

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI&ML)

PROGRAM OUTCOMES

PROGRAM OUTCOMES (POs)

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems 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.
- 4. Conduct investigations of complex problems:** 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.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The Engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. Communication:** Communicate effectively on complex 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.
- 11. Project management and finance:** 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 projects and in multidisciplinary environments.
- 12. Life-long learning:** 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.

Course Code & Title:

As per NPRCET Regulation 2023, the lists of courses are given in the following table.

Table - List of Courses with Course Code:

S/N.	COURSE CODE (NBA)	COURSE CODE (NPRCET)	TITLE OF THE COURSE
1st Semester			
1	C101	23HS101	Professional English - I
2	C102	23MA101	Matrices and Calculus
3	C103	23PH101	Engineering Physics
4	C104	23CY101	Engineering Chemistry
5	C105	23GE101	Problem Solving and C Programming (IC)
6	C106	23GE103	தமிழர்மரபு /Heritage of Tamils
7	C107	23BS112	Physics and Chemistry Laboratory
8	C108	23GE112	English Laboratory -I
2nd Semester			
9	C109	23HS201	Professional English - II
10	C110	23MA203	Probability and Statistics
11	C111	23PH203	Physics for Information Science
12	C112	23BE201	Basic Electrical and Electronics Engineering
13	C113	23GE901	Environmental Sciences and Sustainability
14	C114	23CS201	Python Programming
15	C115	23GE201	தமிழரும்தொழில்நுட்பமும்/Tamils and Technology
16	C116	23GE211	Engineering Practices Laboratory
17	C117	23CS211	Python Programming Laboratory
18	C118	23GE212	English Laboratory –II
3rd Semester			
19	C201	23MA302	Discrete Mathematics
20	C202	23CS901	Digital Principles and Computer Organization
21	C203	23CS301	Data Structures and Algorithms
22	C204	23CS302	Foundations of Data Science
23	C205	23CS303	Object Oriented Programming Using Java
24	C206	23CS311	Data Science Laboratory
25	C207	23CS312	Object Oriented Programming using Java Laboratory
26	C208	23CSA01	Value added courses-I ^s
4th Semester			
27	C209	23AL401	Artificial Intelligence
28	C210	23AL402	Machine Learning

S/N.	COURSE CODE (NBA)	COURSE CODE (NPRCET)	TITLE OF THE COURSE
29	C211	23AL403	Database System Design and Management
30	C212	23CS403	Object Oriented Software Engineering
31	C213	23CS404	Operating Systems
32	C214	23CS405	Theory of Computation
33	C215	23AL411	Artificial Intelligence and Machine Learning Laboratory
34	C216	23AL412	Database System Design and Management Laboratory
35	C217	23CSA02	Value added courses–II ^s

Course Outcomes with K – Level mapping for all courses

SEMESTER 1

Course Code & Title: C101 & 23HS101 Professional English - I		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C101.1	Use appropriate words in a professional context and communicate in a professional context.	K3
C101.2	Gain understanding of basic grammatic structures and use them in right context.	K2
C101.3	Read and infer the denotative and connotative meanings of technical texts and use technical words in describing products with appropriate definitions.	K3
C101.4	Write definitions, descriptions, narrations and essays on various topics.	K6
C101.5	Express their opinions effectively in both oral and written medium of communication.	K6

Course Code & Title: C102 & 23MA101 Matrices and Calculus		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K3
C102.2	Able to use differential calculus ideas on several variable functions.	K3
C102.3	Apply integral calculus and multiple integral tools in solving various application problems.	K3
C102.4	Understand the concepts of Gradient, divergence and curl of a vector point function and related applications.	K2
C102.5	Apply various techniques in solving ordinary differential equations.	K3

Course Code & Title: C103 &23PH101 Engineering Physics		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C103.1	Choose the correct materials based on their qualities for any intended applications and learn the basics of elasticity and its engineering-related applications.	K3
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Infer the characteristics of laser for various Engineering applications and expand the understanding of optical fibers use in communications.	K2
C103.4	Apply quantum theory's sophisticated physics notions to the matter characterization.	K3
C103.5	Know the fundamentals of crystal formations and growth methods.	K2

Course Code & Title: C104 &23CY101 Engineering Chemistry		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C104.1	Summarize the water related problems in boilers and their treatment techniques.	K1
C104.2	Discuss the applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.	K2
C104.3	Discuss the types, properties and applications of polymers and composites.	K3
C104.4	Summarize the fuels used for engineering processes and applications of fuels.	K2
C104.5	Summarize the principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.	K3

Course Code & Title: C105 &23GE101 Problem Solving and C Programming		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C105.1	Understand the basic concepts of C programming tokens, control statements Input/Output statements, and Preprocessor directives.	K2
C105.2	Develop C Programs using basic programming constructs for solving simple problems.	K3
C105.3	Develop C programs for solving computational problems by using arrays and strings.	K3
C105.4	Develop simple real-time applications in C using functions, arrays, and strings.	K3
C105.5	Develop applications for real time problems in C using pointers and structures.	K3

Course Code & Title: C107&23BS112 & Physics and Chemistry Laboratory		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C107.1	Apprehend the concepts of interference, diffraction of light and recognize the resonance concept of waves.	K2
C107.2	Apply the principles of operations of semiconductor using simple circuits and interaction of electromagnetic waves and crystalline solids.	K3
C107.3	Measure the elastic moduli and moment of inertia of given materials with the help of suggested procedures.	K3
C107.4	Experiment the relationship between the light and matter & properties of liquids.	K4
C107.5	Estimate the velocity of sound and compressibility of liquid.	K2

Course Code & Title: C107 & 23BS112 ,Physics and Chemistry Laboratory		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C107.1	Analyze the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K4
C107.2	Determine the amount of metal ions through volumetric and spectroscopic techniques.	K3
C107.3	Analyze and determine the composition of alloys.	K4
C107.4	Learn simple method of synthesis of nanoparticles.	K2
C107.5	Quantitatively analyze the impurities in solution by electroanalytical methods.	K4

Course Code & Title: C108&23GE112 English Laboratory -I		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C108.1	Listen to and comprehend general as well as complex academic information.	K2
C108.2	Listen to and understand different points of view in a discussion.	K2
C108.3	Speak fluently and accurately in formal and informal communicative contexts.	K3
C108.4	Describe products and processes and explain their uses and purposes clearly and accurately.	K6
C108.5	Express their opinions effectively in both formal and informal discussions.	K6

SEMESTER 2

Course Code & Title: C109 &23HS201Professional English -II		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C109.1	Compare and contrast products and ideas in technical texts and write analytical essays.	K2
C109.2	Identify and report cause and effects in events, industrial processes through technical texts and draft a report with suggestions.	K6
C109.3	Analyze problems in order to arrive at feasible solutions and communicate them in the written format.	K4
C109.4	Present their ideas and opinions in a planned and logical manner in industrial nature.	K6
C109.5	Draft effective resumes in the context of job application.	K6

Course Code & Title: C110& 23MA901 Probability and Statistics		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C110.1	Understand the fundamental concepts of probability.	K2
C110.2	Applying the knowledge of one-dimensional random variables to standard distributions which can describe real life phenomenon.	K3
C110.3	Understand the basic concepts of two-dimensional random variables and apply in engineering applications.	K2
C110.4	Apply the concept of testing of hypothesis for small and large samples in real life Problems.	K3
C110.5	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K2

Course Code & Title: C111 &23PH203 Physics for Information Science		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C111.1	To recognize the fundamental ideas behind different free-electron theories and establish the solids' electrical characteristics.	K2
C111.2	To evaluate the functions of semiconductors and their uses.	K3
C111.3	To employing quantum principles to examine the mechanisms at work in magnetic materials.	K3
C111.4	To understand about the uses of superconducting and Optical properties of materials.	K2
C111.5	To show the fundamentals of how micro-and nano-electronic equipment functions.	K2

Course Code & Title: C112 &23BE201 Basic Electrical and Electronics Engineering		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C112.1	Compute the electric circuit parameters for simple Problems	K3
C112.2	Examine the working principle and applications of electrical machines	K2
C112.3	Illustrate the characteristics of analog electronic devices	K2
C112.4	Examine the basic concepts of digital electronics	K4
C112.5	Apply the concepts of principles of measuring instruments for real time applications	K2

Course Code & Title: C113 &23GE901Environmental Sciences and Sustainability

Course Code & Title: C114 &23CS201 Python Programming

Course Code & Title: C116 &23GE211 Engineering Practices Laboratory		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C116.1	Draw pipe line plan; lay and connect various pipe fittings used in common house hold plumbing work; Saw; plan; Make joints in wood materials used in common household wood work.	K3
C116.2	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipment; Make a tray out of metal sheet using sheet metalwork.	K3
C116.3	Wire various electrical joints in common house hold electrical wire work.	K3
C116.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K4

Course Code & Title: C116 &23CS211 Python Programming Laboratory		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C117.1	Develop simple python programs for applying the concepts of datatypes, expressions, and python statements.	K6
C117.2	Develop Python programs using conditionals, looping, functions, and strings for solving real-time computational problems.	K6
C117.3	Understand the concepts of compound data using Python lists, tuples, and dictionaries.	K2
C117.4	Develop python programs for solving problems by using modules, files, and python packages.	K6
C117.5	Utilize Python packages for developing real-world software applications.	K6

Course Code & Title: C118 & 23GE212 English Laboratory -II		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C118.1	Speak effectively in group discussions held in a formal/semi-formal context.	K6
C118.2	Discuss, analyze and present concepts and Problems from various perspectives To arrive at suitable solutions.	K4
C118.3	Make effective presentations in an attractive way using appropriate vocabulary.	K3
C118.4	Attend job interviews and be successful in them.	K6
C118.5	Develop adequate Soft Skills required for the workplace.	K3

SEMESTER 3

Course Code & Title: C201&23MA302 Discrete Mathematics		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C201.1	Apply the engineering knowledge to solve the logic of a program.	K3
C201.2	Understand and analyze the structures of problems on mathematical Induction and counting principle.	K2
C201.3	Apply the fundamentals of graph theory using modern tools in computer networking to manage projects	K3
C201.4	Apply the notion of groups, rings and fields to design and solve the algebraic structures problems.	K3

C201.5	Acquire the knowledge of engineering in real life phenomena by solving Lattices and Boolean algebra	K3
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Course Code & Title: C202 & 23CS901 Digital Principles and Computer Organization

	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C202.1	Design various combinational digital circuits using logic gates	K3
C202.2	Describe the operation and construction of various flipflops.	K2
C202.3	Design sequential circuits and analyze the design procedures.	K3
C202.4	State the fundamentals of computer systems and analyze the execution of an instruction.	K2
C202.5	Analyze different types of control design and identify hazards.	K4
C202.6	Identify the characteristics of various memory systems and I/O communication	K2

Course Code & Title: C203&23CS301 Data Structures and Algorithms

	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C203.1	Explain abstract data types	K2
C203.2	Apply and analyze linear data structures, such as lists, queues, and stacks, according to the needs of different applications	K4
C203.3	Apply searching, sorting, and hashing algorithms to solve real-world problems.	K3
C203.4	Implement effectively and analyze various tree structures to solve computational problems for efficient data management.	K3

C203.5	Implement efficient graph algorithms and Analyze graph modeling to solve them.	K3
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Course Code & Title: C204 & 23CS302 Foundations of Data Science		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C204.1	Understand the data science process	K2
C204.2	Understand different types of data description for data science process	K2
C204.3	Explain the relationships between data in data science	K2
C204.4	Use the Python Libraries for Data Wrangling	K3
C204.5	Apply visualization Libraries in Python to interpret and explore data	K3

Course Code & Title: C205 & 23CS303 Object Oriented Programming Using Java		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C205.1	Summarize classes with access controls to create objects for real world scenarios.	K2
C205.2	Utilize the principle of Inheritance, Packages and Interface.	K3
C205.3	Use of exception handling mechanisms and multithreaded model to solve real world problems	K3
C205.4	Illustrate Java applications with I/O packages, string classes and generics concepts	K2
C205.5	Develop and Design Graphical User Interface Application using JAVA FX.	K3

Course Code & Title: C206 &23CS311 Data Science Laboratory		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C206.1	Use of the python libraries for data science	K3
C206.2	Use of the basic statistical and Probability measures for Data science.	K3
C206.3	Apply descriptive analytics on the benchmark datasets.	K3
C206.4	Apply correlation and regression analytics on standard datasets	K3
C206.5	Interpret data using visualization packages in python.	K3

Course Code & Title: C207 & 23CS312 Object Oriented Programming Using Java Laboratory		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C207.1	Implement the simple java programs using object-oriented programming concepts	K3
C207.2	Illustrate simple applications using package and exceptions.	K2
C207.3	Implement the applications using multi thread in grand files.	K3
C207.4	Create GUIs and event driven programming applications.	K6
C207.5	Execute the real-world problem in team by applying the appropriate features of object-oriented programming paradigm with best practices and document its methodology	K3

Course Code & Title: C208 & 23CSA01-Git and GitHub (Value Added Course-II)		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C208.1	Understand the fundamental concepts of version control systems and the role of Git in software development.	K2
C208.2	Apply basic Git commands to create, manage and navigate local repositories, including initializing a repository and committing changes.	K3
C208.3	Apply switch, and merge branches in Git, including resolving simple merge conflicts.	K3
C208.4	Apply GitHub to create and manage remote repositories, push and pull changes, and collaborate with others on software projects.	K3
C208.5	Analyze collaborative workflows by forking repositories, creating pull requests, and participating in code reviews using GitHub.	K4

SEMESTER 4

Course Code & Title: C209 &23AM401 Artificial Intelligence		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C209.1	To understand the foundation, acknowledge of Intelligent Systems	K2
C209.2	Utilize problem-solving techniques to achieve optimal solutions or navigate complex environments	K3
C209.3	Utilize game playing and CSP approaches to design intelligent systems to solve problems with optimal decisions and complex constraints.	K3
C209.4	Utilize logical reasoning to empower intelligent systems and reasoning techniques to solve the Problem	K3
C209.5	Integrate probabilistic reasoning techniques reasoning under uncertainty in intelligent systems	K3

Course Code & Title: C210 &23AL402 Machine Learning		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C210.1	Gain foundational knowledge of machine learning concepts, applications, theoretical aspects	K2
C210.2	Apply various supervised learning models for continuous and categorical prediction tasks and evaluate the performance.	K3
C210.3	Apply ensemble techniques and unsupervised learning to improve model performance and discover hidden patterns in unlabeled data and evaluate the performance.	K3
C210.4	Design, train, and optimize neural networks to address challenges and improve performance for standard data sets	K3

C210.5	Design and analyze machine learning experiments using best practices, to evaluate and compare the performance of different ML algorithms and select the suitable one based on the application.	K3
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Course Code & Title: C211 &23AL403 Data Base System Design and Management		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C211.1	Understand the database development life cycle and apply conceptual modeling	K
C211.2	Apply SQL and programming in SQL to create, manipulate and query the database	K3
C211.3	Apply the conceptual-to-relational mapping and normalization to design relational database.	K3
C211.4	Determine the serializability of any non-serial schedule using concurrency techniques	K3
C211.5	Apply the data model and querying in Object-relational and No-SQL databases.	K3

Course Code & Title: C212 &23CS403 Object Oriented Software Engineering		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C212.1	Understand software engineering concepts and agile development methods	K2
C212.2	Analyze and model software requirements using UML and tools	K4
C212.3	Design software systems using modern patterns and architectures	K5
C212.4	Apply testing techniques and tools for software quality assurance	K3

C212.5	Develop software projects using risk management, scheduling, and DevOps practices	K5
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Course Code & Title: C213 &23CS404 Operating Systems		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C213.1	Explain the evolution, objectives, and types of operating systems, including their structure, system calls, and security measures.	K2
C213.2	Analyze process management techniques such as process scheduling, inter- process communication, synchronization, and deadlock handling.	K4
C213.3	Apply memory management strategies, including paging, segmentation, and virtual memory, to solve allocation and performance issues.	K3
C213.4	Demonstrate the functioning of storage systems, disk scheduling, and file systems, and assess their implementation methods.	K4
C213.5	Evaluate case studies of operating systems like Linux, iOS, Android, and RTOS, and discuss challenges in modern hardware and virtualization.	K5

Course Code & Title: C214 & 23CS405 Theory of Computation		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C214.1	Construct deterministic and nondeterministic finite automata	K3
C214.2	Apply regular expressions and regular languages for any pattern.	K3
C214.3	Construct context-free grammar and push down automata for any language.	K3
C214.4	Convert context-free grammars (CFGs) into standard normal forms for efficient parsing and language processing.	K3
C214.5	Design Turing machine for computational functions, and undecidable problems.	K3

Course Code & Title: C215 &23AL411 Artificial Intelligence and Machine Learning Laboratory		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C215.1	Implement uninformed and informed search techniques	K3
C215.2	Build a knowledge base in Prolog and process queries to perform inference	K6
C215.3	Develop supervised learning models	K6
C215.4	Develop regression models	K6
C215.5	Compare and evaluate the performance of different models	K5

Course Code & Title: C216 &23AL412 Database System Design and Management Laboratory		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C216.1	Understand the database development life cycle	K2
C216.2	Design relational database using conceptual-to-relational mapping, Normalization	K3
C216.3	Apply SQL for creation, manipulation and retrieval of data	K3
C216.4	Develop a database application for real-time problems	K3
C216.5	Design and query object-relational databases	K3

Course Code & Title: C217 &23CSA02- MongoDB (Value Added Course-II)		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C217.1	Apply modern JavaScript features to build dynamic and modular client-side functionality	K3

C217.2	Develop responsive and stateful user interfaces using React 19 and its advanced hooks	K3
C217.3	Implement complex navigation and form handling using React Router v6 and lifecycle management	K3
C217.4	Design efficient database schemas and perform CRUD and advanced queries using MongoDB	K3
C217.5	Build and integrate full-stack applications using Node.js, Express, React, and MongoDB	K3