KIET GROUP OF INSTITUTIONS, DELHI-NCR, GHAZIABAD
DEPARTMENT OF COMPUTER APPLICATIONS

COURSE OUTCOMES AND MAPPING WITH PO, 2020-21

COURSE OUTCOMES:

MCA-I Semester

KCA 101
Fundamental of Computers & Emerging Technologies
CO1: Develop the basic knowledge of computer components and algorithms to solve problems using programming concepts.
CO2: Demonstrate the features and types of operating system and computer networks.
CO3: Illustrate the basic services of Internet and applications of Internet of Things.
CO4: Examine the features of Blockchain, Cryptocurrency and benefits of cloud computing.
CO5: Discuss the emerging trends and technologies in the field of Information Technology.

KCA102
Problem Solving Using C
CO1: Solve basic problems with the help of flowcharts and algorithms.
CO2: Write 'C' programs that incorporate use of variables, operators, and expressions along with data types
CO3: Implement programs using the control statements, functions, arrays, and strings.
CO4: Write programs using the advanced concepts like pointers, structures, union, and enumerated data types.
CO5: Apply file I/ O operations on Binary and Text Files

KCA 103
Principles of Management & Communication
CO1: Describe primary features, processes and principles of management.
CO2: Explain the functions of management in terms of planning, organizing and decision making.
CO3: Illustrate key factors of leadership skill in directing and controlling business resources and processes.
CO4: Exhibit adequate verbal and non-verbal communication skills at workplace.
CO5: Demonstrate effective discussion, presentation and writing skills for various tasks and events like meeting, drafting of letter, proposal and report and their presentation etc.

KCA-104
Discrete Mathematics
CO1: Examine the mathematical and logical notation for basic discrete structures such as Sets, Relations and Functions
CO2: Apply mathematical arguments using logical connectives and quantifiers to check the validity of an argument.
CO3: Prove properties of Algebraic Structures like Groups, Rings and Fields
CO4: Solve recurrences relations and generating functions using mathematical logics.
CO5: Illustrate the concept of combinatorics to solve basic problems in discrete mathematics

KCA-105
Computer Organization and Architecture
CO1: Determine the functional units of digital system and operations performed by arithmetic and logical unit.
CO2: Demonstrate the various processor organisations with different addressing modes.
CO3: Examine the organizations of control unit along with Instruction execution stages and pipeline concept.
CO4: Analyze the different types of memories and its organization.
CO5: Illustrate the modes of communication between IO devices and CPU.

KCA151
Problem Solving Using C
CO1: Demonstrate Integrated Development Environment (IDE) for compilation, debugging and execution of C program.
CO2: Write programs using variables, operators, and expressions along with data types.
CO3: Implement programs for decision control structures, loops, and arrays.
CO4: Implement concepts of structure, pointer and user defined function.
CO5: Write programs using graphics and file handling operations.

KCA-152
Computer Organization & Architecture Lab
CO1: Examine the output of the basic logic gates for different combinations of input.
CO2: Demonstrate various combinational circuits for binary arithmetic operations and code converter
CO3: Illustrate combinational circuits and sequential circuits such as encoders/decoders, multiplexers/de-multiplexers, and flip-flops
CO4: Implement 2-bit Arithmetic Logic Unit using logic gates and multiplexers

KCA 153
Principles of Management & Communication
CO1: Differentiate various situations to communicate effectively for conversation and public speaking.
CO2: Utilize required voice dynamics to speak effectively for handling various situations at workplace like presentation and official speaking.
CO3: Apply argumentation skills to participate in group discussion and role play.
CO4: Evaluate to summarize topics for thematic presentation and presentation for seminar, workshop, and conference with focus on kinesics.
CO5: Develop communicative abilities in all four dimensions of language.

MCA-II Semester

KCA201
Theory of Automata & Formal Languages
CO1: Construct DFA, NFA with their minimization and conversion.
CO2: Implement regular expressions with closure and decision properties.
CO3: Represent the Context Free Languages grammar and its normal forms.
CO4: Design the PDA with deterministic and Nondeterministic properties
CO5: Construct the Universal Turing machine.

KCA202
Object Oriented Programming
CO1: Implement the basic Programming concepts using Java.
CO2: Analyse OOP concepts like Inheritance, Polymorphism, Abstraction and Encapsulation, etc. using Java
CO3: Implement exception handling and file handling in Java
CO4: Apply the concepts of multithreading and generic programming in Java
CO5: Design GUI applications using AWT and Swing in Java

KCA203
Operating Systems
CO1: The basics of computer system and overview of operating system along with its functions.
CO2: The processes, their states, threads, Multicore and Multithreading
CO3: The CPU scheduling algorithms, Inter process communications, process synchronization and deadlocks.
CO4: Various memory management techniques with case study on Windows and Linux.
CO5: Various I/O management and file system.

KCA204
Database Management Systems
CO1: Understand overall structure of DBMS, construct ER Models for efficient Database Design
CO2: Understand basic concepts of relational model and formulate solutions to a query problem using SQL commands, relational algebra, tuple calculus and domain calculus
CO3: Explain the need of Normalization and normalize a given relation to the desired normal form
CO4: Describe need of transaction processing and recovery mechanism from transaction failures
CO5: Understand various concurrency control techniques and able to apply concurrency control protocols on transactions.

KCA205
Data Structures & Analysis of Algorithms
CO1: Explain the concept of data structure, analysis of algorithms and implement basic data organization schemes such as arrays and linked lists.

CO2: Describe the applications of stacks and queues and implement various operations on them using arrays and linked lists.
CO3: Describe the properties of graphs and trees and implement various operations such as searching and traversal on them.
CO4: Compare incremental and divide-and-conquer approaches of designing algorithms for problems such as sorting and searching.
CO5: Apply and analyze various design approaches such as Divide-and-Conquer, greedy and dynamic for problem solving.

KCAA01
Cyber Security
CO1: Explain Information System in the nature & inherent difficulties in the security.
CO2: Describe various threats, attacks, and measures to counter them with vulnerability assessment in an organization.
CO3: Use knowledge and skills for secure application development, security maintenance and understand threats to E-commerce.
CO4: Explain Security policies for email, corporate, www etc.
CO5: Understand the various aspects of Cyber Crime laws in India and the importance of IPR with respect to software.

KCA251
Object Oriented Programming Lab
CO-1: Write and execute programs in a Java programming environment.
CO-2: Write and execute Object Oriented Programs using Java programming
CO-3: Write robust file handling and Object-Oriented Programs with excepting handling approach using Java programming.
CO-4: Write Object Oriented Programs with multi-threading and generic programming approach using Java programming.
CO-5: Design GUI application with AWT and Swing using Java programming

KCA252
DBMS Lab
CO1: Able to design ER models using Case Tools
CO2: Write SQL Commands to query a database
CO3: Write PL/ SQL Programs for implementing stored procedures, stored functions, cursors, triggers and packages

KCA253
Data Structures & Analysis of Algorithms Lab
CO1: Write and execute programs to implement various searching and sorting algorithms.
CO2: Write and execute programs to implement various operations on two- dimensional arrays.
CO3: Implement various operations of Stacks and Queues using both arrays and linked lists data structures.
CO4: Implement graph algorithm to solve the problem of minimum spanning tree

MCA-III Semester

RCA-301
Operating Systems
CO1: The basics of computer system and overview of operating system along with its functions.
CO2: The processes, their states, threads, Multicore and Multithreading.
CO3: The CPU scheduling algorithms, Inter process communications, process synchronization and deadlocks.
CO4: Various memory management techniques with case study on Windows and Linux.
CO5: Various I/O management and file system.

RCA-302
Web Technology
CO1: To understand internet and web designing concepts.
CO2: To create web pages using HTML, CSS and by using various designing frameworks and libraries.
CO3: To build dynamic web pages using client side scripting language JavaScript and to write XML document.
CO4: To build interactive web application using PHP.

CO5: To construct and manipulate database of web application using PHP and MySQL.

RCA-303
Design & Analysis of Algorithms
CO1: Able to analyze worst-case and average case running times of various sorting algorithms using asymptotic analysis.
CO2: Able to implement various advance data structures like red black tree, binomial heap, Fibonacci heap etc.
CO3: Able to solve real life problem using problem solving techniques i.e. divide- conquer and greedy method,
CO4: Able to solve real life problem using problem solving techniques i.e. dynamic programming, backtracking, branch –bounds.
CO5: Able to understand various new problems of research and mathematical computation using advanced problem solving techniques i.e. approximation and randomization.

RCA-304
Computer Based Optimization Techniques
CO1: Various types of inventory models and their application.
CO2: Solution of linear programming problems using different methods.
CO3: Integer linear programming problem, transportation problems and assignment models with various applications.
CO4: Concept of non-linear programming problem, K-T conditions of optimality.
CO5: Queuing models and their classification with application and limitations for its applications.

RCA 305
Cyber security
CO1: Understand information system and its development in regard of security threats.
CO2: Understand application security and required counter measures
CO3: Practical aspects in respect of secure application development and security maintenance.
CO4: Understand role of policies while dealing with information security and the role of governing acts in terms of safeguarding our intellectual properties.

RCA-A01
Introduction to Programming and Computer Organization
CO1: Use logical notation to define and reason about fundamental mathematical concepts such as sets, relations and functions.
CO2: Have an understanding of the fundamental concepts used in digital electronics i.e. number system, digital circuits, Boolean algebra nd gate minimization techniques.
CO3: Have an understanding of instruction sets, computer arithmetic, CPU structure and pipelining hazards.
CO4: Ability to design flowchart and algorithmic solution to problems and gather the extensive knowledge in C programming.

RCA-351
Operating Systems Lab
CO1: The commands of UNIX and Linux operating systems.
CO2: Learn about shell programming and writing various shell scripts.
CO3: Implement various CPU scheduling algorithms and Page replacement algorithms.

RCA-352
Design and Analysis Algorithm Lab
CO1: Able to Implement and analyse different searching algorithms by showing their performance using graph.
CO2: Able to Implement and analyse different sorting algorithms by showing their performance using graph
CO3: Study of advance topic like NP-Complete theory and Bitonic sorting network

MCA-IV Semester

RCA-401
Database Management System
CO1: Understanding introductory database concepts like DBMS architecture, data models and file system.
CO2: Understanding relation model, constraints over relations and relation algebras.
CO3: Understand conceptual; data model (E-R model), conversion of E-R model to relational model, functional dependencies and its application in normalization.
CO4: Understand use of SQL and the concepts like, constraints, trigger, views etc.

CO5: Understand the concept of various indexing techniques, query execution, transaction management, concurrency control and distributed database.

RCA-402
Computer Network
CO1: Students will be able to describe standard communication model such as TCP/IP, ISO-OSI model, functionality/working of various network topologies along with communicating devices and different type of communication media used in data communication.
CO2: Students will be able to apply knowledge of different flow control techniques along with error detection and correction to detect and solve error single bit during data transmission.
CO3: Students will be able to classify various IP addressing techniques along with network routing protocols and algorithms.
CO4: Students will be able to understand various transport layer protocols and their design considerations along with congestion control.
CO5: Students will be able to understand applications-layer protocols such as HTTP, FTP, Telnet, SMTP etc. and their interaction with underlying services along with familiarization with cryptography and network security.

RCA- 403
Artificial intelligence
CO1: Identify potential areas of AI applications and understand different ways to implement them.
CO2: Implement and understand about various searching and development strategies to support the creation of AI behavior in game theory.
CO3: Understand about knowledge and its representation on certain phenomena of the real world to recognize the logical reasoning steps in a mathematical proof in natural language.
CO4: Present different types machine learning algorithms and extracting knowledge models from data.
CO5:Gain knowledge about state-of-the-art algorithms used in pattern recognition area and able to apply in practical real world problems.

RCA- 404
Compiler Design
CO1: Able to explore various kind of finite and non finite automata with language, grammar and regular expression to identify tokens with understanding of different phases of compiler design.
CO2: Able to know, how tokens rcognized during lexical analysis phase and improve understanding of compiler construction tool i.e. LEX.
CO3: Able to Identify the analysis phase, similarities and differences among various parsing techniques and grammar transformation techniques and able to Implement major parsing techniques ranging from the recursive decent methods to the computationally more intensive LR techniques that have been used in parser generator.
CO4: Able to translate common programming language constructs into intermediate code and identify the effectiveness of optimization and effectively generate machine codes.
CO5: Able to apply the several algorithms for collecting and optimizing the information using data flow analysis.

RCA-E11
Design & Development of Applications
CO1: Understand Android architecture, installation and configuration of Android Studio, Intents and Activities, Testing and Debugging of Mobile App.
CO2: Learn use of built-in layouts, GUI components and Testing UI.
CO3: Learn Android Internet Connection, Notifications and managing Background Tasks.
CO4: Understand basics of SQLite Database, Data Sharing, Content Resolvers and Content Providers.
CO5: Learn publishing App on play store, Google Services, Firebase, Google Cloud Messaging.

RCA A02:
Fundamental of Data Structure, Numerical & Computational Theory
CO1: To be able to utilize knowledge of basic data structure i.e array, linked-list and tree with concept of sorting and searching
CO2: To be able to understand time series and hypothesis of testing with curve fitting and regression analysis
CO3: To be able to explore various kind of finite and non finite automata with language, grammar and touring machine

RCA-451
Mini Project Lab
CO1: To analyse and describe the project.
CO2: To formulate clear work plan and procedures.
CO3: To design the software by various designing techniques.
CO4: To implement a project by using various programming language.
CO5: To design report and able to present their work.

RCA-452
Database Management System Lab
CO1: Use the SQL commands such as DDL, DML, TCL and DCL in Oracle
CO2: Design E-R model using CASE tools.
CO3: Write PL/SQL code using Oracle.

MCA-V Semester

RCA-501
Computer Graphics & Animation
CO1: To understand the concepts of computer graphics and implementation of image creation and filling algorithms.
CO2: To understand the concept of viewing and implement clipping algorithms & transformations.
CO3: To understand the concept of projection and theory related to visible surface detection.
CO4: To implement Bezier curves and study concepts related to illumination models.
CO5: To understand fundamentals of animation and its techniques.

RCA-502
Software Engineering
CO1: To understand Software Engineering Concepts and various SDLC models
CO2: To prepare Software Requirement Specification (SRS), use of Modelling tools and get knowledge of quality standards
CO3: To understand design concepts and engineering approach to software development
CO4: To gain knowledge for testing of software
CO5: Learning of different software project management activities

RCA-E31
Cloud Computing
CO1: Subject will provide an insight to the concepts and principles, history, issues and benefits of different clouds as well as awareness of open source clouds.
CO2: To enable students exploring some important cloud computing driven commercial systems such as GoogleApps, Microsoft Azure and Amazon Web Services, IBM and other businesses cloud applications.
CO3: To impart knowledge about cloud computing and its application in business, education, company and in personal life.
CO4: To familiarize students with the concept of application security and the concept of virtualization in cloud computing.
CO5: To Identify security and privacy issues in cloud computing and to recognize security threat exposure within a cloud computing infrastructure

RCA-E45
Big Data
CO1: Explain the Big Data Fundamentals, including the evolution & characteristics of Big Data, and various business domain for Big Data & its challenges.
CO2: Apply non-relational databases (NoSQL), the techniques for storing and processing large volumes of structured and unstructured data, as well as streaming data
CO3: Learn Hadoop Ecosystem and make sense of how to function with Hadoop Distributed File System (HDFS) for limit and resource organization
CO4: Understand Hadoop MapReduce framework and the working of MapReduce on data stored in HDFS. Also learn about YARN concepts in MapReduce.
CO5: Learn high-level query language like HIVE, Pig and use of Big Data Analytics tools.

RCA-E24
Software Testing
CO1: To study fundamental concepts in software testing, how to plan a test project, design test cases, conduct testing operations, generate a testing report, SRS documentation and verification.
CO2: Understand the importance of functional testing & its types
CO3: To gain knowledge about Regression Testing
CO4: To understand automated testing concepts and use of automation tools for testing.
CO5: To learn the concept of object-oriented testing.

RCA-551
Computer Graphics & Animation Lab
CO1: To implement algorithms related to creation of 2 dimensional objects.
CO2: To implement algorithms related to object transformations and filling.
CO3: To implement clipping algorithms and designing animations by using Flash.

RCA-552
Project Based on Software Engineering
CO1: Learn about different software development process models and software engineering principles and develop an ability to apply them to software design of real-life problems.
CO2: Plan, analyze, design and implement a software project using programming languages like Java, Python, R etc.
CO3: To design report and able to present work with their team.

MCA-VI Semester

RCA-611
Colloquium
CO1: To survey the current affairs in IT industry.
CO2: Able to represent the survey in form of presentation.
CO3: To enhance self-learning capabilities.

RCA-612
Industrial Project
CO1: To understand and implement the concepts of software life cycle models.
CO2: To identify the resources required for a project, to produce a work plan and resource schedule.
CO3: To evaluate and access the current technologies or modern tools related to software development.
CO4: To design, test, implement and document the project as per industry requirement.
CO5: Adapt to the changing demands in the workplace and able to perform increasingly complex tasks, as well as tasks outside a field of expertise.

MAPPING WITH PO:

MCA-I Semester

KCA 101 Fundamental of Computers & Emerging Technologies												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	-	-	2	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	1	2	2	-	1	-	-	1	1	-
CO4	3	-	-	2	2	-	1	-	-	-	-	-
CO5	3	-	1	3	3	-	2	-	-	1	-	-
PO Target	**3**	**2**	**1**	**2.33**	**2.25**	**-**	**1.33**	**-**	**-**	**1**	**1**	**-**

Subject Code: KCA102 Problem Solving Using C												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	-	-	-	-	3	-	2	-	1	1
CO2	3	2	-	-	-	-	2	-	-	-	1	1
CO3	3	2	-	-	-	-	2	-	-	-	1	1
CO4	3	2	-	-	-	-	2	-	-	-	1	1
CO5	3	2	-	-	-	-	2	-	-	-	1	1
PO Target	**3**	**2.2**	**-**	**-**	**-**	**-**	**2.2**	**-**	**2**	**-**	**1**	**1**

KCA 103 Principles of Management & Communication												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	-	-	-	-	-	-	1	-	-	-	2	-
CO2	-	-	-	-	-	-	1	-	-	-	2	-
CO3	-	-	-	-	-	-	2	-	-	-	2	-
CO4	-	-	-	-	-	-	2	-	3	-	2	-
CO5	-	-	-	-	-	-	2	-	3	-	2	-
PO Target	**-**	**-**	**-**	**-**	**-**	**-**	**1.6**	**-**	**3**	**-**	**2**	**-**

KCA-104 Discrete Mathematics												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	2	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	1	-	-	-	-	-
CO5	3	2	-	-	-	-	2	-	-	-	-	-
PO Target	**3**	**2**	**-**	**-**	**-**	**-**	**1.6**	**-**	**-**	**-**	**-**	**-**

KCA-105 Computer Organization and Architecture												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	1	-	-	-	-	1	-	-	-	-	-
CO2	3	1	-	-	-	-	1	-	-	-	-	-
CO3	3	1	-	-	-	-	1	-	-	-	-	-
CO4	3	1	-	-	-	-	1	-	-	-	-	-
CO5	3	1	-	-	-	-	1	-	-	-	-	-
PO Target	**3**	**1**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**

KCA151 Problem Solving Using C												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	-	2	-	-	-	-	1	-	-	-	1	1
CO2	3	2	-	-	-	-	2	-	-	-	1	1
CO3	3	2	-	-	-	-	2	-	-	-	1	1
CO4	3	2	-	-	-	-	2	-	-	-	1	1
CO5	3	2	-	-	-	-	2	-	-	-	1	1
PO Target	**3**	**2**	**-**	**-**	**-**	**-**	**1.8**	**-**	**-**	**-**	**1**	**1**

KCA-152 Computer Organization & Architecture Lab												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	-	-	-	-	2	-	-	-	-	-
CO2	3	2	-	-	-	-	1	-	-	-	-	-
CO3	3	2	-	-	-	-	1	-	-	-	-	-
CO4	3	2	-	-	-	-	1	-	-	-	-	-
PO Target	**3**	**2**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**

KCA 153 Principles of Management & Communication												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO-1	-	-	-	-	-	-	3	-	3	-	3	-
CO-2	-	-	-	-	-	-	3	-	3	-	3	-
CO-3	-	-	-	-	-	-	3	-	3	-	3	-
CO-4	-	-	-	-	-	-	3	-	3	-	3	-
CO-5	-	-	-	-	-	-	3	-	3	-	3	-
PO Target	**-**	-	-	-	-	-	**3**	-	**3**	-	**3**	-

MCA-II Semester

KCA201
Theory of Automata & Formal Languages

CO-PO Matrix												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	–	–	–	–	–	–	–	–	–	–
CO2	3	3	–	–	–	–	–	–	–	–	–	–
CO3	3	2	–	–	–	–	–	–	–	–	–	–
CO4	3	2	–	–	–	–	–	–	–	–	–	–
CO5	3	3	–	–	–	–	–	–	–	–	–	–
Target PO	**3**	**2.6**	–	–	–	–	–	–	–	–	–	–

KCA202
Object Oriented Programming

CO-PO Matrix												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	–	–	–	–	–	–	–	–	–	–
CO2	3	3	3	–	2	-	2	–	–	–	–	–
CO3	3	3	3	–	2	-	2	–	–	–	–	–
CO4	3	3	3	–	2	-	2	–	–	–	–	–
CO5	2	2	2	–	2	-	1	–	–	–	–	–
Target PO	**2.8**	**2.8**	**2.7**	–	**2**	–	**1.7**	–	–	–	–	–

KCA203
Operating Systems

CO-PO Matrix												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	–	–	–	–	–	–	–	–	–	–	–	–
CO2	–	–	–	–	–	–	–	–	–	–	–	–
CO3	3	2	–	–	–	–	–	–	–	–	–	–
CO4	2	3	–	–	–	–	–	–	–	–	–	–
CO5	–	–	–	–	–	–	–	–	–	–	–	–
Target PO	**2.5**	**2.5**	–	–	–	–	–	–	–	–	–	–

KCA204
Database Management Systems

CO-PO/APO Matrix												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	2	–	3	–	–	–	–	–	–	–
CO2	3	2	1	–	3	–	–	–	–	–	–	–
CO3	3	3	3	–	2	–	–	–	–	–	–	–
CO4	1	1	–	–	–	–	–	–	–	–	–	–
CO5	2	1	2	–	–	–	–	–	–	–	–	–
Target PO	**2.4**	**1.8**	**2**	–	**2.6**	–	–	–	–	–	–	–

KCA205
Data Structures & Analysis of Algorithms

CO-PO Matrix												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	–	–	–	–	–	–	–	–	–	–
CO2	3	3	1	–	1	–	–	–	–	–	–	–
CO3	3	3	2	–	2	–	–	–	–	–	–	–
CO4	3	3	2	–	2	–	–	–	–	–	–	–
CO5	3	3	2	–	2	–	–	–	–	–	–	–
Target PO	**3**	**3**	**1.75**	–	**1.75**	–	–	–	–	–	–	–

KCAA01
Cyber Security

CO-PO Matrix												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	–	–	1	–	–	–	–	–	–	–	–	–
CO2	–	–	3	–	–	2	–	–	–	2	–	–
CO3	–	–	3	–	–		–	–	–	2	–	–
CO4	–	–	3	–	–	2	–	–	–	3	–	–
CO5	–	–	3	–	–	2	–	–	–	3	–	–
Target PO	**–**	**–**	**2.6**	**–**	**–**	**2**	**–**	**–**	**–**	**2.5**	**–**	**–**

KCA251
Object Oriented Programming Lab

CO-PO Matrix												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	–	–	–	–	–	–	–	–	–	–
CO2	3	3	3	–	2	-	2	–	–	–	–	–
CO3	3	3	3	–	2	-	2	–	–	–	–	–
CO4	3	3	3	–	2	-	2	–	–	–	–	–
CO5	2	2	2	–	2	-	1	–	–	–	–	–
Target PO	**2.8**	**2.8**	**2.7**	–	**2**	–	**1.7**	–	–	–	–	–

KCA252
DBMS Lab

CO-PO Matrix												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	–	–	–	–	3	–	–	–	–	–	–	–
CO2	–	–	–	–	3	–	–	–	–	–	–	–
CO3	–	–	–	–	3	–	–	–	–	–	–	–
Target PO	–	–	–	–	**3**	–	–	–	–	–	–	–

KCA253
Data Structures & Analysis of Algorithms Lab

CO-PO Matrix												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	–	–	–	–	–	–	–	–	–	–
CO2	3	3	–	–	–	–	–	–	–	–	–	–
CO3	3	3	–	–	–	–	–	–	–	–	–	–
CO4	3	3	–	–	–	–	–	–	–	–	–	–
Target PO	**3**	**3**	–	–	–	–	–	–	–	–	–	–

MCA-III Semester

RCA 301
Operating Systems

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	–	–	–	–	–	–	–	–	–	–
CO2	–	–	–	2	–	–	–	–	–	–	–	–
CO3	3	2	–	–	–	–	–	–	–	–	–	–
CO4	2	–	–	–	–	–	–	–	–	–	–	–
CO5	3	1	–	–	–	–	–	–	–	–	–	–
Target PO	**2.7**	**1.6**	–	**2**	–	–	–	–	–	–	–	–

RCA 302
Web technology

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	–	1	1	–	–	–	1	–	–	1	2	–
CO2	–	–	2	–	3	–	3	–	–	2	2	–
CO3	–	–	–	–	3	–	3	–	–	–	2	2
CO4	–	–	–	–	3	–	3	–	–	–	3	2
CO5	–	–	–	–	3	–	3	–	–	–	3	2
Target PO	–	**1**	**1.5**	–	**3**	–	**2.6**	–	–	**1.5**	**2.4**	**2**

RCA 303
Design & Analysis of Algorithms

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	–	–	–	2	–	–	–	–	–
CO2	3	3	2	2	–	–		–	–	–	–	–
CO3	2	2	2	2	3	–	2	–	–	–	–	–
CO4	2	3	2	3	3	–	2	–	–	–	–	–
CO5	3	3	3	3	3	–	3	–	–	–	–	–
Target PO	**2.6**	**2.8**	**2.2**	**2.5**	**3**	–	**2.25**	–	–	–	–	–

RCA 304
Computer Based Optimization Techniques

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3		3	–	3	3	3	–	3	1
CO2	3	3	2	3	3	–	–	1	–	–	3	–
CO3	3	3	3	2	3	–	–	–	–	–	2	1
CO4	2	2	2	3	2	–	1	1	–	–	–	–
CO5	3	2	3	3	3	–	2	3	2	–	2	3
Target PO	**2.8**	**2.4**	**2.6**	**2.75**	**2.8**	–	**2**	**2**	**2.5**	–	**2.5**	**1.66667**

RCA 305
Cyber security

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	–	–	2	–	–	–	3	–	–	–	2	–
CO2	–	–	2	3	2	–	3	–	–	2	2	–
CO3	–	–	3	3	2	–	3	–	–	2	3	2
CO4	–	–	3	–	–	3	2	–	–	2	2	–
Target PO	–	–	**2.5**	**3**	**2**	**3**	**2.75**	–	–	**2**	**2.25**	**2**

RCA-351
Operating
Systems Lab

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	–	–	–	–	–	–	–	–	–	–	–
CO2	3	–	–	–	1	–	–	–	–	–	–	–
CO3	3	2	–	–	–	–	–	–	–	–	–	–
Target PO	**3**	**2**	–	–	**1**	–	–	–	–	–	–	–

RCA-352
Design and Analysis
Algorithm Lab

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	–	–	–	–	2	–	3	–	2	–
CO2	3	3	–	–	–	–	2	–	3	–	2	–
CO3	3	3	–	–	2	–	2	–	3	–	2	–
Target PO	**3**	**3**	–	–	**2**	–	**2**	–	**3**	–	**2**	–

RCA-A01
Introduction to Programming and Computer
Organization

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	–	–	2	–	–	2	–	–	–	–	–
CO2	2	–	–	–	–	–	–	–	–	–	–	–
CO3	2	–	–	–	–	–	–	–	–	–	–	–
CO4	2	3	–	–	3	–	2	–	–	–	–	1
Target PO	**2.25**	**3**	–	**2**	**3**	–	**2**	–	–	–	–	**1**

MCA-IV Semester

RCA- 401
Database Management System

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	–	–	–	–		–	–	–	–	–	–	–
CO2	2	3	–	–		–	2	–	–	–	–	–
CO3	–	3	–	–	2	–	2	–	2	–	–	–
CO4	–	2	–	–		–	3	–	–	–	–	–
CO5	–	–	–	–		–		–	–	–	–	–
Target PO	**2**	**2.6**	–	–	**2**	–	**2.3**	–	**2**	–	–	–

RCA- 402
Computer Networks

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	–	1	–	–	–	–	–	–	–	–	–	–
CO2	3	1	–	2	2	–	–	–	–	–	–	–
CO3	2	2	–	2	1	–	–	–	2	–	–	–
CO4	–	1	–	2	–	–	–	–	–	–	–	–
CO5	–	–	–	–	–	1	–	–	–	–	–	–
Target PO	**2.5**	**1.25**	–	**2**	**1.5**	**1**	–	–	**2**	–	–	–

RCA- 403
Artificial intelligence

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	–	1	–	–	–	–	–	–	–	–	–	–
CO2	2	3	2	–	–	–	–	–	–	–	–	–
CO3	3	–	–	–	–	2	–	–	–	–	–	–
CO4	–	3	1	3	2	–	–	–	–	–	–	–
CO5	–	3	3	3	3	–	–	–	–	–	–	–
Target PO	**2.5**	**2.5**	**2**	**3**	**2.5**	**2**	–	–	–	–	–	–

RCA- 404
Compiler Design

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	–	1	2	–	1	–	–	–	–	–
CO2	2	3	–	2	2	–	1	–	–	–	–	–
CO3	3	3	–	1	2	–	1	–	–	–	–	–
CO4	2	2	–	1	1	–	1	–	–	–	–	–
CO5	2	2	–	2	2	–	1	–	–	–	–	–
Target PO	**2.4**	**2.6**	–	**1.4**	**1.8**	–	**1**	–	–	–	–	–

RCA-E11
Design & Development of Applications

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	–	–	–	–	1	–	1	–	–	–	2	–
CO2	–	1	2	–	2	–	2	–	–	–	2	–
CO3	–	–	–	1	2	–	2	–	–	2	2	–
CO4	–	–	2	1	2	–	2	–	–	2	2	–
CO5	–	–	2	1	3	–	2	–	–	2	2	–
Target PO	–	**1**	**2**	**1**	**2**	–	**1.8**	–	–	**2**	**2**	–

RCA
A02:
Fundamental of Data Structure ,Numerical &
Computational Theory

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	–	–	1	–	2	–	–	–	–	–
CO2	3	1	–	–	2	–	–	–	–	–	–	–
CO3	3	2	–	–	3	–	–	–	–	–	–	–
Target PO	**2.3**	**2**	–	–	**2**	–	**2**	–	–	–	–	–

RCA-451
Mini Project
Lab

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	1	1	–	–	1	1	–	–	1	–
CO2	2	3	3	1	1	–	1	2	–	–	1	–
CO3	1	2	2	1	1	1	1	2	–	1	2	–
CO4	–	1	2	–	3	–	–	–	–	1	1	–
CO5	–	–	–	–	–	–	–	–	3	–		–
Target PO	**1.6**	**2.25**	**2**	**1**	**1.6**	**1**	**1**	**1.6**	**3**	**1**	**1.25**	–

RCA-452
Database Management System
Lab

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	–	2	–	–	–	–	2	–	–	–	–	–
CO2	–	3	–	–	2	–	2	–	1	–	–	–
CO3	–	2	–	–	–	–	2	–	–	–	–	–
Target PO	–	**2.3**	–	–	**2**	–	**2**	–	**1**	–	–	–

MCA-V Semester

RCA-501
Computer Graphics & Animation

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	1	1	–	1	–	–	–	–	–
CO2	3	3	1	1	1	–	1	–	–	–	–	–
CO3	3	3	2	2	1	–	1	–	–	–	–	–
CO4	3	3	1	2	2	–	1	–	–	–	–	1
CO5	1	1			1	–	1	–	–	–	–	2
Target PO	**2.6**	**2.6**	**1.25**	**1.5**	**1.2**	–	**1**	–	–	–	–	**1.5**

RCA-502
Software Engineering

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	–	–	3	1	1	–	–	–	–	–	–	1
CO2	–	–	–	2	2	2	1	–	3	–	–	–
CO3	–	3	3	2	2	2	2	–	3	–	–	–
CO4	–	2	–	3	3	2	2	–	3	–	–	1
CO5	–	–	–	3	2	2	3	3	2	3	3	–
Target PO	–	**2.5**	**3**	**2.2**	**2**	**2**	**2**	**3**	**2.75**	**3**	**3**	**1**

RCA-E31
Cloud Computing

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	–	–	–	–	1	2	2	–	–	–	–	3
CO2	–	–	–	–	3	2	3	–	–	–	–	3
CO3	–	–	2	–	3	2	3	–	–	–	–	3
CO4	–	–	2	–	2	2	3	–	–	1	–	–
CO5	–	–	–	–	3	3	1	–	–	2	–	–
Target PO	–	–	**2**	–	**2.4**	**2.2**	**2.4**	–	–	**1.5**	–	**3**

RCA-E24
Software Testing

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	–	2	–	–	1	2	2	–	3	2	2	–
CO2	–	–	–	–	3	–	2	–	3	–	2	–
CO3	–	–	–	–	3	–		–	1	–	2	–
CO4	–	–	–	–	3	–	3	–	3	–	2	–
CO5	–	–	–	–	3	–	1	–	1	–	2	–
Target PO	–	**2**	–	–	**2.6**	**2**	**2**	–	**2.2**	**2**	**2**	–

RCA-E45
Big Data

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	–	–	2	1	–	–	1	–	–	–	–
CO2	3	2	2	2	2	2	–	–	–	–	2	–
CO3	2	2	3	3	3	–	–	3	–	–	2	–
CO4	2	3	3	3	3	–	–	2	–	–	2	–
CO5	1		3	3	3	–	–	–	2	–	2	–
Target PO	**2.2**	**2.3**	**2.75**	**2.6**	**2.4**	**2**	–	**2**	**2**	–	**2**	–

RCA-551
Computer Graphics &
Animation Lab

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	–	2	–	2	–	–	–	1	–
CO2	3	2	1	–	2	–	2	–	–	–	1	–
CO3	3	2	1	3	3	–	3	–	–	–	3	2
Target PO	**3**	**2**	**1**	**3**	**2.3**	–	**2.3**	–	–	–	**1.6**	**2**

RCA-552
Project Based on Software Engineering

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	–	2	3	2	–	–	2	–	–	–	2	–
CO2	–	3	3	–	3	–	2	–	–	–	2	–
CO3	–	–	–	–	–	–	1	–	3	–	3	–
Target PO	–	**2.5**	**3**	**2**	**3**	–	**1.6**	–	**3**	–	**2.3**	–

MCA-VI Semester

RCA-611
Colloquium

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	–	3	–	3	3	–	2	–	3	–
CO2	–	2	–	–	2	2	3	–	3	–	3	–
CO3	3	2	–	3	–	–	2	–	3	–	2	–
Target PO	**3**	**2.3**	–	**3**	**2**	**2.5**	**2.6**	–	**2.6**	–	**2.6**	–

RCA-612
Industrial Project

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	–	–	3	–	–	2	1	–	2	–
CO2	3	2	2	3	2	–	2	–	–	–	1	–
CO3	3	3	2	–	3	2	–	–	–	–	2	–
CO4	3	–	3	–	3	–	–	–	3	–	3	–
CO5	1	2	1	1	1	2	3	–	1	1	1	–
Target PO	**2.6**	**2.5**	**2**	**2**	**2.4**	**2**	**2.5**	**2**	**1.6**	**1**	**1.8**	–