

Course Outcomes (2019 - 20)

CODE	CO No.	VTU code	CO	Blooms Level
101	101.1	18MAT11	Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of a curve.	K3
	101.2		Learn the notion of partial differentiation to calculate rates of change of multivariate functions and solve problems related to composite functions and Jacobians.	K3
	101.3		Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing the area and volumes.	K4
	101.4		Solve first order linear/nonlinear differential equation analytically using standard methods.	K3
	101.5		Make use of matrix theory for solving system of linear equations and compute eigenvalues and eigenvectors required for matrix diagonalization process.	K3
102	102.1	18CHE12	Use of free energy in equilibria, rationalize bulk properties and processes using thermodynamic considerations, electrochemical energy systems and causes & effects of corrosion of metals and control of corrosion.	K2
	102.2		Modification of surface properties of metals to develop resistance to corrosion, wear, tear, impact etc. by electroplating and electro less plating and water chemistry.	K2
	102.3		Production & consumption of energy for industrialization of country and living standards of people. Electrochemical and concentration cells. Classical, modern batteries and fuel cells. Utilization of solar energy for different useful forms of energy.	K2
	102.4		Environmental pollution and waste management.	K2
	102.5		Different techniques of instrumental methods of analysis and Fundamental principles of nanomaterials.	K2
103	103.1	18CPS13	Understanding the basics of computer types, parts and structure of C program.	K2
	103.2		Comparing the various types of branching and looping statements	K2
	103.3		Explain the types of arrays, searching and sorting algorithms.	K2
	103.4		Describe the concepts of functions and recursion.	K2
	103.5		Modularize the given problem using structures, pointers and preprocessor directives.	K2

104	104.1	18ELN14	Appreciate the significance of electronics in different applications.	K2
	104.2		Understand the applications of diode in rectifiers, filter circuits and wave shaping.	K2
	104.3		Apply the concept of diode in rectifiers, filters circuits	K3
	104.4		Design simple circuits like amplifiers (inverting and non inverting), comparators, adders, integrator and differentiator using OPAMPS.	K2
	104.5		Compile the different building blocks in digital electronics using logic gates and implement simple logic function using basic universal gates.	K3
105	105.1	18ME15	Identify different sources of energy and their conversion process.	K1
	105.2		Explain the working principle of hydraulic turbines, pumps, IC engines and refrigeration.	K2
	105.3		Recognize various metal joining processes and power transmission elements.	K2
	105.4		Understand the properties of common engineering materials and their applications in engineering industry.	K2
	105.5		Discuss the working of conventional machine tools, machining processes, tools and accessories and describe the advanced manufacturing systems.	K2
106	106.1	18CHEL16	Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results.	K3
	106.2		Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results.	K3
107	107.1	18CPL17	Write algorithms, flowcharts and program for simple problems.	K1
	107.2		Correct syntax and logical errors to execute a program.	K2
	107.3		Write iterative and wherever possible recursive programs	K2
	107.4		Demonstrate use of functions, arrays, strings and structures in problem solving.	K2
	107.5		Appreciate pointers and their advantages.	K2
108	108.1	18EGH18	Improve the functional effectiveness through better workplace communication skills.	K3
	108.2		Acquire basic proficiency in English reading and listening, comprehensions, writing and speaking skills.	K2
	108.3		Write campus recruitment exams, engineering competitive exams and all other general competitive exams.	K2
	108.4		Improve business and technical communication skills and technical writing skills.	K2

109	109.1	18MAT21	Solve first order linear/nonlinear differential equations analytically using standard methods.	K3
	109.2		Explain various physical models through higher order differential equations and solve such linear ordinary differential equations.	K3
	109.3		Understand a variety of partial differential equations and solution by exact methods/method of separation of variables.	K3
	109.4		Describe the applications of infinite series and obtain series solution of ordinary differential equations.	K3
	109.5		Apply the knowledge of numerical methods in the models of various physical and engineering phenomena.	K3
110	110.1	18PHY22	Understand various types of oscillations and their implications, the role of Shock waves in various fields and Recognize the elastic properties of materials for engineering applications.	K2
	110.2		Realize the interrelation between time varying electric field and magnetic field, the transverse nature of the EM waves and their role in optical fiber communication.	K3
	110.3		Compute Eigen values, Eigen functions, momentum of Atomic and subatomic particles using Time independent 1-D Schrodingers wave equation.	K2
	110.4		Apprehend theoretical background of laser, construction and working of different types of laser and its applications in different fields	K2
	110.5		Understand various electrical and thermal properties of materials like conductors, semiconductors and dielectrics using different theoretical models.	K2
111	111.1	18ELE23	Analyse D.C and A.C circuits.	K4
	111.2		Explain the principle of operation and construction of single phase transformers.	K2
	111.3		Explain the principle of operation and construction of DC machines and synchronous machines.	K2
	111.4		Explain the principle of operation and construction of three phase induction motors.	K2
	111.5		Discuss concepts of electrical wiring, circuit protecting devices and earthing.	K2
112	112.1	18CIV24	Mention the applications of various fields of Civil Engineering.	K2
	112.2		Compute the resultant of given force system subjected to various loads.	K3
	112.3		Comprehend the action of Forces, Moments and other loads on systems of rigid bodies and compute the reactive forces that develop as a result of the external loads	K3
	112.4		Locate the Centroid and compute the Moment of Inertia of regular and built-up sections.	K3

	112.5		Express the relationship between the motion of bodies and analyze the bodies in motion.	K2
113	113.1	18EGDL25	Prepare engineering drawings as per BIS conventions mentioned in the relevant codes.	K3
	113.2		Produce computer generated drawings using CAD software.	K3
	113.3		Use the knowledge of orthographic projections to represent engineering information I concepts and present the same in the form of drawings.	K4
	113.4		Develop isometric drawings of simple objects reading the orthographic projections of those objects.	K3
	113.5		Convert pictorial and isometric views of simple objects to orthographic views.	K3
114	114.1	18PHYL26	Recall the concepts of interference of light, diffraction of light, Fermi energy.	K3
	114.2		Understand the principles of operations of optical fibers and semiconductor devices such as photodiode, and NPN transistor using simple circuits.	K2
	114.3		Determine elastic moduli and moment of inertia of given materials with the help of suggested procedures.	K3
	114.4		Recognize the resonance concept and its practical applications.	K4
	114.5		Understand the importance of measurement procedure, honest recording and representing the data, reproduction of final results.	K2
115	115.1	18ELEL27	Get an exposure to common electrical components.	K2
	115.2		Make electrical connections by wires of appropriate ratings.	K2
	115.3		Understand the usage of common electrical measuring instruments.	K2
	115.4		Understand the basic functioning of electrical machines.	K2
	115.5		Understand two way and three way control of lamp.	K2
116	116.1	18EGH28	Improve the functional effectiveness through better workplace communication skills.	K3
	116.2		Acquire basic proficiency in English reading and listening, comprehensions, writing and speaking skills.	K2
	116.3		Write campus recruitment exams, engineering competitive exams and all other general competitive exams.	K2
	116.4		Improve business and technical communication skills and technical writing skills.	K2
201	201.1	18MAT31	Use of periodic signals and Fourier series to analyze circuits and system communications.	K3

	201.2		Apply the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform.	K3
	201.3		Employ appropriate numerical methods to solve algebraic and transcendental equations.	K3
	201.4		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.	K3
	201.5		Determine the extremals of functionals and solve the simple problems of the calculus of variations.	K3
202	202.1	18CS32	Understand the basics of data structures, operations and algorithms for problem solving.	K2
	202.2		Define recursion and apply on data structures such as stack and queues to solve problems.	K2
	202.3		State the different types of linked list and operations on various applications.	K2
	202.4		Understand the fundamentals of trees and its types.	K2
	202.5		Define Graphs and apply sorting, searching and file structure techniques.	K3
203	203.1	18CS33	Explain the application of analog circuits using photo devices, timer IC, power supply and regulator IC and op-amp.	K2
	203.2		Simplify digital circuits using Karnaugh Map, and Quine-McClusky Methods.	K3
	203.3		Describe and Design Digital multiplexers, Decoders, Encoders, PLA's & PAL's.	K2
	203.4		Demonstrate the working of Latches, Flip-Flops and develop simple HDL programs.	K3
	203.5		Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.	K3
204	204.1	18CS34	Describe operational concepts of computer components and its performance measures.	K2
	204.2		Explain standard I/O interface devices and their operations.	K2
	204.3		Apply binary arithmetic operators on binary numbers.	K3
	204.4		Explain various types of memory of a digital computer with their performances.	K2
	204.5		Explain hard wired and micro programmed control unit operations.	K2
205	205.1	18CS35	Explain software system, component, or process to meet desired needs within realistic constraints.	K2
	205.2		Explain the fundamentals of object oriented concepts.	K2
	205.3		Use system models, use UML diagrams and apply design patterns.	K3

	205.4		Apply various levels of software testing methods and the importance of software maintenance.	K3
	205.5		Explain estimation techniques, schedule project activities and compute pricing.	K2
206	206.1	18CS36	Prove an argument using propositional & predicate logic along with truth tables.	K2
	206.2		Solve problems using counting techniques and combinatorics.	K3
	206.3		Solve problems involving relations and functions.	K3
	206.4		Perform basic operations using inclusion exclusion principle & on recurrence relations.	K3
	206.5		Explain the concepts of graphs and the trees.	K2
207	207.1	18CSL37	Use appropriate design equations / methods to design the given circuit.	K3
	207.2		Examine and verify the design of both analog and digital circuits using simulators.	K3
	207.3		Make us of electronic components, ICs, instruments and tools for design and testing of circuits for the given the appropriate inputs.	K3
	207.4		Compile a laboratory journal which includes; aim, tool/instruments/software/components used, design equations used and designs, schematics, program listing, procedure followed, relevant theory, results as graphs and tables, interpreting and concluding the findings.	K3
208	208.1	18CS38	Analyze and Compare various linear and non-linear data structures	K3
	208.2		Code, debug and demonstrate the working nature of different types of data structures and their applications	K3
	208.3		Implement, analyze and evaluate the searching and sorting algorithms	K3
	208.4		Choose the appropriate data structure for solving real world problems	K3
209	209.1	18MAT41	Solve first and second order ordinary differential equations arising in flow problem using single step and multistep numerical methods.	K3
	209.2		function relating to cylindrical polar coordinate systems and Legendre's polynomials relating to	K3
	209.3		electromagnetic theory.	K2
	209.4		and optimization concepts of stability of design and structural engineering.	K3
	209.5		correlation problems for feasible random events.	K3
210	210.1	18CS42	Describe computational solution to well known problems like searching, sorting etc	K2
	210.2		Estimate the computational complexity of different algorithms.	K3

	210.3		Apply design strategies for problem solving and compute computational complexity	K4
	210.4		Analyze and solve the standard problems.	K3
	210.5		Devise an algorithm using appropriate design strategies for problem solving.	K4
211	211.1	18CS43	Apply various CPU scheduling algorithms and identifying efficient algorithm that solves starvation problem.	K3
	211.2		Use Process synchronization approaches to solve critical section problems.	K3
	211.3		Apply deadlocks handling method to overcome from deadlock state	K3
	211.4		Illustrate the various memory management schemes in which data can stored and retrieved.	K2
	211.5		Explain secondary storage management to utilize resource efficiently and discussion of Linux Case study.	K2
212	212.1	18CS44	Design effective Embedded Systems using ARM Design Philosophy.	K3
	212.2		Design ARM Assembly programs for various applications.	K3
	212.3		Analyze the components of an Embedded System and its function.	K4
	212.4		Design Embedded Hardware and Firmware according to Quality attributes.	K3
	212.5		Analyze the components of RTOS and features of IDE for Embedded System Design.	K3
213	213.1	18CS45	Design a software system, component, or process to meet desired needs within realistic constraints.	K2
	213.2		Assess professional and ethical responsibility	K3
	213.3		Function on multi-disciplinary teams	K3
	213.4		Make use of techniques, skills, and modern engineering tools necessary for engineering practice	K3
	213.5		Comprehend software systems or parts of software systems	K3
214	214.1	18CS46	Illustrate basic computer network technology.	K3
	214.2		Identify the different types of network topologies and protocols	K3
	214.3		List and explain the layers of the OSI model and TCP/IP model.	K3
	214.4		Comprehend the different types of network devices and their functions within a network	K4
	214.5		Demonstrate subnetting and routing mechanisms.	K4

215	215.1	18CSL47	Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)	K3
	215.2		Implement a variety of algorithms such as sorting, graph related, combinatorial, etc., in a high level language.	K3
	215.3		Analyze and compare the performance of algorithms using language features.	K3
	215.4		Apply and implement learned algorithm design techniques and data structures to solve real-world problems.	K4
216	216.1	18CSL48	Develop and test program using ARM7TDMI/LPC2148	K3
	216.2		Conduct the following experiments on an ARM7TDMI/LPC2148 evaluation board using evaluation version of Embedded 'C' & Keil Uvision-4 tool/compiler.	K4
301	301.1	18CS51	Explain the structure of organization, characteristics of management and the planning process and staffing.	K2
	301.2		Define the various roles of Co-ordination, controlling and directing of the staff.	K2
	301.3		Describe roles and responsibilities of various entrepreneurs and implement systematic approaches in project preparation with financial support.	K2
	301.4		Explain resources available from Enterprise Resource Planning (ERP).	K2
	301.5		Explain IPR and institutional support in Entrepreneurship.	K2
302	302.1	18CS52	Explain principles of application layer protocols	K2
	302.2		Outline transport layer services and infer UDP and TCP protocols	K3
	302.3		Classify routers, IP and Routing Algorithms in network layer	K4
	302.4		Explain the Wireless and Mobile Networks covering IEEE 802.11 Standard	K2
	302.5		Define Multimedia Networking and Network Management	K2
303	303.1	18CS53	Describe the Architecture of Database Management System and able to design mathematical models for various databases.	K2
	303.2		Apply Different SQL Queries to Create, Manipulate Database and perform set operations.	K3
	303.3		Apply different techniques to connect database with frontend.	K3
	303.4		Apply different Normalization techniques on the Database as per the requirements.	K3
	303.5		Explain Simple and concurrent transactions on Database.	K2

304	304.1	18CS54	Understand the core concepts in Automata and Theory of Computation	K2
	304.2		Identify different Formal language classes and their relationships	K2
	304.3		Design grammars and recognizers for different formal languages	K3
	304.4		Analyze and design theorems in automata theory using their properties and PDA	K4
	304.5		Determine the decidability and intractability of computational problems and understands the concept of turing machine.	K4
305	305.1	18CS55	Describe Syntax and Semantics and create Functions in Python.	K2
	305.2		Understand Lists, Dictionaries and Regular expressions in Python.	K3
	305.3		Understand the commonly used operations involving regular expressions and file system.	K3
	305.4		Implement Object Oriented Programming concepts in Python	K4
	305.5		Understand the need for scraping websites and working with CSV, JSON and other file formats.	K4
306	306.1	18CS56	Explain Unix Architecture, File system and use of Basic Commands.	K2
	306.2		Explain UNIX File System with its attributes and permissions, Shell Programming and to write Shell Scripts.	K2
	306.3		Categorize, compare and make use of Unix System Calls.	K4
	306.4		Build an application/service over a Unix system.	K4
	306.5		Describe process relationship and Explain signals and daemon process of unix kernel.	K2
307	307.1	18CSL57	Analyze and Compare various networking protocols.	K4
	307.2		Demonstrate the working of different concepts of networking.	K4
	307.3		Implement, analyze and evaluate networking protocols in NS2 / NS3 and JAVA programming language	K4
308	308.1	18CSL58	Create, Update and query on the database.	K3
	308.2		Demonstrate the working of different concepts of DBMS	K4
	308.3		Implement, analyze and evaluate the project developed for an application.	K4
309	309.1	17CS61	Discuss cryptography and its need to various applications	K2
	309.2		Design and develop simple cryptography algorithms	K2

	309.3		Understand cyber security and need cyber Law	K2
310	310.1	17IS62	Describe the creation of efficient file Structures and perform different operations on files to organize them properly on secondary storage devices.	K2
	310.2		Explain different methods to organize record structures in files.	K2
	310.3		Apply concept of matching and merging on different models of large files.	K3
	310.4		Perform operations on files using the concepts of B-trees, B+ trees & apply indexing and multilevel indexing on files.	K2
	310.5		Apply hashing and extendible hashing on files for efficient retrieval of records.	K3
311	311.1	17IS63	Derive test cases for any given problem	K3
	311.2		Compare the different testing techniques	K5
	311.3		Classify the problem into suitable testing model	K4
	311.4		Apply the appropriate technique for the design of flow graph.	K4
	311.5		Create appropriate document for the software artefact.	K4
312	312.1	17CS64	Understand operating system, system structure and management.	K2
	312.2		Compare Process synchronization approaches.	K4
	312.3		Analyze the different types of deadlocks handling methods.	K4
	312.4		Categorize the various memory management schemes, file management and secondary storage management.	K4
	312.5		Explain the different concepts of OS in platform of usage through casestudies.	K2
313(1)	313.1	17CS651	Explain the processes the process of data warehousing.	K2
	313.2		Explain basic steps of KDD and its applications.	K2
	313.3		Apply association rules for a given data pattern.	K3
	313.4		Apply various Classifications methods for classifying Supervised data.	K3
	313.5		Explain various Clustering methods for classifying unsupervised data.	K2
313(2)	313.1	17CS653	Formulate linear programming problems and its graphical interpretation.	K3
	313.2		Solve linear programming problems using simplex method and its variants.	K3
	313.3		Apply duality theory and dual simplex method to solve LPP.	K3

	313.4		Determine solutions to the transportation and Assignment problems.	K3
	313.5		Implement game theory concepts and understand Metaheuristics.	K3
314	314.1	17CS664	Describe Syntax and Semantics and create Functions in Python.	K2
	314.2		Explain how to handle Strings and Files in Python.	K2
	314.3		Understand Lists, Dictionaries and Regular expressions in Python.	K3
	314.4		Implement Object Oriented Programming concepts in Python	K4
	314.5		Build Web Services and introduction to Network and Database Programming in Python.	K4
315	315.1	17CSL67	Understand requirements for the given problem	K2
	315.2		Design and implement the solution for given problem in any programming language(C,C++,JAVA)	K2
	315.3		Discuss test cases for any given problem	K2
	315.4		Apply the appropriate technique for the design of flow graph.	K4
316	316.1	17ISL68	Implement operations related to files	K3
	316.2		Apply the concepts of file system to produce the given application	K3
	316.3		Evaluate performance of various file systems on given parameters	K3
	316.4		Perform Various Operations on Filed and Records	K3
	316.5		Implement mini project using the concepts studied from the theory subject	K4
401	401.1	17CS71	Adapt HTML and CSS syntax and semantics to build web pages	K3
	401.2		Construct and visually format tables and forms using HTML and CSS	K3
	401.3		Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically	K4
	401.4		Appraise the principles of object oriented development using PHP	K3
	401.5		Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features	K4
402	402.1	17IS72	Describe the architecture and understand different structural patterns.	K2
	402.2		Analyze the architecture and build the system from the components.	K2

	402.3		Compare and distinguish the various roles, responsibilities and behavior of different quality and system attributes.	K3
	402.4		Design the various architectural styles with case studies and analyze client server architecture.	K3
	402.5		Analyze the software architecture programs and Document it as per the needs.	K3
403	403.1	17CS73	Explain Concept learning task and Designing a Learning system, and select the either supervised, unsupervised or reinforcement learning.	K2
	403.2		Explain Bayes classifier, Naive Bayes classifier, BBN, EM Algorithm.	K2
	403.3		Explain Artificial Neural Network representation problems.	K2
	403.4		Evaluating Hypothesis and explain Instance Based Learning, Reinforcement Learning.	K2
	403.5		Illustrate and apply clustering algorithms and identify its applicability in real life problems.	K2
404(1)	404(1.1)	17CS743	Understand cryptography, Analyze various Classic Crypto.	K3
	404(1.2)		Explain Hash Function and different usage of Hash Function.	K2
	404(1.3)		Explain Fundamental Authentication Scheme and Analyze basic Cryptographic Protocols.	K2
	404(1.4)		Illustrate the need of key management.	K3
	404(1.5)		Analyse the Digital security lapses.	K2
405(1)	405(1.1)	17CS753	Explain the foundation concepts of Management Information Systems	K2
	405(1.2)		Understand the design and implement the Enterprise Business Systems	K2
	405(1.3)		Apply the techniques of CRM, SCM and ERP in e-Commerce Systems	K3
	405(1.4)		Describe the Decision Support Systems	K2
	405(1.5)		Explain the security, ethical challenges in global management of IT systems	K2
407	407.1	17CSL76	Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.	K3
	407.2		Understand the concepts of Web Application Terminologies, Internet Tools other web services.	K3
	407.3		Recall how to link and publish web sites	K3

408	408.1	17CSL77	Understand the implementation procedures for the machine learning algorithms.	K2
	408.2		Design Java/Python programs for various Learning algorithms.	K2
	408.3		Apply appropriate data sets to the Machine Learning algorithms.	K3
	408.4		Identify and apply Machine Learning algorithms to solve real world problems.	K3
409	409.1	17CS81	To Differentiate the IoT Architectures based on functionality and its applications.	K3
	409.2		To Apply communication criteria and access technologies for connecting Smart Objects.	K3
	409.3		To Apply and Optimize the Internet Protocol for IoT.	K3
	409.4		To Apply concepts of Data Analytics and Security for IoT.	K3
	409.5		To Design IoT Applications using Arduino and Rasberry Pi.	K3
410	410.1	17CS82	Describe the concepts of HDFS and Map Reduce framework	K2
	410.2		Explore Hadoop tools and manage Hadoop with Ambari	K3
	410.3		Appraise the role of Business intelligence and its applications across industries	K4
	410.4		Assess core data mining techniques for data analytics	K3
	410.5		Identify various Text Mining techniques	K2
411(1)	411(1).1	17CS832	Understand the design of Interface.	K2
	411(1).2		Understand the design of menu creation.	K2
	411(1).3		Design of windows creation, connection between menus and window	K3
	411(1).4		Analyze the design of web pages and accessibility	K3
	411(1).5		Understand the design of window layout.	K2
411(2)	411(2).1	17IS833	Illustrate technology, underlying principles, its potential and limits and to learn about the criteria for defining useful applications.	K3
	411(2).2		Explain process of creating virtual environments	K5