast Message 4.4 Alert Dialog box Unit-5 : Handling data in Android applications 5.1 Purpose of Shared Preferences 5.2 Shared Preference Modes 5.3 Writing to Shared Preferences 5.4 Methods of Editor class 5.5 Reading from Shared Preferences 5.6 Introduction to SQLite 5.7 SqliteOpenHelper Class
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	5.8 SQLite Methods - ExecSQL, Rawquery, Insert, Update, Delete Unit-6 : Programming for different devices 4.1 Android TV, Android for Car, Android Things 4.2 Overview of screen compatibility 4.3 Support different pixel densities
Practical	List of practical will be prepared at the beginning of each semester
Reference Books	1. Professional Android 4 Application Development Reto Meier, WROX Publication-2015 2. Android for Programmers-An App Driven Approach, Deitel, Deitel, Deitel and Morgano, Pearson Publication-2012 3. Android Programming Unleashed, Harwani, Pearson Publication-2013 4. Professional Android Programming-with MONO McClure,Blevins, Croft, Dick and Hardy, Wiley India-2012 5. Android application development for java programmer, James C Sheusi, Cenage Learning-2013 6. Android Essentials, Chris Haseman, Apress Publication, 2009 7. Beginning Android, Mark L Murphy, Wiley India Pvt Ltd, 2009 8. Pro Android, Sayed Y Hashimi and Satya Komatineni, Wiley India Pvt Ltd, APress-2009

Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences			
Faculty	Science	Program	B.Sc. (Computer Science)
Year	3	Version	3.0
Semester	6	Effective From	December 2025

SARVAJANIK UNIVERSITY
FACULTY OF SCIENCE
Bachelor of Science (Hons.) Computer Science Sem-6

Course Code	BSCS31628	Course Name	Major: Programming for Smart Devices			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CA)	Term end examinations (TEE)	Total
1	0	0	2	10	15	25

SARVAJANIK UNIVERSITY
FACULTY OF SCIENCE
Bachelor of Science (Hons.) Computer Science Sem-6

Purpose of Course	To introduce the most demanding and developing mobile app technology. Fundamentals of android open-source technology
Course Objective	- To make students understand the fundamentals of mobile app technology. - To make students understand various inbuilt features of android. - To make students understand the android design essentials. - To make students understand android user interface design basics.
Pr-requisite	Fundamentals of java programming.
Course Out come	Students will have knowledge about android which is widely used Mobile OS and open-source technology and its concepts. Various features of android like Application Design Essentials, User Interface Design Essentials, Use of Common data storage using SQLite.
Course Content	The students will be required to carry out practical on android using the methods and tools discussed in their theory. A Journal must be prepared for the practical work done.
Practical	List of practical will be prepared at the beginning of each semester
Reference Books	As per paper Major - Programming for Smart Devices

SARVAJANIK UNIVERSITY
FACULTY OF SCIENCE
Bachelor of Science (Hons.) Computer Science Sem-6

Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	B.Sc. (Computer Science)		
Year	3		Version	3.0		
Semester	6		Effective From	December, 2025		
Course Code	BSCS31629	Course Name	Operating System Architecture			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CA)	Term end examinations (TEE)	Total
4	4	0	0	50	50	100

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Bachelor of Science (Hons.) Computer Science Sem-6

Purpose of Course	Conceptualize the students with the theoretical concepts of Operating Systems.
Course Objective	Familiarization with different objectives of operating system components process management and inter-process communication; Experiments on process scheduling and other operating system tasks through simulation/implementation under a simulated environment
Pr-requisite	Fundamental knowledge of Computer Organization.
Course Outcome	• Deep understanding of various components of operating systems. • Case study of Unix operating systems to analyze the different services provided by UNIX Operating System • Design and implement various system calls and concurrent processes requiring synchronization. • Optimum resource management.
Course Content	Unit- 1: Operating System Concepts [6 hrs] 1.1. Operating System Fundamentals and Its Types 1.2. Components of operating system 1.3. BIOS, Booting process and kernel 1.4. Functions of operating systems 1.5. Interrupt and System call, Data bus and Address bus Unit- 2: I/O Device and File Management [8 hrs] 2.1 I/O Devices, Device controllers and drivers, DMA, Programmed I/O, Interrupt driven I/O, I/O using DMA 2.2 Disk Architecture 2.3 Disk Space Management 2.4 Allocation and Disk Arm Scheduling Methods 2.4.1 FCFS 2.4.2 SSTF 2.4.3 SCAN 2.4.4 C-SCAN 2.5 Drivers for different devices. Unit- 3: Files structure [7 hrs] 3.1 File storage mechanism, 3.1.1 File allocation table 3.1.2 Directory and File structure, 3.1.3 Attributes, Types, Access, Operations, Protection and sharing and remote access. 3.2 File system management and optimization – 3.2.1 Disk space management 3.2.2 Backup, consistency, Performance 3.2.3 Defragmentation

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Unit- 4: Memory Management [9 hrs]

- 4.1 Address space
 - 4.1.1 Contiguous and non- contiguous allocation
 - 4.1.2 Managing free space
- 4.2 Virtual memory
 - 4.2.1 Paging, Page size, Page table, Page fault
 - 4.2.2 Demand Paging
 - 4.2.3 Page replacement algorithms
 - 4.2.3.1 FIFO
 - 4.2.3.2 LRU
 - 4.2.3.3 2nd Chance NRU Optimal Shared page
- 4.3 Segmentation
 - 4.3.1 Implementation of pure segmentation
 - 4.3.2 segmentation with paging.

Unit- 5: Process Management [9 hrs]

- 5.1 Process
 - 5.1.1 Process states
 - 5.1.2 PCB
 - 5.1.3 Process scheduling
- 5.2 Scheduling Algorithms
- 5.3 Study of Round-robin
 - 5.3.1 FCFS
 - 5.3.2 SJF
 - 5.3.3 SRTF
 - 5.3.4 priority algorithms
- 5.4 Overview of deadlock
- 5.5 Deadlock avoidance, prevention and recovery
- 5.6 Overview of Inter process communication

Unit- 6: Threads [5 hrs]

- 6.1 Introduction to Threads
- 6.2 Process vs Threads
- 6.3 Types of Threads: User level thread, System level thread

Unit- 7: Introduction to Unix operating system [7 hrs]

- 7.1 Introduction: History of Unix, features
- 7.2 Unix system architecture and kernel
- 7.3 Unix command format
 - 7.3.1 Unix internal and external commands
 - 7.3.2 Directory commands
 - 7.3.3 File related commands
 - 7.3.4 Disk related commands
 - 7.3.5 general utilities

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	Unit- 8: File, Process and memory management in Unix operating systems [9hrs] 8.1 Unix file system 8.1.1 Boot inode, super and data block, Directories 8.1.2 Conversion of pathname to inode 8.1.2.1 inode to a new file 8.1.3 Disk block allocation 8.2 Process management in Unix 8.2.1 Process state and data structures of a process 8.2.1.1 User Vs kernel node 8.2.2 Context of a process 8.2.3 Background processes 8.2.4 Process scheduling commands 8.2.5 Process terminating and examining commands 8.3 Storage management in Unix 8.3.1 Formatting, making file system 8.3.2 Checking disk space 8.3.3 Mountable file system 8.3.4 Disk partitioning 8.3.5 File compression 8.4 Special tools and utilities 8.4.1 Filters, Stream editor SED and AWK 8.4.2 Unix system calls and library functions, Processes 8.4.3 signals and Interrupts, storage and compression facilities 8.5 Basic shell programming concepts
Reference Books	1. Operating System Concepts, James Peterson McGrawHill 2. An OS Concept ,Silberschatz AdditionWesley Publication 3. An Operating Systems, W.Stallings Pearson Education 4. Understanding Operating Systems, I.M.Flinn, A.M. Mchoes – Thomson Learning 5. Operating Systems, Donovan M McGrawHill Publication 6. Operating Systems: A Design Oriented Approach, Crowley TataMcGrawHill 7. Operating Systems, S. Godbole TMH. 8. OperatingSystems: Designand Implementation, Tanenbaum & Woodhull 9. The Design of the Unix Operating System, Maurice J. Bach PHI

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FACULTY OF SCIENCE
Bachelor of Science (Hons.) Computer Science Sem-6

Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	B.Sc. (Computer Science)		
Year	3		Version	1.0		
Semester	6		Effective From	June, 2025		
Course Code	BSCS31623	Course Name	Web Application Development-IV			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CA)	Term end examinations (TEE)	Total
3	3	0	0	40	35	75

Purpose of Course	To introduce Java EE for developing Enterprise applications
Course Objective	- Understand the core concepts of Enterprise Java (Jakarta EE). - Develop web-based and enterprise applications using Java technologies. - Implement Servlets, JSP, EJB and JDBC for scalable applications. - Integrate Java applications with databases and web services. - Deploy applications in an enterprise environment.
Pr-requisite	Fundamentals of java programming.
Course Out come	Upon completing the course, students will master advanced programming concepts and technologies such as Java EE, JSP, Servlets and EJB, enabling them to develop robust, scalable Java applications.
Course Content	Unit 1: Introduction to Enterprise Java (6 Hours) 1.1. Evolution of Java EE (Jakarta EE) 1.2. Java EE Architecture and Components 1.3. Java SE vs Java EE 1.4. Overview of Java EE APIs (Servlets, JSP, EJB, JPA, etc.) 1.5. Setting up a Java EE development environment (JDK, Payara, Tomcat, Eclipse/IntelliJ)

	Unit 2: Servlets – Web Application Foundation (7 Hours) 2.1. Servlet Architecture 2.2. Request and Response Handling 2.3. Servlet Lifecycle 2.4. Session Management (Cookies, URL Rewriting, HttpSession) - Servlet Filters and Listeners Unit 3: Java Server Pages (JSP) (7 Hours) 3.1. JSP Lifecycle and Compilation Process 3.2. JSP Directives, Implicit Objects, and Scripting Elements 3.3. Expression Language (EL) 3.4. JSP Tag Libraries (JSTL) Unit 4: Enterprise JavaBeans (10 Hours) 4.1. Introduction to EJB and Types (Session Beans, Message-Driven Beans) 4.2. Stateful vs Stateless Beans 4.3. Dependency Injection in EJB 4.4. Transactions and Security in EJB Unit 5: JDBC -Database Connectivity (10 Hours) 5.1. JDBC Architecture 5.2. Types of JDBC Drivers 5.3. DriverManager class and Connection Interface 5.4. Interfaces : Statement, ResultSet, PreparedStatement, CallableStatement 5.5. ResultSet Operations 5.6. Creating CRUD Application Unit 6: Application Deployment & Security (8 Hours) 6.1. Deployment of Java EE Applications (WAR, EAR files) 6.2. Role-based Security and Authentication – Java Web Tokens 6.3. Web Application Performance Optimization 6.4. RESTful Web Services in Java EE
Reference Books	1. Professional Android 4 Application Development Reto Meier, WROX Publication-2015 2. Android for Programmers-An App Driven Approach, Deitel, Deitel, Deitel and Morgano, Pearson Publication-2012 3. Android Programming Unleashed, Harwani, Pearson Publication-2013

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| | <ol style="list-style-type: none">4. Professional Android Programming-with MONO McClure,Blevins, Croft, Dick and Hardy, Wiley India-20125. Android application development for java programmer, James C Sheusi, Cenage Learning-20136. Android Essentials, Chris Haseman, Apress Publication, 20097. Beginning Android, Mark L Murphy, Wiley India Pvt Ltd, 20098. Pro Android, Sayed Y Hashimi and Satya Komatineni, Wiley India Pvt Ltd, APress-2009 |
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Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	B.Sc. (Computer Science)		
Year	3		Version	1.0		
Semester	6		Effective From	June, 2025		
Course Code	BSCS31626	Course Name	Web Application Development-IV			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CA)	Term end examinations (TEE)	Total
1	0	0	2	15	10	25

Purpose of Course	To introduce Java EE for developing Enterprise applications
Course Objective	- Understand the core concepts of Enterprise Java (Jakarta EE). - Develop web-based and enterprise applications using Java technologies. - Implement Servlets, JSP, EJB and JDBC for scalable applications. - Integrate Java applications with databases and web services. - Deploy applications in an enterprise environment.
Pr-requisite	Fundamentals of java programming.
Course Out come	Upon completing the course, students will master advanced programming concepts and technologies such as Java EE, JSP, Servlets and EJB, enabling them to develop robust, scalable Java applications.
Course Content	The students shall carry out practical using the methods and tools discussed. A Journal must be prepared for the practical work done.
Practical	List of practical will be prepared at the beginning of each semester
Reference Books	As per paper Major - Web Application Development-IV



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MINOR SUBJECTS

SEM 6

DETAILED CURRICULUM

(W.E.F. 2025-26)

ARTIFICIAL INTELLIGENCE-II

Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	B.Sc. Computer Science		
Year	2025		Version	1.0		
Semester	VI		Effective From	April, 2025		
Course Code	BSCS32607	Course Name	Artificial Intelligence -II			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CCE)	Semester end examinations (SEE)	Total
3	3	-	-	40	35	75

Purpose of Course	The purpose of the course is to establish foundations of concepts, approaches, methods and techniques artificial intelligence
Course Objective	The course aims to develop the ability to design, implement, and evaluate machine learning models for solving real-world problems, with a focus on both theoretical understanding and practical skills using modern tools and techniques.
Pr-requisite	Understanding of Statistics, Mathematics and Algorithms
Course Outcome	After completion of this course, the student will be able to understand and solve real world ML problems, application areas and state of the art ML concepts which are being used in practical implementation.
Course Content	Unit 1 : Introduction to Machine Learning [5 hrs] 1.1 Types of Problem in ML 1.2 Supervised Machine Learning 1.3 Unsupervised Machine Learning 1.4 Reinforcement Learning Unit 2 : Supervised Learning Techniques [7 hrs] 2.1 Classification 2.2 Naïve Bayes Classifier 2.3 Regression 2.4 Linear Regression Unit 3 Machine Learning Model Implementation -skitlearn [6 hrs] 3.1 Role of Dataset and Instances 3.2 Train-Test Set, Validation Set 3.3 ML model training-testing process

	3.4 ML Process Flow with sklearn Unit 4 Classification [7 hrs] 4.1 Classification: Examples and Applications 4.2 Classification Algorithms -NB , SVM 4.3 Classification Algorithms - KNN 4.4 Rule based ML - Decision Trees Unit 5 Evaluation Metrics for Classification [7 hrs] 5.1 Confusion Matrix 5.2 Accuracy and Precision 5.3 Precision and F1-Score 5.4 Evaluation and Fine Tuning of Model Unit 6 Working with Continuous Data Regression [7 hrs] 6.1 Multiple Linear Regression 6.2 Polynomial Regression 6.3 Evaluation Metrics for Regression 6.4 Result Visualization Unit 7: Model Validation [6 hrs] 7.1 Purpose of Model Validation 7.2 Validation Techniques (Cross-Validations) 7.3 Feature Reduction/Dimensionality reduction 7.4 Generalization, Overfitting, and Underfitting, Relation of Model Complexity to Dataset Size Unit 8: Advanced Machine Learning Concepts [6 hrs] 8.1 Introduction to MLOps 8.2 Transfer Learning 8.3 Federated Learning
Text and Reference Literature	1. AI an Machine Learning, Vinod Chandra SS, Anans Hareendran S. PHI Publication 2. Machine Learning with Python, Abhishek Vijayvargia, BPB Publication 3. Machine Learning Hand-On for Developers and Technical Professionals, Jason Bell, Wiley Publication 4. Machine Learning for Beginners: Learn to Build Machine Learning Systems Using Python , Harsh Bhasin, BPB Publication 5. Machine Learning - Tom M. Mitchell, McgrewHill Publication

Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program		B.Sc. Computer Science	
Year	2025		Version		1.0	
Semester	VI		Effective From		July, 2025	
Course Code	BSCS32608	Course Name		Information Security and Cyber Security II		
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial(T)	Practical (P)	Continuous Assessments (CCE)	Semester end examinations (SEE)	Total
4	4	-	-	50	50	100

Purpose of the Course	The purpose of the course is to make students capable of concepts to protect valuable information and systems from unwanted access and attacks.
Course Objectives	This subject aims to cover various privacy techniques on digital assets, ensuring data availability and mitigating risk. Learning cryptosystems and ways to move towards Cybersecurity culture to Global security.
Pre requisite	Basic concepts of computer systems and networks
Course out come	After completion of this course, the student will able to understand the importance of data protection and take career paths towards cybersecurity
Course content	1. Introduction to Information Security [6 Hours] 1.1. Active and Passive attacks 1.2. Ciphertext Only Attacks (COA), Known Plaintext Attack (KPA), Chosen Plaintext Attack (CPA), Brute Force Attack (BFA) , Dictionary Attack, Birthday Attack (attack on hash function), Man in Middle Attack (MIM) , Side Channel Attack (SCA) , Timing Attack, Power Analysis Attacks, Fault analysis Attacks, Rainbow table attack. 1.3. Biometrics: Types of Biometric Techniques: False Rejection, False Acceptance, Crossover Error Rates. 1.4. Password authentication/multi-factor , Password Authentication, Password Vulnerabilities & Attacks, password policies Cryptanalysis tool. 2. Virus, Worms, Trojan attacks [6 Hours] 2.1. Virus - design factors, life cycle, Taxonomies of malicious program, phases of virus, technical, physiological, legal and Ethical effect of virus, system sector/boot viruses, Batch file virus, 2.2. Macro viruses: parasitic (file) viruses, cluster viruses, companion viruses,

Course content	2.3. Virus detection (1st to 4th generation), Anti-virus technologies (Scanners (interceptors, disinfectors, Heuristic), Inoculators, Integrity checkers, NBAR/QoS, anti-virus packages integrity checkers) 2.4. Worms : differentiate virus and worms, Morris internet worms (internet worms), change in system administration by first worm, components of worms (Reconnaissance, specific attacks, command interface, intelligence capabilities, unused and non-attack capabilities, communication mechanisms) 2.5. Trojans : Logic bombs, Unix backdoors, Phishing, Clickjacking, Scareware. 2.6. Business Impact analysis : Event damage (negligible, minor, major), Recovery time (recovery point objective and recovery time objective: disaster recovery plan, Restoration plan). 2.7. High availability solutions: Raid, Fault tolerance server, SAN, Network disaster recovery (redundancy, alternative routing, diverse routing, last-mile circuit protection, long-haul network diversity, voice recovery) 3. Vulnerabilities [9 Hours] 3.1. Vulnerabilities , Threats (categories and sources) and Risk Relationship between Risk, Threats and Vulnerabilities. 3.2. Network Vulnerabilities: Overview of vulnerability scanning, Open Port / Service Identification, Version Check, Traffic Probe, Vulnerability Probe, Vulnerability Examples, OpenVAS, Metasploit. 3.3. Networks Vulnerability Scanning (Nmap, Socat), Network Sniffers and Injection tools. 3.4. Web attack: Browser Attacks, Web Attacks Targeting Users, Obtaining User or Website Data, Email Attacks 4. Threats System and Application [9 Hours] 4.1. Threats and Security on Cloud 4.2. Threats and Security on IOT 4.3. IP and Network Threats and Security 4.4. OS Threats and Security / Protection 4.5. Administrative Threats and Security 4.6. DevOps Threats and Security Automation 4.7. Applications Threats and Security 5. Introduction to Investigation and digital forensic [9 Hours] 5.1. Investigation 5.1.1. Understanding digital evidence 5.1.2. Evidence collection and handling 5.1.3. Data acquisition techniques 5.1.4. Chain of custody 5.1.5. Hashing and verification 5.2. Overview of digital forensic 5.2.1. OS Forensic 5.2.2. File system analysis 5.2.3. Data recovery 5.2.4. Image forensic 5.2.5. Memory forensic
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	5.2.6. Network forensic 5.3. Security audit 5.3.1. Compliance Audits. 5.3.2. Vulnerability Assessments. 5.3.3. Penetration Testing. 5.3.4. Risk Assessment Audits. 5.3.5. Internal Security Audits. 5.3.6. External Security Audits. 5.4. Introduction to disaster recovery 5.4.1. Key elements of cyber attack disaster recovery 6. Introduction to Cyber Crime Investigation [9 Hours] 6.1. Firewalls and Packet Filters 6.2. Password Cracking, 6.3. Keyloggers and Spyware, 6.4. Steganography 6.5. DOS and DDOS attack, 6.6. SQL injection, 6.7. Buffer Overflow, 6.8. Attack on wireless Networks 7. Web application scanning tools [6 Hours] 7.1. Nikto, W3af, HTTP utilities: Curl, OpenSSL and Stunnel, 7.2. Application Inspection tools: Zed Attack Proxy, Sqlmap, DVWA, Webgoat, 7.3. Password cracking and brute-force tools: John the Ripper, L0htcrack, Pwdump, 7.4. HTC-Hydra 8. Introduction to Cyber law [6 Hours] 8.1. Cyber crime and legal landscape around the world, IT Act 2000 and its amendments. limitations of IT Act 2000. 8.2. Cyber crime and punishments, Cyber laws and legal and ethical aspects related to new technologies- AI/ML, IoT, Blockchain, Darknet and social media, Cyber laws of other countries, Case studies.
Practical	Web Link for Practical application: • Crypto Hashes and Collisions Practical Cryptography for Developers • Programming Languages for Cryptography Cryptography Guide • Nmap: the Network Mapper - Free Security Scanner • How Does Trend Micro Smart Protection Server Work?
Reference Books	1. Computer security: Art and Science, Matt Bishop, Addison –Wesley 2. Introduction to computer security, Matt Bishop, Addison –Wesley 3. Information security – William Stallings 4. Information security, Dhien Patel, PHI 5. Cryptography and network security, Fourth edition, William Stallings 6. Cyber security understanding cyber crimes computer forensics and legal perspectives by Nina Godbole, Sunit Belapur by Wiley India Publications. 7. Internet forensic using digital evidences to solve computer crime by Robert Jones O'Reilly.

	8. Windows forensic - The field guide for conducting corporate computer investigations by Chad Steel Wiley India publications. 9. Digital evidence and computer crime 3rd Edition by Eoghan Casey Academic Press 10. Cyber crimes and fraud management by Petrick kishore, macmillan Education 11. E-Material: Cyber Security
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ABILITY ENHANCEMENT COURSE (AEC) SUBJECTS SEM 6

DETAILED CURRICULUM

(W.E.F. 2025-26)

Sarvajanik University
Faculty of Science
B.Sc. (Hons)

Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	B.Sc. (All)		
Year	3		Version	3		
Semester	VI		Effective From	July 2025		
Course Code	BSGN34610	Course Name	Human Values and Professional Ethics (Mulya Pravah 2.0)			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CCE)	Term end examinations (SEE)	Total
2	2	0	0	25	25	50

Sarvajanik University
Faculty of Science
B.Sc. (Hons)

Human Values and Professional Ethics (*Mulya Pravah 2.0*)

Name of Faculty: Sciences	Department: All
Program: B.Sc. (Hons)	Type: AEC
Subject: Human Values and Professional Ethics (<i>Mulya Pravah 2.0</i>)	
Credit: 02	Total teaching hours: 30
Course description: This course on “Mulya Pravah” creates a new paradigm towards an equitable world for all. It draws upon the innate space of universal values within individuals and communities to plan and implement strategic change and generate measurable results. It develops the capacity of individuals, groups, and communities to look within themselves to source their inner potential and universal values to ensure that their actions enable justice and equity for all. It strengthens them to envision new patterns and leverages systemic and cultural change and economic and social transformation, through equitable actions.	
Learning Outcomes: By the end of the course, students will be able to: ● Understand India’s rich cultural legacy and human values of which we are the custodians. ● Focus on professional ethics, which help citizens to discern desirable and undesirable actions ● Understand constitutional values, universal values, and holistic education to create integrated citizens.	

Reference:

- Blanchard, Kenneth and Peale, Norman Vincent. 1988. The Power of Ethical Management. New York: William Morrow and Company, Inc.
- Gandhi, Mohandas Karamchand. 1971. Pathway to God compiled by MS Deshpande. Ahmedabad: Navajivan Mudranalaya, Navjivan Trust.
- Kashyap, Subhash C. 2019 .Constitution of India. A handbook for students. New Delhi: National Book Trust.
- Lama, D. 1999. Ethics for the New Millennium. New York: Riverhead Books
- Lama, D. 2012. Beyond Religion: Ethics for a Whole World. India: Harper Collins.
- Mahadevan, B., Bhat, V.R. and Nagendra, P.R.N. 2022. Introduction to Indian Knowledge System. Delhi: PHI.
- Niti Shatak, Chaukhamba Prakashan, Varanasi
- Rodriguez, S. and Juvva, S. 2018. Embodying Universal Values and Ethical Leadership in Higher Education: Creating Change Agents for Social Transformation. In B. Chatterjee, A. Banerji and P. Arya (Eds.). Resolution to Resolve: Sustainability Practices in Industry and Education. New Delhi: Bloomsbury [ISBN: 978-938-74-7168-9].

Sarvajanik University
Faculty of Science
B.Sc. (Hons)

Unit-1: Introduction to Indian Ethos

(07 Hours)

- 1.1 Meaning of ethos and cultural essence of India
- 1.2 Scriptures as the base of the Indian Knowledge System (IKS)
- 1.3 Integrating the two methodologies: interiorization process for self-exploration, and exterior scientific pursuit for the prosperity of world
- 1.4 The Law of Karma and Nishkama Karma (The Law of action and selfless action)

Unit-2: Human Values and Ethics

(08 Hours)

- 2.1 Knowing the Self and the universal values that we stand for. This is self enquiry & self discovery.
- 2.2 Background conversations and deep listening, recognizing the assumptions that we make the biases we have, and the implications for ethical action.
- 2.3 Self-identity: distinguishing and embracing oneself (and others) four profiles (inner potential, social, professional, personality)
- 2.4 Distinguish ideology, perspectives beliefs from embodying values.

Unit-3: Constitutional Values and Global Citizenship

(07 Hours)

- 3.1 Values embedded in the Preamble of the Indian Constitution Integration of Human Rights and duties
- 3.2 Directive principles and responsibilities as citizens of India
- 3.3 Sensibility and responsibilities towards global environment, Loksangraha and Vasudhaiva Kutumbakam.

Unit-4: Integrated Personality and Well-being

(08 Hours)

- 4.1 The three gunas (qualities of sattva—purity and harmony, rajas —activity and passion, tamas —darkness and chaos), the four antah-karanas (inner instruments), and panch kosha (five sheaths).
- 4.2 Stress management: meditated personality and agitated personality.
- 4.3 Oneness, non-duality, and equanimity
- 4.4 Physical, mental, social, and spiritual well-being

Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	B.Sc. (All)		
Year	3		Version	3		
Semester	VI		Effective From	July 2025		
Course Code	BSGN34609	Course Name	Professional Skills			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CCE)	Term end examinations (SEE)	Total
2	2	0	0	25	25	50

Name of Faculty: Science	Department: All
Program: UG	Type: AEC- 6
Subject: Professional Skills	

Credit: 02	Total Learning Hours: 30 Hours
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The Objectives are to help learners

- Acquire career skills and fully pursue to partake in a successful career path
- Prepare a good résumé
- Prepare for interviews and group discussions
- Understand the significance of Team Skills
- Acquire Team Skills
- Design, develop, and adapt to situations as an individual and as a team member

Student Learning Outcome:

After completion of the course the student will be able to

- Prepare their résumé on an appropriate template without grammatical and other errors and using proper syntax.
- Actively participate in group discussions towards gainful employment.
- Perform appropriately and effectively in group discussions.
- Explore and Identify career opportunities.
- Demonstrate a set of non-cognitive skills such as empathy, creativity, teamwork, and collaboration, for the smooth and efficient functioning at a workplace.
- Actively use and operate online team communication tools, such as: Webinar, Skype, Zoom, Google, and Hangout.
- Demonstrate a set of cognitive skills and non-cognitive skills such as critical thinking, problem-solving, ability to learn for maintaining good interpersonal relations, smooth and efficient functioning at a workplace, empathy, creativity and teamwork skills.

Unit -1

1.1 Résumé Skills: Preparation and Presentation (03 hours)

- Introduction of Résumé and Related Terms
- Importance of Preparing a Good Résumé
- Difference between a CV, Résumé, and Biodata
- Essential Components of a Good Résumé

1.2 Résumé Skills: Common Errors

- Common Errors
- Guidelines for Résumé Preparation

Unit -2

2.1 Interview Skills: Preparation and Presentation (06 hours)

- Meaning of Interview
- Types of Interviews

- STAR Approach for Facing an Interview
- 2.2. Interview Procedure
 - Dos and Don'ts
 - Important Questions Generally Asked in a Job Interview
- 2.3 Interview Skills: Common Errors
 - Common Errors
 - Interview Questions for Assessing Your Strengths and Weaknesses
- 2.4 Simulation
 - Job Simulation Formats
 - Comment Critically on Simulated Interviews
- 2.5 Demonstrate an Ideal Interview

Unit – 3

3.1 Meaning and Importance of a Group Discussion (GD) (06 hours)

- Meaning of a Group Discussion
- Importance of a Group Discussion
- Types of Group Discussions.

3.2 Procedure of a Group Discussion

- Methodology
- Ground Rules
- Evaluation of a Group Discussion

3.3 Group Discussion: Common Errors

3.4 Group Discussion: Simulation

Unit – 4

4.1 Process of Career Exploration (03 hours)

- Knowing Yourself — Personal Characteristics
- Knowledge about the World of Work, Requirements of Jobs Including Self-employment.
- Sources of Career Information
- Preparing for a Career Based on Potentials of Learners and Availability of Opportunities

Unit –5

5.1 Cognitive Skills: Meaning, types of cognitive skills, strategies to develop cognitive skills. (06 hours)

- Critical Thinking Skills.
- Problem-solving Skills
- Ability to Learn.

5.2 Non-cognitive Skills

- Empathy
- Creativity
- Teamwork
- Collaboration
- Resilience

- Interpersonal skills
- Perseverance
- Social Control
- Social Skill

Unit – 6

6.1 Presentation: Meaning and Types (6hours)

- Meaning of Presentation
- Types of Presentations
- Presentation for Internal and External Communication
- Presentation Strategies
- Ways to Improve Presentation Skills Over Time

Recommended Reading:

1. Plomin, R. (1999). Genetics and general cognitive ability, *Nature*, 402, C25-C29.
2. Plomin, R. & Von Stumm, S. (2018). The new genetics of intelligence, *Nature Reviews Genetics*, 19 (3): 148-159.
3. Mumford, M. D., Todd, E. M., Higgs, C. & McIntosh, T. (2017). Cognitive skills and leadership performance: The nine critical skills, *The Leadership Quarterly*, 28(1): 24-39.
4. Welsh, J. A., Nix, R. L., Blair, C., Bierman, K. L. and Nelson, K. E. (2010). The Development of cognitive skills and gains in academic school readiness for children from low-income families, *J Educ Psychol*. 102(1): 43–53.
5. Nickerson, R.S. (1999). “Enhancing Creativity” ed. Sternberg, R.J. *Handbook of Creativity*, Cambridge University Press.
6. Snee, R. D. (2001). “Dealing with the Achilles Heel of Six Sigma—Project Selection Is the Key to Success,” *Quality Progress* 66–72.
7. Scholtes, P. R., Joiner, B. L. and Streibel, B. J. (2003). *The Team Handbook*, 3rd ed. (Madison, WI: Joiner Associates.
8. Ibid.
9. GOAL/QPC & Joiner Associates, *The Team Memory Jogger* (Madison, WI: 1996).
10. Doyle, M. and Straus, D. (1982). *How to Make Meetings Work*; New York: Jove Books.
11. Snee, R. D., Kelleher, K. H. and Reynard, S. (May 1998). “Improving Team Effectiveness,” *Quality Progress*, 43–48.
12. Hoerl, R. and Snee, R. (2012). *Statistical Thinking: Improving Business Performance, Second Edition* Copyright ©
13. Berber, N., Slavić, A. and Aleksić M. (2020). Relationship between perceived teamwork effectiveness and team performance in banking sector of Serbia, *Sustainability*, 12(20), 8753 (<https://doi.org/10.3390/su12208753>)
14. Gutman, L. M., & Schoon, I. (2013). The Impact of Non-Cognitive Skills on Outcomes for Young People (pp. 1-5). London: Education Endowment Foundation. Leading Education and Social Research.

15. Megargee, E. I. (1966). Undercontrolled and overcontrolled personality types in extreme antisocial aggression. *Psychological Monographs: General and Applied*, 80(3), 1–29. <https://doi.org/10.1037/h0093894>
16. Kjøbli, John and Ogden, Terie (2014). A randomized effectiveness trial of individual child social skills training: Six-month follow-up, *Child and Adolescent Psychiatry and Mental Health* 8 (31)
17. Driskell, J. E., Salas, E. & Driskell, T. (2018). Foundations of teamwork and collaboration. *American Psychologist*, 73 (4), 334-338. (<https://doi.org/10.1037/amp0000241>)

Web links

1. <https://www.edublox.com/what-are-cognitive-skills/>
2. <https://mybrainware.com/cognitive-skills/cognitive-skills-foundation-for-learning/>
<https://www.thebalancecareers.com/cognitive-skills-definition-and-examples-2063736>
3. https://www.rungila.com/en/cognitive_skill
4. <https://news.harvard.edu/gazette/story/2015/03/smarter-by-the-minute-sort-of/>
5. https://en.wikipedia.org/wiki/Cognitive_skill
6. <https://www.indeed.com/career-advice/career-development/cognitive-skills-how-to-improve-them>
7. <https://www.skillsyouneed.com/ips/problem-solving.html/>

Videos

1. <https://www.youtube.com/watch?v=k-8K9IksLh8>
2. <https://youtu.be/y0FtXhSu0J0>
3. <https://youtu.be/RuQjYzP9PMo>
4. <https://youtu.be/4ET3SvXJyhw>
5. <https://youtu.be/FXJUDyqobbM>
6. <https://youtu.be/UzPMMSKfKZQ>
7. <https://youtu.be/EGvI1BTCm5w>
8. <https://www.youtube.com/watch?v=E2jYdEO18nU> Self Control: Teaching Students About Their Greatest Inner Strength with Nathan DeWall-
9. <https://www.youtube.com/watch?v=mZUTZKbe4hI> Self control is the key to success. Lessons from the Marshmallow Test
10. https://www.youtube.com/watch?v=4StLXX1k_9I How Instant Gratification is Harming Society and What to Do About It | John Davidson | TEDxCSUS
11. <https://www.youtube.com/watch?v=E2jYdEO18nU> Self Control: Teaching Students About Their Greatest Inner Strength with Nathan DeWall-
12. <https://www.youtube.com/watch?v=mZUTZKbe4hI> Self control is the key to success. Lessons from the Marshmallow Test
13. https://www.youtube.com/watch?v=4StLXX1k_9I How Instant Gratification is Harming Society and What to Do About It | John Davidson | TEDxCSUS
14. https://www.youtube.com/watch?v=lw_2qDIeV8s How To Develop Self-Control To Create An Amazing Life”

Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	Bachelor of Science (Information Technology) / B.Sc. (Computer Science)		
Year	2025-26		Version	3.0		
Semester	6		Effective From	December, 2025		
Course Code	BSGN34611	Course Name	Mathematics for Computer Science			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CA)	Term end examinations (TEE)	Total
2	2	0	0	25	25	50

Purpose of Course	To equip students with the foundational mathematical concepts necessary for understanding and analyzing key areas of computer science.
Course Objective	To provide students with essential foundational support that strengthens their background knowledge and enhances their ability to engage effectively with the course material.
Pr-requisite	Basic mathematical familiarity
Course Out come	Students will develop the mathematical foundation needed to understand, analyze, and apply core concepts used in computer science.
Course Content	Unit 1: Algebra I 1.1 Determinants Determinants of order 2 and 3, properties of determinants; evaluation of determinants. Area of triangles using determinants, Cramer's rule. 1.2 Matrices-1 Definition, equality, addition and multiplication of matrices. Adjoint and inverse of a matrix. Solution of a system of linear equations – homogeneous and non-homogeneous. 1.3 Matrices-2 Elementary row operations; rank of a matrix, reduction to normal form, Inverse of a matrix using elementary row operations. Unit 2: Algebra II 2.1 Sequence and Series Definition of sequence and series; A.P, G.P, H.P and A.G.P. $\sum n$, $\sum n^2$ and $\sum n^3$, Idea of limit of a sequence.

	2.2 Complex Number Complex number in the form of $a+ib$. Addition, multiplication, division of complex numbers. Conjugate and modulus of complex numbers. De Moivre's Theorem. Unit 3: Calculus 3.1 Differential Calculus Concept of limit and continuity; differentiation of the sum, difference, product and quotient of two functions, chain rule. Differentiation of parametric functions. 2nd order derivatives. 3.2 Simple Application of Differential Calculus Rate of change; monotonicity-increasing and decreasing; maxima and minima. Unit 4: Vectors and Three-Dimensional Geometry 4.1 Vector-1 Vectors and scalars, magnitude and direction of a vector. Direction cosines/ratio of vectors. Addition of two vectors. Multiplication of a vector by a scalar. Position vector of a point and section formula. 4.2 Vector-2 Scalar (Dot) product of vectors, Vector (Cross) product of vectors. Scalar triple product and vector triple product. 4.3 Linear Programming Introduction, definition and related terminology such as constraints, objective function, optimization. Mathematical Formulation of LPP. Graphical method of solving LPP in two variables. Feasible and inferring solution (up to three non-trivial constraints).
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