A Documentary Support

for
Matric No. – 1.1.2

employability/ entrepreneurship/ skill development

under the
Criteria – I
(Curriculum Design and Development)
Key Indicator - 1.1

in
Matric No. – 1.1.2

B.E. COMPUTER SCIENCE & ENGINEERING
1998

Mapping of course to:
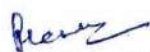
| Employability | Entrepreneurship | Skills Development |

Registrar
Dr. B.R.A University, Agra

Department of Computer Science and Engineering

	Programme Outcomes(POs)	Graduate Attributes (GAs)
PO1.	Apply the knowledge of mathematics, science, engineering fundamentals, and Engineering concepts for the solution of complex Engineering problems	Engineering Knowledge
PO2.	Identify, formulate, review the literature and analyze complex problems related to computer science and engineering reaching substantiated conclusions using the first principles of mathematics and engineering sciences.	Problem Analysis
PO3.	Design solutions for complex problems in mechanical engineering and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations	Design/Development of solutions
PO4.	Use research-based knowledge and research methods including design of experiments, analysis, and interpretation of data, and synthesis of the information to provide valid conclusions.	Conduct Investigations of complex problems
PO5.	Create, select, and apply appropriate techniques, resources, and modern engineering tools such as optimization techniques, simulations, including prediction and modeling to complex process engineering problems with an understanding of their limitations.	Modern Tool Usage
PO6.	Apply contextual knowledge with justification to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering and computer science and engineering professional practice	The Engineer & Society
PO7.	Environment and sustainability: An ability to understand the principles, commitment and practice to improve product sustainable development globally in computer science and engineering with minimal environmental effect.	Environment and Sustainability

Incharge
Computer Science Engineering
Institute of Engineering and Technology
Dr. .... Ambedkar University,
.... Campus, Agra

Director
Institute of Engineering & Technology
Dr. B. R. Ambedkar University
Khandari Campus, Agra

PO8.	Apply ethical principles and commit to professional ethics adhering to the norms of the computer science engineering practice	Ethics
PO9.	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings	Communication

Yellow color represents the text highlighted for Local,National, and Regional Needs
Cyan color represents the text highlighted for Global Needs

PO10.	Communicate effectively on complex engineering and computer science and engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions	Individual and Team work
PO11.	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change	Lifelong Learning
PO12.	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage computer science and engineering projects and in multi disciplinary environments.	Project management &Finance

Incharge
Computer Science Engineering
Institute of Engineering and Technology
Ambedkar University,
Campus, Agra

Director
Institute of Engineering & Technology

Department of computer and science engineering

Program Specific Outcomes(PSOs)

PSO1: To apply computer science and engineering knowledge to identify and solve the real life problems

PSO2: To enhance technical capabilities, entrepreneurship quality and awareness of latest trends in computer science and engineering discipline

PSO3: To develop the computer based system in logical manner using various algorithms and programming.

Yellow color represents the text highlighted for Local,National, and Regional Needs

Cyan color represents the text highlighted for Global Needs

Incharge
Computer Science Engineering
Institute of Engineering and Technology
Dr. Bhimrao Ambedkar University,
Khandari Campus, Agra

Director
Institute of Engineering & Technology
Dr. B. R. Ambedkar University
Khandari Campus, Agra

3 | P a g e

BCS-301	Database Management System	3L-T-2P	CREDIT -4

Course Outcomes:

1. For a given query write relational algebra expressions for that query and optimize the developed expressions
2. For a given specification of the requirement design the databases using E-R method and normalization.
3. For a given specification construct the SQL queries for Open source and Commercial DBMS - MYSQL, ORACLE, and DB2.
4. For a given query optimize its execution using Query optimization algorithms.
5. For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.
6. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.

BCS302	Data Structure	3L-T-2P	CREDIT -3

Course Outcomes:

1. To review the concepts of fundamental data structures to be used in programming. To understand various searching algorithms.
2. To understand the various operations on different types of data structures such as stacks, queues and linked lists. To apply and analyze various data structures on different applications.
3. To understand, analyze and compare various sorting algorithms. To understand the concept of hashing and its techniques.
4. To understand the various types of tree structures and their implementation. To evaluate various tree structures. To be able to apply tree structures on various problems.
5. To understand and implement various types of graphs. To study and implement various shortest path algorithms on graphs.

BEC 301	Digital Electronics	3L-1T-2P	CREDIT -4

Objectives of the course:

At the end of this course, students will demonstrate the ability to

Incharge
Computer Science Engineering
Institute of Engineering and Technology
Dr Bhimrao Ambedkar University,
Khandari Campus, Agra

Director
Institute of Engineering & Technology
Dr. B. R. Ambedkar University
Khandari Campus, Agra

Page

PO10.	Communicate effectively on complex engineering and computer science and engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions	Individual and Team work
PO11.	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change	Lifelong Learning
PO12.	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage computer science and engineering projects and in multi disciplinary environments.	Project management &Finance

Department of computer and science engineering

Program Specific Outcomes(PSOs)

PSO1: To apply computer science and engineering knowledge to identify and solve the real life problems

PSO2: To enhance technical capabilities, entrepreneurship quality and awareness of latest trends in computer science and engineering discipline

PSO3: To develop the computer based system in logical manner using various algorithms and programming.

1. Understand working of logic families and logic gates.
2. Design and implement Combinational and Sequential logic circuits.
3. Understand the process of Analog to Digital conversion and Digital to Analog conversion.
4. Be able to use PLDs to implement the given logical problem.

MC 302	Human values and Professional Ethics	2L-0T-0P	No CREDIT

Course Outcome : On completion of this course, the students will be able to:

1. Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society
2. Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.
3. Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society
4. Distinguish between ethical and unethical practices, and start working over the strategy to actualize a harmonious environment wherever they work.

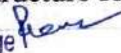| BSC 301	Mathematics-III	3L-1T-0P	CREDIT -4

Course Outcomes:

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

1. Solve the Fourier Transform of function.
2. Compute poles & zeros.
3. Evaluate the real & complex integrals with the help of Cauchy's Residue Theorem.
4. Utilize curve fitting techniques for data representations and computation in engineering analysis.
5. Employee the principle of linear regression and correlation, translate real- world problems into probability models, use Binomial, Poisson & Normal Distribution to solve statistical problems.

BCS 403	Design and Analysis of Algorithms	3L-1T-4P	CREDIT -4

Course Outcomes:

1. Gain insight about design and analysis of standard searching and sorting algorithms. Learn various algorithm Analysis techniques.
2. Able to compare between different data structures i.e., trees, heaps etc. also, pick an appropriate data structure for a design situation.

Incharge
Computer Science Engineering
Institute of Engineering and Technology
Dr. Bhimrao Ambedkar University,
Khandari Campus, Agra

Director
Institute of Engineering & Technology
Dr. B. R. Ambedkar University
Khandari Campus, Agra

3. Learn divide and conquer, Greedyparadigms and understand and analyze when an algorithmic design situation calls for them.
4. Developing and analyzing the solutions for the problems using Dynamic programming, backtracking and Branch and bound approaches..
5. Understand NP completeness and difference between NP-Hard & NP-complete problems..

BCS-401	Computer Organization	3L-1T-0P	CREDIT -4

Course outcomes:

1. Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
2. Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication).
3. Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
4. Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU.
5. Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodology.

BCS403	Discrete Mathematics	3L-1T-0P	CREDIT -4

Course Outcomes:

At the end of this course, students will be able to:

1. Understand the basic principles of sets and operation in sets. Demonstrate and understanding of relations and functions and be able to determine their properties. Determine when a function is 1-1 and "onto".
2. Use the theory, methods and techniques of the course to solve problems about groups, rings and fields.
3. Write an argument using logical notation and determine if the argument is or is not valid.
4. Apply counting principle to determine probabilities.
5. Demonstrate different traversal methods for trees and graphs.

Computer Network

BCS501	Computer Network	3L-T-P	CREDIT -3

Course outcome expected:

By end of this course the student should be able to

CO1: To Study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model. To understand the fundamentals and basics of Physical layer, and to apply them in real time applications.

CO2: to study and evaluate medium access layer protocols. To learn data link layer concepts, design issues, and protocols and to Demonstrate knowledge of various error detection, correction and flow control techniques in data link layer.

CO3: To classify the routing protocols, analyze how to assign the IP addresses for the given network and to evaluate different congestion control methods.

CO4: To understand, analyze and evaluate a number of Transport layer and presentation layer services, and protocols.

CO5: To understand the functions of Application layer paradigms and Protocols

THEORY OF COMPUTATION

BCS502	Theory of Computation	3L-T-P	CREDIT -3

Course outcome expected:

By end of this course the student should be able to

CO1 To use basic concepts of formal languages of finite automata techniques

CO2 To Design Finite Automata's for different Regular Expressions and Languages

CO3 To Construct context free grammar for various languages

CO4. To solve various problems of applying normal form techniques, push down automata and Turing Machines

CO5. To understand the concept of recursively enumerable language.

OPERATING SYSTEM

BCS-503	Operating System	3L-T-P	CREDIT -3

Course outcome expected:

By end of this course the student should be able to

CO1: Analyze the structure of OS and basic architectural components involved in OS design

CO2: Analyze and design the applications to run in parallel either using process or thread models of different OS

CO3: Analyze the various device and resource management techniques for timesharing and distributed systems

CO4: Understand the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system

CO5: Interpret the mechanisms adopted for file sharing in distributed Applications

CO6: Conceptualize the components involved in designing a contemporary OS

OPERATING SYSTEM LAB

BCS-551	Operating System lab	L-T-2P	CREDIT -1

Course outcome expected:

By end of this course the student should be able to

CO1. Experiment with Unix commands and shell programming

CO2. Build 'C' program for process and file system management using system calls

CO3. Choose the best CPU scheduling algorithm for a given problem instance

CO4 .Identify the performance of various page replacement algorithms

CO5. Develop algorithm for deadlock avoidance, detection and file allocation strategies.

3. Simulate Paging Technique of Memory Management

ECONOMICS FOR INDUSTRY

BHSM501	Economics for industry	3L-0T-0P	CREDIT -3

Course outcome:

At the end of the course, the students will be able to

CO1. Define the main concepts and describe the models and methods in economic analysis

CO2. Explain economic events in individual markets and the aggregate economy using basic theory and tools

CO3. Apply supply and demand analysis to relevant economic issues

CO4. Explain how individual decisions and actions as a member of society affect the economy locally, nationally and internationally

CO5. Distinguish between perfect competition and imperfect competition and explain the welfare loss in non-competitive markets

Incharge
Computer Science Engineering
Institute of Engineering and Technology
Dr Bhimrao Ambedkar University,
Khandari Campus, Agra

Director
Institute of Engineering & Technology
Dr. B. R. Ambedkar University
Khandari Campus, Agra

BCS601	Artificial Intelligence	3L-1T-P	CREDIT -4

Course outcome expected:

By end of this course the student should be able to

CO1: To Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents. Apply concept of Natural Language processing to problems leading to understanding of cognitive computing.

CO2: To Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.

CO3: Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing.

CO4: To study and apply the basic issues of knowledge representation and Logic and blind and heuristic search, as well as an understanding of other topics such as chaining, resolution, etc. that play an important role in AI programs.

CO5: To understand various machine learning techniques and models.

BEC-651	Artificial Intelligence Lab	L-T-2P	CREDIT-1

Course outcome expected:

By end of this course the student should be able to

CO1. To implements basic concepts of prolog.

CO2. To performs some mathematical concepts like factorial, Fibonacci using prolog.

CO3. To demonstrate various AI problems like water-jug, 4 queen's problem, etc

CO4. To implement search problems like A* algorithm.

COMPILER DESIGN

BCS 602	Compiler Design	3L-1T-P	CREDIT -4

Course outcome expected:

By end of this course the student should be able to

CO1: Identify all essential steps for automatically converting source code into object code.(Understand)

CO2: Generate the low-level code for calling functions/methods in modern languages. (Apply)

CO3: Discuss opportunities for optimization introduced by naïve translation and approaches for achieving optimization such as instruction selection, instruction scheduling , register allocation, and peephole optimization.(Apply)

CO4: Interpret benefits and limitations of automatic memory management. (Understand)

CO5: Explain advantages, disadvantages and difficulties of just in time and dynamic recompilation. (Unders

COMPILER DESIGN LAB

BCS652	Compiler Design Lab	0L-0T-2P	CREDIT -1

Course outcome expected:

By end of this course the student should be able to

C01. By this laboratory, students will understand the practical approach of how a compiler works.

CO2. This will enable him to work in the development phase of new computer languages in industry.

C03 Student will learn is the Lexical Analyser's Basic Mechanism?

CO4 Generate machine code from the intermediate code forms

CO5 student will learn the ability to design and analyze a com

MICROPROCESSOR AND MICROCONTROLLER

BEC-602	Microprocessor & Microcontroller	3L-1T-0P	CREDIT-4

Course outcome expected:

By end of this course the student should be able to

CO1. Recall and apply a basic concept of digital fundamentals to microprocessor based personal computer system and Recall the memory types and understand the interfacing of memory with microprocessor.

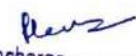2. Understand the internal architecture and organization of 8085 & 8086.

CO2 .1. Apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor and microcontroller.

2. Analyze assembly language programs; select appropriate assemble into machine a cross assembler utility of a microprocessor and microcontroller.

CO3. Discuss how the different peripherals are interfaced with microprocessor like 8255,8253/54,8237,8279,etc.

CO4. 1.To analyze the concepts of memory interfacing for faster execution of instructions and improves the speed of operations & hence performance of microprocessors.

2.To Understand the basic knowledge of advanced processor and Analyze the internal architecture of 80286,80486 and Pentium processor.

Incharge
Computer Science Engineering
Institute of Engineering and Technology
Dr Bhimrao Ambedkar University,
Khandari Campus, Agra

Director
Institute of Engineering & Technology
Dr. B. R. Ambedkar University
Khandari Campus, Agra

CO5 1. Analyze the internal architecture and real time control of 8051.

2. Analyze the internal architecture of ARM Processors.

MICROPROCESSOR AND MICROCONTROLLER

BEC-651	Microprocessor & Microcontroller lab	0L-0T-2P	CREDIT-1

Course outcome expected:

By end of this course the student should be able to

CO1.Do basic assembly language programming of 8085.

CO2.Do advance assembly language programming of 8086.

CO3.Do basic assembly language programming of 8085 for interfacing of peripherals.

CO4.Do advance assembly language programming of 8086 for interfacing of peripherals.

OCCUPATIONAL HEALTH AND SAFETY

MC601	Occupational Health and Safety	2L-0T-P	NO CREDIT

Course outcome expected:

By end of this course the student should be able to

CO1Identify the diseases associated with occupation.

CO2Manage safety in industries by suggesting safety measures.

CO3Identify the accidental causes & apply the preventions.

CO4Identify Fire Explosion & apply PPE.

CO5Identify & apply Hazards & Risk identification, Assessment and control techniques.

Soft Computing

BCS701	Soft Computing	3L-0T-0P	CREDIT -3

Course outcome expected:

By the end of the course the students should be able to:

Incharge
Computer Science Engineering
Institute of Engineering and Technology
Dr Bhimrao Ambedkar Univ ity,
Khandari Campus Agra

Director
Institute of Engineering & Technology
mbedkar Univ
Campus

CO1: To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations. Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications

CO2: Apply perceprtron and backprogation technique for classification.

CO3: Understand the concepts of crisp fuzzy sets.

CO4: knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic and apply fuzzification and defuzzinfication.

CO5: Analyze the genetic algorithms and their applications. Apply genetic algorithms to combinatorial optimization problems

Soft Computing Lab

BCS751	Soft Computing LAB	0L-0T-2P	CREDIT -1

Course outcome expected:

By the end of the course the students should be able to:

CO1: Learn McCulloch-pits

CO2: Execute Hebb's Net and Perceptron Training Algorithm

CO3: Learn and execute logic gates and Genetic Algorithm

Digital Image Processing
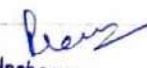
BCS702	Digital Image Processing	3L-1T-P	CREDIT -4

Course Outcomes Expected:

By the end of the course the students should be able to:

CO1: Review the fundamental concepts of a digital image processing system.

CO2 : Analyze images in the frequency domain using various transforms.

CO3 : Evaluate the techniques for image enhancement and image restoration.

CO4 : Categorize various compression techniques.

CO5: Interpret Image compression standards.

CO6 : Interpret image segmentation and representation techniques.

Cryptography and Network Security

Incharge
Computer Science Engineering
Institute of Engineering and Technology
Dr Bhimrao Ambedkar University,

Director
Institute of Engineering & Technology
Ambedkar University
Campus, Agra

BCS801	Cryptography and Network Security	3L-1T-0P	CREDIT -4

Course Outcomes

By the end of the course the students should be able to:

CO1 Illustrate the concepts of Network Security and Compare Various Symmetric and Asymmetric Cryptographic methods used for Network Security.

CO2 Classify various Algorithms to be used at various TCP/IP Layers & to operate Digital Signature in Real World Situation

CO3 Summarize different Authentication Techniques & Describe programs like PGP & S/MIME

CO4 Implement IP Security Architecture &Transport Layer Security to identify the vulnerability of the Internet systems and recognize the mechanisms of the attacks, and apply them to design and evaluate counter-measure tools

CO5 Implement Firewall design principles and identify various intrusion detection systems and be able to achieve highest system secur

Advance Data base management system

BCS802	AdvanceDatabase management system	3L-0T-0P	CREDIT -3

Course outcome expected:

By the end of the course the students should be able to:

CO1: Exposure to fundamentals of DBMS and its importance.

CO2: Exposure for students to write complex queries including full outer joins, self-join, sub queries, and set theoretic queries, Cursor Management, Triggers, Transaction Processing & Locking using concept of Concurrency control.

CO3 Understand the importance of Functional Dependency and Functional Decomposition and apply normalization techniques.

CO4: Apply transaction management techniques to database.

CO5: Apply concurrency control methods on database.
SQL for set theory queries, joins, Transactional Control(Commit, Save point) DCL Commands (Grant and Revoke) Types of locks on DB, Indexing, Views, Cursors, Triggers, Synonymes, Exceptions.

Unit-III : Functional Dependency and Decomposition:

Incharge
Computer Science Engineering
Institute of Engineering and Technology
Dr. Bhimrao Ambedkar University
Khandari Campus, Agra

Director
Institute of Engineering & Technology 15 | P a g e
Dr. B. R. Ambedkar University
Khandari Campus, Agra

Departmental Elective

DATA COMPRESSION

DECS 501	Data Compression	3L-0T-0P	CREDIT -3

Course outcome expected:

By end of this course the student should be able to

C01 Students will able to understand important of data compression

Co2 Student will be able to learn application different type of compression

CO3 Student is able to select methods and techniques appropriate for the task

CO4 Student is able to develop the methods and tools for the given task

CO5. student will learn different type of Distortion criteria

COMPUTER GRAPHICS

DECS-502	Computer Graphics	3L-T-P	CREDIT -3

Course outcome expected:

By end of this course the student should be able to

CO1:-To know the foundations of computer graphics.

CO2:-To comprehend the concept of geometric, mathematical and algorithmic concepts necessary for programming computer graphics

CO3:-To understand the comprehension of windows, clipping and view-ports object representation in relation to images displayed on screen.

CO4:- To apply the concept of 3D transformation for the creation of objects

CO5:-To understand the basics of curves and surfaces and to recognize the software utilized in constructing computer graphics applications

DECS 552	Computer Graphics lab	0L-0T-2P	CREDIT -1

Course outcome expected:

By end of this course the student should be able to

CO1. To implement the line and circle drawing algorithm

CO2. To implement the translation, rotation, scaling, reflection and sharing.

Incharge
Computer Science Engineering
Institute of Engineering and Technology
Dr. Bhimrao Ambedkar University,
Khandari Campus, Agra

Director
Institute of Engineering & Technology
A. ...dk... ...niver...
...campus, Ag.

CO3. Execute scan line polygon filling

CO4 Implement basic transformations on objects

CO5 Implement clipping algorithm on lines

DATA MINING AND DATA WAREHOUSE

DECS 503	**DATA MINING AND DATA WAREHOUSING**	3L-T-P	**CREDIT -3**

Course outcome expected:

By end of this course the student should be able to

CO1 Be familiar with mathematical foundations of data mining tools.

CO2 Understand and implement classical models and algorithms in data warehouses and data mining

CO3 Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.

CO4 Master data mining techniques in various applications like social, scientific and environmental context.

CO5 Develop skill in selecting the appropriate data mining algorithm for solving practical problems.

DATA MINING AND DATA WAREHOUSING LAB

DECS 553	**DATA MINING AND DATA WAREHOUSING LAB**	L-T-2P	**CREDIT -1**

Course outcome expected:

By end of this course the student should be able to

CO1.To evaluate the different models of OLAP and data preprocessing.

CO2.To enlist various algorithms used in information analysis of Data Mining Techniques.

CO3 To demonstrate the knowledge retrieved through solving problems

Employability   Entrepreneursgip   Skill Development

DECS 601	**Advance Computer architecture**	3L-1T-P	**CREDIT -4**

Course outcome expected:

By end of this course the student should be able to

Incharge
Computer Science Engineering
Institute of Engineering and Technology
Dr. Bhimrao Ambedkar University,
Khandari Campus, Agra

Director
Institute of Engineering & Technology
Dr. B. R. Ambedkar University
Khandari Campus, Agra

| P a g e