Course Outcomes (COs) For BCA

Semester: I

Course Code: HRA210	**Course Title:** Digital Computer Organization
Course Credits: 03 (3-0-0)	**Hours/Week:** 03
Total Contact Hours: 44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

On successful completion of this course, students will be able to:

1. Understand the digital computer system including classification of computers, anatomy of computer, input/output devices ad memory organization of computer.
2. Illustrate the types of Software, Computer languages and Translator programs.
3. Apply Boolean algebra to simplify logical expressions and solve problems using Karnaugh maps and other minimization techniques.
4. Design and analyze combinational and sequential logic circuits, including adders, subtractors, flip-flops, encoders, decoders, multiplexers, and counters.
5. Perform conversions between decimal, binary, octal, and hexadecimal number systems and carry out arithmetic operations in binary.

Course Code: HRA210P	**Course Title:** Office Automation and HTML
Course Credits: 02 (0-0-2)	**Hours/Week:** 04
Total Contact Hours: 60	**Formative Assessment Marks:** 10
Exam Marks: 40	**Exam Duration:** 03

Course Outcomes (COs):

On successful completion of this course, students will be able to:

1. Confidently work on Office Automation software such as word processor, spreadsheet and power point.
2. Understand the Web Programming basics and create simple web pages using HTML**.**

Course Code: HRA220	**Course Title:** Problem Solving using C++
Course Credits: 03 (3-0-0)	**Hours/Week:** 03
Total Contact Hours: 44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

On successful completion of this course, students will be able to:

1. Understand the fundamental concepts and benefits of Object-Oriented Programming (OOP) and how it differs from Procedure-Oriented Programming paradigms.
2. Interpret and apply C++ syntax and structure, including input-output statements, keywords, identifiers, constants, variables, data types, operators, expressions and file handling to create basic programs and solve problems.
3. Describe the control structures, functions, and different parameter passing methods and write programs to solve problems.
4. Demonstrate the concepts of classes and objects , access specifiers, constructors, destructors, and OOP features like polymorphism, inheritance with the help of programs.

Course Code: HRA220P	**Course Title:** C++ Programming
Course Credits: 02 (0-0-2)	**Hours/Week:** 04
Total Contact Hours: 60	**Formative Assessment Marks:** 10
Exam Marks: 40	**Exam Duration:** 03

Course Outcomes (COs):

On successful completion of this course, students will be able to:

1. Demonstrate fundamental C++ programming concepts by writing programs for simple problems.
2. Utilize features of C++, such as recursion, function overloading, and friend functions, to enhance the functionality and efficiency of programs.
3. Design and construct classes and objects in C++ to model real-world entities, demonstrate inheritance, operator overloading, constructors, and file handling operations.

Course Code: HRA230	**Course Title:** Mathematical and Statistical Computing
Course Credits: 03 (3-0-0)	**Hours/Week:** 03
Total Contact Hours: 44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

On successful completion of this course, students will be able to:

1. Construct, evaluate, and apply logical statements and truth tables, understand the principles of set theory, perform various set operations, and effectively use Venn diagrams for solving complex problems.
2. Understand Cartesian products, relations, and their properties, including equivalence relations and partitions. They will also gain skills in function composition, inverse functions, and representing relations through matrices and directed graphs.
3. Organize and interpret data using statistical methods, calculate measures of central tendency and dispersion, analyze correlation between variables, and perform linear regression analysis.

Course Code: HRA230P	**Course Title:** Mathematical and Statistical Computing using R
Course Credits: 02 (0-0-2)	**Hours/Week:** 04
Total Contact Hours: 60	**Formative Assessment Marks:** 10
Exam Marks: 40	**Exam Duration:** 03

Course Outcomes (COs):

On successful completion of this course, students will be able to:

1. Develop practical skills in implementing set operations and function operations using R programming.
2. Implement logic gates using R and perform comprehensive statistical analysis including calculations of central tendency and conduct linear regression analysis.
3. Compute Cartesian products and analyze relations for properties such as reflexivity, symmetry, and transitivity through R scripts.

Semester II

Course Code: HRB210	**Course Title:** Data Structures
Course Credits: 03 (3-0-0)	**Hours/Week:** 03
Total Contact Hours: 44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

On successful completion of this course, students will be able to:

1.Understand the basics of Data Structures.

2.Identify the appropriate data structures and algorithms for solving real world problems.

3.Understand the practical applications of Tree and Graph.

4.Understand the fundamentals of sorting and searching algorithms.

Course Code: CAM21P	**Course Title:** Data Structures using C++
Course Credits: 02 (0-0-2)	**Hours/Week:** 04
Total Contact Hours: 60	**Formative Assessment Marks:** 10
Exam Marks: 40	**Exam Duration:** 03

Course Outcomes (COs):

On successful completion of this course, students will be able to:

1. Implement data structures using C++.
2. Demonstrate searching and sorting techniques using C++.
3. Demonstrate advanced programming skills through C++ programming language.

Course Code: HRB220	**Course Title:** Object Oriented Programming with Java
Course Credits: 03 (3-0-0)	**Hours/Week:** 03
Total Contact Hours: 44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

On successful completion of this course, students will be able to:

1. Understand the Java programming fundamentals.
2. Describe with examples of basic Java OOP concepts.
3. Understand the Java Interfaces and Packages.
4. Deliberate the Details of Multithreading, Exception Handling & File Handling
5. Design GUI applications using tools like AWT.

Course Code: CAM22P	**Course Title:** Programming with Java
Course Credits: 02 (0-0-2)	**Hours/Week:** 04
Total Contact Hours: 60	**Formative Assessment Marks:** 10
Exam Marks: 40	**Exam Duration:** 03

Course Outcomes (COs):

On successful completion of this course, students will be able to:

1. Implement simple programs using Java Fundamental concepts.
2. Identify classes, objects, members of class and the relationships among them needed for finding the solution to specific problems using Objected Oriented Programming concepts of Java.
3. Design & Develop simple GUI programs using AWT GUI tool.

Course Code: HRB230	**Course Title:** Operating Systems
Course Credits: 03 (3-0-0)	**Hours/Week:** 03
Total Contact Hours: 44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

On successful completion of this course, students will be able to:

1. Understand the fundamentals of the operating system.
2. Describe the concepts of process, process management, CPU Scheduling, process synchronization, Dead locks, memory management and Virtual Memory management.
3. Illustrate the file system and structure.
4. Understand the UNIX OS, Shell Programming, Conditional Control Structures in Shell Programming.

Course Code: CAM23P	**Course Title:** Shell Programming
Course Credits: 02 (0-0-2)	**Hours/Week:** 04
Total Contact Hours: 60	**Formative Assessment Marks:** 10
Exam Marks: 40	**Exam Duration:** 03

Course Outcomes (COs):

On successful completion of this course, students will be able to:

1. Develop skill in shell scripting to perform simple operations and problems.
2. Perform file manipulation using shell scripts.
3. Understand and implement shell scripts for system information.

Semester: III

Course Code: HRC210	**Course Title: C# and .NET Programming**
Course Credits: 03 (3-0-0)	**Hours/Week:** 03
Total Contact Hours: 44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

CO1 Understand C# basics, syntax, control statements, arrays, strings.
CO2 Apply OOP concepts like classes, inheritance, and interfaces.
CO3 Use delegates, events, and file I/O in C#.
CO4 Build GUI apps using Windows Forms and ADO.NET.

Course Code: HRC210P	**Course Title: C#.NET Programming Lab**
Course Credits: 02 (0-0-2)	**Hours/Week:** 04
Total Contact Hours: 60	**Formative Assessment Marks:** 10
Exam Marks: 40	**Exam Duration:** 03

Course Outcomes (COs):

CO1 Demonstrate C# basics using methods, arrays, and strings.
CO2 Apply OOP concepts like inheritance and overloading in C#.
CO3 Implement delegates, events, and file handling in C#.
CO4 Design Windows Forms and connect databases using ADO.NET.

Course Code: HRC220	**Course Title: Data Base Management System**
Course Credits: 03 (3-0-0)	**Hours/Week:** 03
Total Contact Hours: 44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

CO1: Understand basic concepts of databases, data models, and ER diagrams.

CO2: Apply relational algebra and SQL to query and manipulate data.

CO3: Analyze database normalization to improve design and remove anomalies.

CO4: Evaluate transaction management and database security features.

Course Code: HRC220P	**Course Title: DBMS Lab**
Course Credits: 02 (0-0-2)	**Hours/Week:** 04
Total Contact Hours: 60	**Formative Assessment Marks:** 10
Exam Marks: 40	**Exam Duration:** 03

Course Outcomes (COs):

CO1: Execute single-line SQL queries and apply group functions effectively.

CO2: Perform database operations using DDL, DML, DCL, and TCL commands.

CO3: Implement advanced SQL concepts like nested queries and join operations.

CO4: Create views and apply table-level locking mechanisms for data control.

Course Code: HRC230	**Course Title: Web Technologies**
Course Credits: 03 (3-0-0)	**Hours/Week:** 03
Total Contact Hours: 44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

CO1 Understand Internet basics, WWW, and HTML5 structure.

CO2 Design responsive web pages using HTML forms and CSS.

CO3 Write JavaScript code using variables, functions, and control structures.

CO4 Use JavaScript objects, arrays, events, and DOM manipulation.

Course Code: HRC230P	**Course Title: Web Technologies Lab**
Course Credits: 02 (0-0-2)	**Hours/Week:** 04
Total Contact Hours: 60	**Formative Assessment Marks:** 10
Exam Marks: 40	**Exam Duration:** 03

Course Outcomes (COs):

CO1 Create web pages using HTML tags, tables, lists, and forms.

CO2 Style web pages using inline, internal, and external CSS.

CO3 Use JavaScript for interactivity, validation, and event handling.

CO4 Build JavaScript programs for clocks, calculators, and animations.

Course Code: HRC2401**(Elective)**	**Course Title: Cyber Security**
Course Credits: 03(3-0-0)	**Hours/Week:** 03
Total Contact Hours:44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

CO1 Describe cyberspace, internet infrastructure, and cyber security concepts.

CO2 Identify types of cybercrimes and understand related cyber laws.

CO3 Analyze social media risks, privacy issues, and legal aspects.

CO4 Use cyber security tools and apply best practices for protection.

Course Code: HRC2402 **(Elective)**	**Course Title: Software Engineering**
Course Credits: 03(3-0-0)	**Hours/Week:** 03
Total Contact Hours: 44 Hours	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

CO1 Explain software engineering concepts, process models, and agile practices.
CO2 Apply techniques to gather and manage software requirements.
CO3 Model systems using UML diagrams and system modeling techniques.
CO4 Design software architecture using patterns and UML notations.

Course Code: HRC2403 **(Elective)**	**Course Title: System Software**
Course Credits: 03(3-0-0)	**Hours/Week:** 03
Total Contact Hours:44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

CO1 Understand system software, SIC/SIC-XE, CISC and RISC.
CO2 Explain assembler functions and features.
CO3 Describe loader and linker operations.
CO4 Identify functions of DBMS, editors, and debuggers.

Course Code: HRC2501 **(Elective)**	**Course Title: Cloud Computing**
Course Credits: 03(3-0-0)	**Hours/Week:** 03
Total Contact Hours:44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

CO1 Understand cloud computing concepts, architecture, benefits, and challenges.
CO2 Explain cloud service models (IaaS, PaaS, SaaS) and their providers.
CO3 Describe deployment models, virtualization types, and hypervisors.
CO4 Explore cloud storage, databases, networking, and DevOps practices.

Course Code: HRSC2502 **(Elective)**	**Course Title: Digital Image Processing**
Course Credits: 03(3-0-0)	**Hours/Week:** 03
Total Contact Hours: 44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

CO1 Understand the fundamentals of digital and color image processing.
CO2 Apply spatial and frequency domain techniques for image enhancement.
CO3 Implement image restoration using filtering and degradation models.
CO4 Perform image segmentation, morphological operations, and compression techniques.

Course Code: HRC2503 **(Elective)**	**Course Title: E-commerce and E-Governance**
Course Credits: 03(3-0-0)	**Hours/Week:** 03
Total Contact Hours: 44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

CO1 Understand the fundamentals, models, and infrastructure of E-commerce.
CO2 Analyze E-commerce strategies, marketing, and real-world applications.
CO3 Explain E-Governance models, technologies, and service frameworks.
CO4 Evaluate challenges, innovations, and future trends in E-Governance.

Semester: IV

Course Code: HRD210	**Course Title: Computer Networks**
Course Credits: 03 (3-0-0)	**Hours/Week:** 03
Total Contact Hours: 44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

CO1 Explain digital data transmission between computers.

CO2 Apply data communication and network types in real life.

CO3 Compare layers in networking models.

CO4 Compare protocols in OSI and TCP/IP models.

Course Code: HRD210P	**Course Title: Computer Networks Lab**
Course Credits: 02	**Hours/Week: 04**
Total Contact Hours: 60	**Formative Assessment Marks: 10**
Exam Marks: 40	**Exam Duration: 03**

Course Outcomes (COs):

CO1 Identify and set up basic computer hardware, software, and network configurations.

CO2 Create and test wired network cables and connect networking devices.

CO3 Simulate and configure various network topologies using network simulators.

CO4 Analyze network protocols and services like FTP and wireless LAN through simulation.

Course Code: HRD220	**Course Title: Python Programming**
Course Credits: 03 (3-0-0)	**Hours/Week:** 03
Total Contact Hours: 44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

CO1 Demonstrate basic Python programs using control structures and arrays.

CO2 Use functions, strings, lists, and dictionaries in Python.

CO3 Apply OOP, file handling, and exception handling concepts.

CO4 Build GUI apps, work with databases, and visualize data using Python libraries.

Course Code: HRD220P	**Course Title: Python Programming Lab**
Course Credits: 02 (0-0-2)	**Hours/Week:** 04
Total Contact Hours: 60	**Formative Assessment Marks:** 10
Exam Marks: 40	**Exam Duration:** 03

Course Outcomes (COs):

CO1 Apply basic Python syntax and logic.

CO2 Use data structures and functions effectively.

CO3 Build apps with Tkinter, SQLite, NumPy, Matplotlib, and Pandas.

CO4 Solve real-world problems using modular Python code.

Course Code: HRD230	**Course Title: PHP & MySQL**
Course Credits: 03 (3-0-0)	**Hours/Week:** 03
Total Contact Hours: 44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

CO1 Understand PHP basics, syntax, variables, data types, and control structures.

CO2 Use arrays, functions, and strings to create dynamic PHP programs.

CO3 Apply object-oriented concepts and exception handling in PHP.

CO4 Build web applications using forms, sessions, and MySQL with PHP.

Course Code: CAM43P	**Course Title: PHP & MySQL Lab**
Course Credits: 02 (0-0-2)	**Hours/Week:** 04
Total Contact Hours: 60	**Formative Assessment Marks:** 10
Exam Marks: 40	**Exam Duration:** 03

Course Outcomes (COs):

CO1 Implement syntax, control structures, and loop constructs to solve problems.

CO2 Apply arrays, functions, and string operations to build dynamic web features.

CO3 Implement object-oriented programming and exception handling in PHP.

CO4 Develop interactive web applications with form handling, sessions, and MySQL integration.

Course Code: HRD2401 **(Elective)**	**Course Title: Fundamentals of Data Science**
Course Credits: 03(3-0-0)	**Hours/Week:** 03
Total Contact Hours: 44	**Formative Assessment Marks:** 20
Exam Marks: 80	**Exam Duration:** 03

Course Outcomes (COs):

CO1 Explain key concepts of data mining, KDD, and its real-world applications.

CO2 Apply data preprocessing and perform frequent pattern mining using Apriori and FP Growth.
CO3 Implement and evaluate classification techniques and prediction models.
CO4 Apply clustering methods and evaluate clustering results.

Course Code: HRD2402 **(Elective)**	**Course Title: Internet of Things**
CourseCredits:03(3-0-0)	**Hours/Week:**03
TotalContactHours:44	**Formative Assessment Marks:** 20
ExamMarks:80	**ExamDuration:**03

Course Outcomes (COs):

CO1 Define key concepts, architecture, and challenges of IoT.
CO2 Explain the role of sensors, actuators, and communication in IoT networks.
CO3 Illustrate the use of IoT protocols and data analytics tools.
CO4 Apply IoT concepts to basic smart city use cases.

Course Code: HRD2403 **(Elective)**	**Course Title: Software Testing**
CourseCredits:03(3-0-0)	**Hours/Week:**03
TotalContactHours:44	**Formative Assessment Marks:** 20
ExamMarks:80	**ExamDuration:**03

Course Outcomes (COs):

CO1 Understand basics of software testing and test case design.

CO2 Apply decision table and data flow testing methods.

CO3 Analyze integration and system testing techniques.
CO4 Evaluate object-oriented and GUI testing approaches.

Course Code: HRD250	**Course Title: Digital Marketing**
Course Credits: 02(2-0-0)	**Hours/Week:** 02
Total Contact Hours: 30	**Formative Assessment Marks:** 10
Exam Marks: 40	**Exam Duration:** 02

Course Outcomes (COs):

CO1 Describe the basics, evolution, and channels of digital marketing.
CO2 Apply social media and email marketing strategies effectively.
CO3 Create content and mobile marketing plans with analytics.

BCA: Semester V [NEP]

DSC-13 Course code: GRE210	Course Title: Design and Analysis of Algorithm
Total Contact Hours: 52	Course Credits: 04
Formative Assessment Marks: 40	Duration of SEE/Exam: 2 $^{1}/_{2}$ hrs
Summative Assessment Marks: 60	

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

- CO1. Understand the fundamental concepts of algorithms and their complexity, including time and space complexity, worst-case and average-case analysis, and Big-O notation. BL (L1, L2)
- CO2. Design algorithms for solving various types of problems, such as Sorting, Searching and Graph traversal, Decrease-and-Conquer, Divide-and-Conquer and Greedy Techniques. BL (L1, L2, L3)
- CO3. Analyze and compare the time and space complexity of algorithms with other algorithmic techniques. BL (L1, L2,L3,L4)
- CO4. Evaluate the performance of Sorting, Searching, Graph traversal, Decrease-and-Conquer, Divide-and-Conquer and Greedy Techniques using empirical testing and benchmarking, and identify their limitations and potential improvements. BL (L1, L2, L3, L4)
- CO5. Apply various algorithm design to real-world problems and evaluate their effectiveness and efficiency in solving them. BL (L1, L2, L3) Note: Blooms Level(BL): L1=Remember, L2=Understand, L3=Apply, L4=Analyze, L5= Evaluate, L6= Create

DSC-14 Course code: GRE220	Course Title: Statistical Computing & R Programming
Total Contact Hours: 52	Course Credits: 04
Formative Assessment Marks: 40	Duration of SEE/Exam: 2 $^{1}/_{2}$ hrs
Summative Assessment Marks: 60	

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

- Explore fundamentals of statistical analysis in R environment.
- Describe key terminologies, concepts and techniques employed in Statistical Analysis
- Define Calculate, Implement Probability and Probability Distributions to solve a wide variety of problems.
- Conduct and interpret a variety of Hypothesis Tests to aid Decision Making.
- Understand, Analyse, and Interpret Correlation Probability and Regression to analyse the underlying relationships between different variables.

Course code: GRE220P	Course Title: R Programming Lab
Total Contact Hours: 52-4hrs/week	Course Credits: 02
Formative Assessment Marks: 25	Duration of SEE/Exam: 03 Hours
Summative Assessment Marks: 25	

Course Outcomes:

- Install, Code and Use R Programming Language in R Studio IDE to perform basic tasks on Vectors, Matrices and Data frames. Explore fundamentals of statistical analysis in R environment.
- Describe key terminologies, concepts and techniques employed in Statistical Analysis.
- Define Calculate, Implement Probability and Probability Distributions to solve a wide variety of problems.
- Conduct and interpret a variety of Hypothesis Tests to aid Decision Making.
- Understand, Analyse, and Interpret Correlation Probability and Regression to analyse the underlying relationships between different variables.

DSC-15 Course code: GRE230	Course Title: Software Engineering
Total Contact Hours: 52	Course Credits: 04
Formative Assessment Marks: 40	Duration of SEE/Exam: 2 $^1/_2$ hrs
Summative Assessment Marks: 60	

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

- How to apply the software engineering lifecycle by demonstrating competence in Communication, planning, analysis, design, construction, and deployment
- An ability to work in one or more significant application domains
- Work as an individual and as part of a multidisciplinary team to develop and deliver quality Software
- Demonstrate an understanding of and apply current theories, models and techniques that provide a basis for the software lifecycle
- Demonstrate an ability to use the techniques and tools necessary for engineering practice

DSE-E1 Course code: GRE240	Course Title: Cloud Computing
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE/Exam: 2 $^1/_2$ hrs
Summative Assessment Marks: 60	

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

- Explain the core concepts of the cloud computing paradigm such as how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.
- Apply the fundamental concepts in data center to understand the trade-offs in power, efficiency and cost.
- Identify resource management fundamentals like resource abstraction, sharing and sandboxing and outline their role in managing infrastructure in cloud computing.
- Analyse various cloud programming models and apply them to solve problems on the cloud

DSE-E1 Course code: GRE240	Course Title: Business Intelligence
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE/Exam: 2 $^{1}/_{2}$ hrs
Summative Assessment Marks: 60	

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

- Describe the Decision Support systems and Business Intelligence framework.
- Explore knowledge management, explain its activities, approaches, and its implementation
- Describe business intelligence, analytics, and decision support system

Voc1 Course code: GRE250	Course Title: Digital Marketing
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE/Exam: 2 $^{1}/_{2}$ hrs
Summative Assessment Marks: 60	

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

- Understand the fundamental concepts and principles of digital marketing.
- Develop practical skills to implement various digital marketing strategies and techniques.
- Analyze and evaluate the effectiveness of digital marketing campaigns.
- Apply critical thinking and problem-solving skills to real-world digital marketing scenarios.
- Create comprehensive digital marketing plans and strategies.

SEC-3 Course code: GRE260	Course Title: Cyber Security
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE Exam: $2^{1}/_{2}$ hrs
Summative Assessment Marks: 60	

Course Outcomes (COs):

After the successful completion of the course, the student will be able to

- Understand the concept of Cyber security and issues and challenges associated with it.
- 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
- 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

BCA: Semester VI [NEP]

DSC-16 Course code: GRF210	Course Title: Artificial Intelligence and Applications
Total Contact Hours: 52	Course Credits: 04
Formative Assessment Marks: 40	Duration of SEE Exam: $2^1/_2$ hrs
Summative Assessment Marks: 60	

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

- Gain a historical perspective of AI and its foundations
- Become familiar with basic principles and strategies of AI towards problem solving
- Understand and apply approaches of inference, perception, knowledge representation, and learning.
- Understand the various applications of AI

Course code: GRF210P	Course Title: Artificial Intelligence Lab
Total Contact Hours: 52-4hrs/week	Course Credits: 02
Formative Assessment Marks: 25	Duration of SEE/Exam: 03 Hours
Summative Assessment Marks: 25	

Course Outcomes:

- Identify and apply Artificial Intelligence concepts to solve real world problems.
- Develop learning programs for supervised learning models.
- Design and develop solutions for informed and uninformed search problems in AI.

DSC-17 Course code: GRF220	Course Title: **PHP & MySQL**
Total Contact Hours: 52	Course Credits: 04
Formative Assessment Marks: 40	Duration of SEE Exam: $2^1/_2$ hrs
Summative Assessment Marks: 60	

Course Outcomes:

- After the successful completion of the course, the student will be able to:
- Design dynamic and interactive web pages and websites.
- Run PHP scripts on the server and retrieve results.
- Handle databases like MySQL using PHP in websites

Course code: GRF220P	Course Title: PHP and MySQL Lab
Total Contact Hours: 52-4hrs/week	Course Credits: 02
Formative Assessment Marks: 25	Duration of SEE/Exam: 03 Hours
Summative Assessment Marks: 25	

Course Outcomes (COs):

CO1 Implement syntax, control structures, and loop constructs to solve problems.

CO2 Apply arrays, functions, and string operations to build dynamic web features.

CO3 Implement object-oriented programming and exception handling in PHP.

CO4 Develop interactive web applications with form handling, sessions, and MySQL integration.

DSE-E2 Course code: GRF240	Course Title: Fundamentals of Data Science
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE Exam: $2^{1}/_{2}$ hrs
Summative Assessment Marks: 60	

Course Outcomes (CO s):

After the successful completion of the course, the student will be able to:

- Understand the concepts of data and pre-processing of data
- Know simple pattern recognition methods
- Understand the basic concepts of Clustering and Classification
- Know the recent trends in Data Science

DSE-E2 Course code: GRF240	Course Title: Mobile Application Development
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE Exam: $2^1/_2$ hrs
Summative Assessment Marks: 60	

Course Outcomes (CO s):

After the successful completion of the course, the student will be able to:

- Create Servlets for server-side programming Create, test and debug Android application by setting up Android development environment
- Critique mobile applications on their design pros and cons,
- Program mobile applications for the Android operating system and understand techniques for designing and developing sophisticated mobile interfaces
- Deploy applications to the Android marketplace for distribution

Voc-2 Course code: GRF250	Course Title: Web Content Management System
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE Exam: $2^1/_2$ hrs
Summative Assessment Marks: 60	

Course Outcomes (CO s):

After the successful completion of the course, the student will be able to:

- Understand content development basics
- Gain Knowledge of tools for multimedia content development for audio/ video, graphics, animations, presentations, screen casting
- Host websites and develop content for social media platforms such as wiki and blog,
- Understand e-publications and virtual reality
- Use of e-learning platform Moodle and CMS applications Drupal and Joomla