



# Cambridge Institute of Technology

## DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

### Course outcomes of 2017-2018 scheme

17MAT31	Engineering Mathematics-III	CO1: Know the use of periodic signals and Fourier series to analyze circuits and system communications. CO2: Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform. CO3: Employ appropriate numerical methods to solve algebraic and transcendental equations. CO4: Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems. CO5: Determine the extremals of functionals and solve the simple problems of the calculus of variations
17CS32	Analog And Digital Electronics	CO1: Explain the operation of JFETs and MOSFETs, Operational Amplifier circuits and their application CO2: Explain Combinational Logic, Simplification Techniques using Karnaugh Maps, Quine McClusky technique. CO3: Demonstrate Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors, working of Latches, Flip-Flops, Designing Registers, Counters, A/D and D/A Converters CO4: Design of Counters, Registers and A/D & D/A converters

17CS33	Data Structures And Applications	CO1: Explain different types of data structures, operations and algorithms CO2: Apply searching and sorting operations on files CO3: Make use of stack, Queue, Lists, Trees and Graphs in problem solving. CO4: Develop all data structures in a high-level language for problem solving.
17CS34	Computer Organization	CO1: Explain the basic organization of a computer system. CO2: Demonstrate functioning of different sub systems, such as processor, Input/output, and memory. CO3: Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing systems. CO4: Build simple arithmetic and logical units.
17CS35	Unix And Shell Programming	CO1: Explain UNIX system and use different commands. CO2: Compile Shell scripts for certain functions on different subsystems. CO3: Demonstrate use of editors and Perl script writing
17CS36	Discrete Mathematical Structures	CO1: Make use of propositional and predicate logic in knowledge representation and truth verification. CO2: Demonstrate the application of discrete structures in different fields of computer science. CO3: Solve problems using recurrence relations and generating functions. CO4: Apply different mathematical proofs, techniques in proving theorems. CO5: Compare graphs, trees and their applications
17CSL37	Analog And Digital Electronics Laboratory	CO1: Demonstrate various Electronic Devices like Cathode ray Oscilloscope, Signal generators, Digital Trainer Kit, Multimeters and components like Resistors, Capacitors, Op amp and Integrated Circuit. CO2: Design and demonstrate various combinational logic circuits. CO3: Design and demonstrate various types of counters and Registers using Flip-flops CO4: Make use of simulation package to design circuits. CO5: Infer the working and implementation of ALU.

17CSL38	Data Structures Laboratory	CO1: Analyze and Compare various linear and non-linear data structures CO2: Demonstrate the working nature of different types of data structures and their applications CO3: Develop, analyze and evaluate the searching and sorting algorithms CO4: Choose the appropriate data structure for solving real world problems
17MAT41	Engineering Mathematics-Iv	CO1: Solve first and second order ordinary differential equation arising in flow problems using single step and multistep numerical methods. CO2: Illustrate problems of potential theory, quantum mechanics and heat conduction by employing notions and properties of Bessel's functions and Legendre's polynomials. CO3: Explain the concepts of analytic functions, residues, poles of complex potentials and describe
17CS42	Object Oriented Concepts	CO1: Explain the object-oriented concepts and JAVA. CO2: Develop computer programs to solve real world problems in Java. CO3: Develop simple GUI int effaces for a computer program to interact with users, and to comprehend the event-based GUI handling principles using Applets and swings.
17CS43	Design And Analysis Of Algorithms	CO1: Describe computational solution to well-known problems like searching, sorting etc. CO2: Estimate the computational complexity of different algorithms. CO3: Develop an algorithm using appropriate design strategies for problem solving
17CS44	Microprocessors And Microcontrollers	CO1: Differentiate between microprocessors and microcontrollers CO2: Develop assembly language code to solve problems CO3: Explain interfacing of various devices to x86 family and ARM processor CO4: Demonstrate interrupt routines for interfacing devices
17CS45	Software Engineering	CO1: Design a software system, component, or process to meet desired needs within realistic constraints. CO2: Assess professional and ethical responsibility CO3: Function on multi-disciplinary teams CO4: Make use of techniques, skills, and modern engineering tools necessary for engineering
17CS46	Data Communication	CO1: Illustrate basic computer network technology. Identify the different types of network topologies and protocols.

		<p>CO2: List and explain the layers of the OSI model and TCP/IP model.</p> <p>CO3: Comprehend the different types of network devices and their functions within a network</p> <p>CO4: Demonstrate subnetting and routing mechanisms.</p>
17CSL47	Design And Analysis Of Algorithm Laboratory	<p>CO1: Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)</p> <p>CO2: Develop variety of algorithms such as sorting, graph related, combinatorial, etc., in a high level language.</p> <p>CO3: Analyze and compare the performance of algorithms using language features.</p> <p>CO4: Apply and implement learned algorithm design techniques and data structures to solve real world Problems</p>
17CSL48	Microprocessor And Microcontroller Laboratory	<p>CO1: Summarize 80x86 instruction sets and comprehend the knowledge of how assembly language works.</p> <p>CO2: Design and develop assembly programs using 80x86 assembly language instructions</p> <p>CO3: Infer functioning of hardware devices and interfacing them to x86 family</p> <p>CO4: Choose processors for various kinds of applications</p>
17CS51	Management And Entrepreneurship For It Industry	<p>CO1: Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship</p> <p>CO2: Utilize the resources available effectively through ERP</p> <p>CO3: Make use of IPRs and institutional support in entrepreneurship</p>
17CS52	Computer Networks	<p>CO1: Explain principles of application layer protocols</p> <p>CO2: Outline transport layer services and infer UDP and TCP protocols</p> <p>CO3: Classify routers, IP and Routing Algorithms in network layer</p> <p>CO4: Explain the Wireless and Mobile Networks covering IEEE 802.11 Standard</p> <p>CO5: Define Multimedia Networking and Network Management</p>
17CS53	Database Management System	<p>CO1: Summarize the concepts of database objects; enforce integrity constraints on a database using RDBMS.</p> <p>CO2: Use Structured Query Language (SQL) for database manipulation.</p> <p>CO3: Design simple database systems</p> <p>CO4 :Design code for some application to interact with databases.</p>

17CS54	Automata Theory And Computability	<p>CO1: Tell the core concepts in automata theory and Theory of Computation</p> <p>CO2: Explain how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).</p> <p>CO3: Interpret Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.</p> <p>CO4: Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.</p> <p>CO5: Classify a problem with respect to different models of Computation.</p>
17CS551	Object Oriented Modeling And Design	<p>CO1: Describe the concepts of object-oriented and basic class modelling.</p> <p>CO2: Draw class diagrams, sequence diagrams and interaction diagrams to solve problems.</p> <p>CO3: Choose and apply a befitting design pattern for the given problem.</p>
17IS552	Social Network Analysis	<p>CO1: Define notation and terminology used in network science.</p> <p>CO2: Demonstrate, summarize and compare networks.</p> <p>CO3: Explain basic principles behind network analysis algorithms.</p> <p>CO4: Analyze real world network</p>
17CS553	Advanced Java And J2ee	<p>CO1: Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs</p> <p>CO2: Build client-server applications and TCP/IP socket programs</p> <p>CO3: Illustrate database access and details for managing information using the JDBC API</p> <p>CO4: Describe how servlets fit into Java-based web application architecture</p> <p>CO5: Develop reusable software components using Java Beans</p>
17IS554	Programing Langauges	<p>CO1: Select appropriate languages for given applications</p> <p>CO2: Compare and contrast the strengths and weaknesses of different languages</p>
17CS561	Programming In Java	<p>CO1: Explain the object-oriented concepts and JAVA.</p> <p>CO2: Develop computer programs to solve real world problems in Java.</p> <p>CO3: Develop simple GUI interfaces for a computer program to interact with users</p>
17CS562	Artificial Intelligence	<p>CO1: Identify the AI based problems</p> <p>CO2: Apply techniques to solve the AI problems</p> <p>CO3: Define learning and explain various learning techniques</p> <p>CO4: Discuss expert systems</p>

17CS563	Embedded Systems	CO1: Distinguish the characteristics of embedded computer systems. CO2: Identify the various vulnerabilities of embedded computer systems. CO3: Design and develop modules using RTOS. CO4: Explain RPC, threads and tasks
17CS564	Dot Net Framework For Application Development	CO1: Build applications on Visual Studio .NET platform by understanding the syntax and semantics of C# CO2: Demonstrate Object Oriented Programming concepts in C# programming language CO3: Design custom interfaces for applications and leverage the available built-in interfaces in building complex applications. CO4: Illustrate the use of generics and collections in C# CO5: Compose queries to query in-memory data and define own operator behavior
17CS565	Cloud Computing	CO1: Explain the concepts and terminologies of cloud computing CO2: Demonstrate cloud frameworks and technologies CO3: Define data intensive computing CO4: Demonstrate cloud applications
17CSL57	Computer Network Laboratory	CO1: Analyze and Compare various networking protocols. CO2: Demonstrate the working of different concepts of networking. CO3: Implement and analyze networking protocols in NS2 / NS3
17CSL58	Dbms Laboratory With Mini Project	CO1: Use Structured Query Language (SQL) for database Creation and manipulation. CO2: Demonstrate the working of different concepts of DBMS CO3: Implement and test the project developed for an application
17CS61	Cryptography, Network Security And Cyber Law	CO1: Discuss cryptography and its need to various applications CO2: Design and develop simple cryptography algorithms CO3: Understand cyber security and need cyber Law
17IS62	File Structures	Discuss appropriate file structure for storage representation. CO1: Illustrate a suitable sorting technique to arrange the data. CO2: Explain indexing and hashing techniques for better performance to a given problem
17IS63	Software Testing	CO1: Discuss test cases for any given problem CO2: Compare the different testing techniques CO3: Illustrate the problem into suitable testing model CO4: Understand the appropriate technique for the design of flow graph. CO5: Design and Develop appropriate document for the software artefact

17CS64	Operating Systems	CO1: Demonstrate need for OS and different types of OS CO2: Discuss suitable techniques for management of different resources CO3: Illustrate processor, memory, storage and file system commands CO4: Explain the different concepts of OS in platform of usage through case studies
17CS651	Data Mining And Data Warehousing	CO1: Understand data mining problems and implement the data warehouse CO2: Demonstrate association rules for a given data pattern. CO3: Discuss between classification and clustering solution.
17IS652	System Software	Explain system software such as assemblers, loaders, linkers and microprocessors CO1: Design and develop lexical analyzers, parsers and code generators CO2: Understand Lex and yacc tools for implementing different concepts of system software
17CS653	Operations Research	CO1: Explain optimization techniques for various problems. CO2: Understand the given problem as transportation and assignment problem and solve. CO3: Illustrate game theory for decision support system.
17CS654	Distributed Computing System	CO1: Explain the characteristics of a distributed system along with its and design challenges CO2: Illustrate the mechanism of IPC between distributed objects CO3: Describe the distributed file service architecture and the important characteristics of SUN NFS. CO4: Discuss concurrency control algorithms applied in distributed transactions
17CS661	Mobile Application Development	CO1: Design and Develop Android application by setting up Android development environment CO2: Implement adaptive, responsive user interfaces that work across a wide range of devices. CO3: Explain long running tasks and background work in Android applications CO4: Demonstrate methods in storing, sharing and retrieving data in Android applications CO5: Discuss performance of android applications and understand the role of permissions and security CO6: Describe the steps involved in publishing Android application to share with the world
17CS662	Big Data Analytics	CO1: Explain the importance of data and data analysis CO2: Interpret the probabilistic models for data CO3: Illustrate hypothesis, uncertainty principle CO4: Demonstrate regression analysis

17CS663	Wireless Networks And Mobile Computing	CO1: Understand various mobile communication systems. CO2: Describe various multiplexing systems used in mobile computing. CO3: Explain the use and importance of data synchronization in mobile computing
17CS664	Python Application Programming	Understand Python syntax and semantics and be fluent in the use of Python flow control and functions. CO1: Demonstrate proficiency in handling Strings and File Systems. CO2: Implement Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions. CO3: Interpret the concepts of Object-Oriented Programming as used in Python. CO4: Implement exemplary applications related to Network Programming, Web Services and Databases in Python.
17CS665	Service Oriented Architecture	CO1: Understand the different IT architecture CO2: Explain SOA based applications CO3: Illustrate of web service and realization of SOA CO4: Discuss Restful services
17CS666	Multi-Core Architecture And Programming	CO1: Identify the issues involved in multicore architectures CO2: Explain fundamental concepts of parallel programming and its design issues CO3: Solve the issues related to multiprocessing and suggest solutions CO4: Discuss the salient features of different multicore architectures and how they exploit parallelism CO5: Illustrate OpenMP and programming concept
17ISL67	Software Testing Laboratory	CO1: Understand requirements for the given problem CO2: Design and implement the solution for given problem in any programming language (C, C++, JAVA) CO3: Discuss test cases for any given problem CO4: Apply the appropriate technique for the design of flow graph. CO5: Create appropriate document for the software artefact
17ISL68	File Structures Laboratory With Mini Project	CO1: Implement operations related to files CO2: Apply the concepts of file system to produce the given application. CO3: Evaluate performance of various file systems on given parameters



17CS71	Web Technology And Its Applications	<p>CO1: Define HTML and CSS syntax and semantics to build web pages.</p> <p>CO2: Understand the concepts of Construct, visually format tables and forms using HTML using CSS</p> <p>CO3: Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.</p> <p>CO4: List the principles of object-oriented development using PHP</p> <p>CO5: Illustrate JavaScript frameworks like jQuery and Backbone which facilitates</p>
17IS72	Software Architecture And Design Patterns	<p>CO1: Design and implement codes with higher performance and lower complexity</p> <p>CO2: Illustrate the code qualities needed to keep code flexible</p> <p>CO3: Define core design principles and understand the importance to assess the quality of a design with respect to these principles.</p> <p>CO4: List the capabilities of applying these principles in the design of object oriented systems.</p> <p>CO5: Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary.</p> <p>CO6: Recall the suitable select and apply patterns in specific contexts</p>
17CS73	Machine Learning	<p>CO1: Recall the problems for machine learning. And select the either supervised, unsupervised or reinforcement learning.</p> <p>CO2: Understand theory of probability and statistics related to machine learning</p> <p>CO3: Illustrate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,</p>
17CS741	Natural Language Processing	<p>CO1: Analyze the natural language text.</p> <p>CO2: Define the importance of natural language.</p> <p>CO3: Understand the concepts Text mining.</p> <p>CO4: Illustrate information retrieval techniques</p>
17CS742	Cloud Computing And Its Applications	<p>CO1: Understand the concepts of cloud computing, virtualization and classify services of cloud computing</p> <p>CO2: Illustrate architecture and programming in cloud</p> <p>CO3: Define the platforms for development of cloud applications and List the application of cloud.</p>
17CS743	Information And Network Security	<p>CO1: Analyze the Digital security lapses</p> <p>CO2: Illustrate the need of key management</p>

17CS744	Unix System Programming	CO1: Understand the working of Unix Systems CO2: Illustrate the application/service over a UNIX system.
17CS751	Soft And Evolutionary Computing	CO1: Understand soft computing techniques CO2: Apply the learned techniques to solve realistic problems CO3: Differentiate soft computing with hard computing techniques
17CS752	Computer Vision And Robotics	CO1: Implement fundamental image processing techniques required for computer vision CO2: Perform shape analysis CO3: Implement boundary tracking techniques CO4: Apply chain codes and other region descriptors CO5: Apply Hough Transform for line, circle, and ellipse detections. CO6: Apply 3D vision techniques. CO7: Implement motion related techniques. CO8: Develop applications using computer vision techniques.
17IS753	Information Management System	CO1: Understand the role of information technology and information systems in business CO2: Illustrate the current issues of information technology and relate those issues to the firm CO3: Interpret how to use information technology to solve business problems
17CS754	Storage Area Networks	CO1: Identify key challenges in managing information and analyze different storage networking technologies and virtualization CO2: Explain components and the implementation of NAS CO3: Describe CAS architecture and types of archives and forms of virtualization CO4: Illustrate the storage infrastructure and management activities
17CSL76	Machine Learning Laboratory	CO1: Understand the implementation procedures for the machine learning algorithms. CO2: Design Java/Python programs for various Learning algorithms. CO3: Apply appropriate data sets to the Machine Learning algorithms. CO4: Identify and apply Machine Learning algorithms to solve real world problems
17CSL77	Web Technology Laboratory With Mini Project	CO1: Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's. CO2: Understand the concepts of Web Application Terminologies, Internet Tools other web services. CO3: Recall how to link and publish web sites

17CS81	Internet Of Things Technology	<p>CO1: Interpret the impact and challenges posed by IoT networks leading to new architectural models.</p> <p>CO2: Compare and contrast the deployment of smart objects and the technologies to connect them to network.</p> <p>CO3: Appraise the role of IoT protocols for efficient network communication.</p> <p>CO4: Elaborate the need for Data Analytics and Security in IoT.</p> <p>CO5: Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry</p>
17CS82	Big Data Analytics	<p>CO1: Explain the concepts of HDFS and MapReduce framework</p> <p>CO2: Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration</p> <p>CO3: Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making</p> <p>CO4: Infer the importance of core data mining techniques for data analytics</p> <p>CO5: Compare and contrast different Text Mining Techniques</p>
17CS831	High Performance Computing	<p>CO1: Illustrate the key factors affecting performance of CSE applications</p> <p>CO2: Infer mapping of applications to high-performance computing systems</p> <p>CO3: Apply hardware/software co-design for achieving performance on real-world applications</p>
17CS832	User Interface Design	<p>CO1: Design the User Interface, design, menu creation, windows creation and connection between menus and windows</p>
17IS833	Virtual Reality	<p>CO1: Illustrate technology, underlying principles, its potential and limits and to learn about the criteria for defining useful applications.</p> <p>CO2: Explain process of creating virtual environments</p>
17CS834	System Modelling And Simulation	<p>CO1: Explain the system concept and apply functional modeling method to model the activities of a static system</p> <p>CO2: Describe the behavior of a dynamic system and create an analogous model for a dynamic system;</p> <p>CO3: Illustrate the operation of a dynamic system and make improvement according to the simulation results.</p>

17IS84	Internship / Professional Practise	CO1: Adapt easily to the industry environment CO2: Take part in team work CO3: Make use of modern tools CO4: Decide upon project planning and financing. CO5: Adapt ethical values. CO6: Motivate for lifelong learning
17ISP85	Project Work Phase II	CO1: Identify a issue and derive problem related to society, environment, economics, energy and technology CO2: Formulate and Analyze the problem and determine the scope of the solution chosen CO3: Determine, dissect, and estimate the parameters, required in the solution. CO4: Evaluate the solution by considering the standard data / Objective function and by using appropriate performance metrics. CO5: Compile the report and take part in present / publishing the finding in a reputed conference / publications CO6: Attempt to obtain ownership of the solution / product developed
17ISS86	Seminar	CO1: Survey the changes in the technologies relevant to the topic selected CO2: Discuss the technology and interpret the impact on the society, environment and domain. CO3: Compile report of the study and present to the audience, following the ethics.



PRINCIPAL

CAMBRIDGE INSTITUTE OF TECHNOLOGY

K.R. PURAM, BANGALORE-560 036.