

# PROGRAMME OUTCOME, PROGRAMME SPECIFIC OUTCOMES AND COURSE OUTCOMES OF ALL DEPARTMENTS - 2022-23(CRITERIA - 2)

## 2.6.1 Program outcomes, program specific outcomes and course outcomes

ProgramOutcomes:



# Department of Computer Science and Engineering

## 2.6.1 Program outcomes, program specific outcomes and course outcomes

### Program Outcomes:

#### PROGRAM SPECIFIC OUTCOMES (PSOs):

#### Engineering Graduates will be able to:

<b>PSO-1:</b>	Understand, apply and demonstrate advanced technical skills in problem solving and leadership, as well as an understanding of system integration and the practical technological problems of end users.
<b>PSO-2:</b>	An ability to design, implement, and evaluate a software or software/hardware system, component, or process to meet desired needs within realistic constraints such as memory, runtime efficiency, as well as other socio-economic constraints.

**CourseOutcomes:**

<b>Year / SEM:2<sup>nd</sup>year/ 3<sup>rd</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:--TRANSFORM CALCULUS, FOURIER SERIES AND NUMERICAL TECHNIQUES-21MAT31</b>		
<b>CO1</b>	To have an insight into solving ordinary differential equations by using Laplace transform techniques	
<b>CO2</b>	Learn to use the Fourier series to represent periodical physical phenomena in engineering analysis.	
<b>CO3</b>	To enable the students to study Fourier Transforms and concepts of infinite Fourier Sine and Cosine transforms and to learn the method of solving difference equations by the z-transform method	
<b>CO4</b>	To develop the proficiency in solving ordinary and partial differential equations arising in engineering applications, using numerical methods	

<b>Year / SEM:2<sup>nd</sup>year/ 3<sup>rd</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:--DATASTRUCTURESANDAPPLICATIONS-21CS32</b>		
<b>CO1</b>	Explain the fundamentals of data structures and their applications essential for implementing solutions to problems.	
<b>CO2</b>	Illustrate representation of data structures: Stack, Queues, Linked Lists, Trees and Graphs.	
<b>CO3</b>	Design and Develop Solutions to problems using Arrays, Structures, Stack, Queues, Linked Lists	
<b>CO4</b>	Explore usage of Trees and Graph for application development.	
<b>CO5</b>	Apply the Hashing techniques in mapping key value pairs.	

<b>Year / SEM:2<sup>nd</sup>year/ 3<sup>rd</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:ANALOG ANDDIGITALELECTRONICS– 21CS33</b>		
<b>CO1</b>	Explain the use of photo electronics devices, 555 timer IC, Regulator ICs and uA741	
<b>CO2</b>	Make use of simplifying techniques in the design of combinational circuits.	
<b>CO3</b>	Illustrate combinational and sequential digital circuits	
<b>CO4</b>	Demonstrate the use of flipflops and apply for registers	
<b>CO5</b>	Design and test counters, Analog-to-Digital and Digital-to-Analog conversion techniques.	

Year /SEM: 2 <sup>nd</sup> year /3 <sup>rd</sup> sem		Yearof Study:2022-23
<b>CourseName:COMPUTERORGANIZATION–21CS34</b>		
<b>CO1</b>	Understand the organization and architecture of computer systems, their structure and operation	
<b>CO2</b>	Illustrate the concept of machine instructions and programs	
<b>CO3</b>	Demonstrate different ways of communicating with I/O devices	
<b>CO4</b>	Describe different types memory devices and their functions	
<b>CO5</b>	Explain arithmetic and logical operations with different data types	
<b>CO6</b>	Demonstrate processing unit with parallel processing and pipeline architecture	

Year /SEM: 2 <sup>nd</sup> year /3 <sup>rd</sup> sem		Yearof Study:2022-23
<b>CourseName:OBJECT ORIENTED PROGRAMMING WITH JAVA LABORATORY –21CSL35</b>		
<b>CO1</b>	Demonstrate the use of Eclipse/Netbeans IDE to create Java Applications.	
<b>CO2</b>	Using java programming to develop programs for solving real-world problems.	
<b>CO3</b>	Reinforce the understanding of basic object-oriented programming concepts.	

Year /SEM: 2 <sup>nd</sup> year /3 <sup>rd</sup> sem		Year ofStudy:2022-23
<b>CourseName:MASTERING OFFICE –21CSL381</b>		
<b>CO1</b>	Understand the basics of computers and prepare documents and small presentations.	
<b>CO2</b>	Attain the knowledge about spreadsheet/worksheet with various options.	
<b>CO3</b>	Create simple presentations using templates various options available.	
<b>CO4</b>	Demonstrate the ability to apply application software in an office environment.	
<b>CO5</b>	Use MS Office to create projects, applications.	

Year / SEM:2 <sup>nd</sup> year/4 <sup>th</sup> sem		Year ofStudy:2022-23
<b>CourseName:DESIGNANDANALYSISOFALGORITHMS–21CS42</b>		
<b>CO1</b>	Explain the methods of analysing the algorithms and to analyze performance of algorithms.	
<b>CO2</b>	State algorithm’s efficiencies using asymptotic notations.	

<b>CO3</b>	Solve problems using algorithm design methods such as the brute force method, greedy method, divide and conquer, decrease and conquer, transform and conquer, dynamic programming, backtracking and branch and bound.
<b>CO4</b>	Choose the appropriate data structure and algorithm design method for a specified application.
<b>CO5</b>	Introduce P and NP classes.

<b>Year /SEM: 2<sup>nd</sup>year / 4<sup>th</sup>sem</b>		<b>Year ofStudy:2022-23</b>	
<b>CourseName:OPERATING SYSTEMS– 21CS44</b>			
<b>CO1</b>	Demonstrate the need for OS and different types of OS		
<b>CO2</b>	Apply suitable techniques for management of different resources		
<b>CO3</b>	Use processor, memory, storage and file system commands		
<b>CO4</b>	Realize the different concepts of OS in platform of usage through case studies		

<b>Year/ SEM:2<sup>nd</sup>year/ 4<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>	
<b>CourseName:MICROCONTROLLERANDEMBEDEDDESYSTEMS– 21CS43</b>			
<b>CO1</b>	Understand the fundamentals of ARM-based systems, including programming modules with registers and the CPSR		
<b>CO2</b>	Use the various instructions to program the ARM controller.		
<b>CO3</b>	Program various embedded components using the embedded C program		
<b>CO4</b>	Identify various components, their purpose, and their application to the embedded system's applicability.		
<b>CO5</b>	Understand the embedded system's real-time operating system and its application in IoT		
<b>CO6</b>	Demonstratetheneed ofrealtimeoperatingsystemforembeddedsystemapplications		

<b>Year /SEM: 2<sup>nd</sup>year / 4<sup>th</sup>sem</b>		<b>Year ofStudy:2022-23</b>	
<b>CourseName:PYTHON PROGRAMMING LABORATORY-21CSL46</b>			
<b>CO1</b>	Demonstrate the use of IDLE or PyCharm IDE to create Python Applications		
<b>CO2</b>	Using Python programming language to develop programs for solving real-world problems		
<b>CO3</b>	Implement the Object-Oriented Programming concepts in Python.		

<b>CO4</b>	Appraise the need for working with various documents like Excel, PDF, Word and Others
<b>CO5</b>	Demonstrate regular expression using python programming

<b>Year /SEM: 2<sup>nd</sup>year / 4<sup>th</sup>sem</b>		<b>Year ofStudy:2022-23</b>
<b>CourseName:WEB PROGRAMMING-21CSL481</b>		
<b>CO1</b>	Learn Web tool box and history of web browsers.	
<b>CO2</b>	Learn HTML, XHTML tags with utilizations.	
<b>CO3</b>	Know CSS with dynamic document utilizations.	
<b>CO4</b>	Learn JavaScript with Element access in JavaScript.	
<b>CO5</b>	. Logically plan and develop web pages..	

<b>Year/ SEM:2<sup>nd</sup>year/ 4<sup>th</sup>sem</b>		<b>Year ofStudy:2022-23</b>
<b>CourseName:DESIGNANDANALYSISOFALGORITHM LABORATORY–21CSL42</b>		
<b>CO1</b>	Analyze the performance of the algorithms, state the efficiency using asymptotic notations and analyze mathematically the complexity of the algorithm.	
<b>CO2</b>	Apply divide and conquer approaches and decrease and conquer approaches in solving the problems analyze the same	
<b>CO3</b>	Apply the appropriate algorithmic design technique like greedy method, transform and conquer approaches and compare the efficiency of algorithms to solve the given problem.	
<b>CO4</b>	Apply and analyze dynamic programming approaches to solve some problems. and improve an algorithm time efficiency by sacrificing space.	
<b>CO5</b>	Apply and analyze backtracking, branch and bound methods and to describe P, NP and NPComplete problems.	

<b>Year / SEM:2<sup>nd</sup>year / 4<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:MICROCONTROLLERANDEMBEDDEDSYSTEMSLABORATORY–21CSL48</b>		
<b>CO1</b>	Explain C-Compilers and optimization	
<b>CO2</b>	Describe the ARM microcontroller's architectural features and program module	
<b>CO3</b>	Apply the knowledge gained from programming on ARM to different applications.	
<b>CO4</b>	Program the basic hardware components and their application selection method.	
<b>CO5</b>	Demonstrate the need for a real-time operating system for embedded system applications	

Year/SEM : 3 <sup>rd</sup> year/5 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:MANAGEMENTANDENTREPRENEURSHIPFORITINDUSTRY–18CS51</b>		
<b>CO1</b>	Definemanagement,organization,entrepreneur,planning,staffing,ERPandoutl inetheirimportancein entrepreneurship	
<b>CO2</b>	Utilizetheresourcesavailableeffectively through ERP	
<b>CO3</b>	MakeuseofIPRs andinstitutionalsupportinentrepreneurship	

Year/SEM : 3 <sup>rd</sup> year/5 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:COMPUTERNETWORKS–18CS52</b>		
<b>CO1</b>	Explainprinciplesofapplication layerprotocols	
<b>CO2</b>	Outlinetransport layerservices andinferUDPandTCPprotocols	
<b>CO3</b>	Classifyrouters, IP and RoutingAlgorithmsinnetworklayer	
<b>CO4</b>	UnderstandtheWireless andMobileNetworks coveringIEEE802.11Standard	
<b>CO5</b>	DescribeMultimediaNetworkingandNetworkManagement	

Year/ SEM:3 <sup>rd</sup> year/ 5 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:DATABASEMANAGEMENTSYSTEM–18CS53</b>		
<b>CO1</b>	Summarizetheconceptsofdatabaseobjects;enforceintegrityconstraintsonadatab ase using RDBMS.	
<b>CO2</b>	UseStructuredQuery Language (SQL)fordatabasemanipulation.	
<b>CO3</b>	Designandbuildsimpledatabasesystems	
<b>CO4</b>	Developapplicationtointeractwithdatabases.	

Year/SEM : 3 <sup>rd</sup> year/5 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:AUTOMATATHEORYANDCOMPUTABILITY–18CS54</b>		
CO1	Tellthecoreconceptsinautomatatheoryand TheoryofComputation	
CO2	Explainhowtotranslatebetweendifferent modelsofComputation(e.g.,DeterministicandNon-deterministicandSoftwaremodels).	
CO3	InterpretGrammarsandAutomata(recognizers)fordifferentlanguage classes and become knowledgeable about restricted models of Computation(Regular,Context Free) and theirrelativepowers.	
CO4	Develop skillsinformalreasoningandreduction ofaproblemtoaformalmodel,with anemphasis onsemanticprecisionand conciseness	
CO5	Classifya problemwithrespecttodifferentmodelsofComputation.	

Year/SEM : 3 <sup>rd</sup> year/5 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:ADVANCEDJAVAANDJ2EE–18CS553</b>		
CO1	Interprettheneedforadvanced Javaconceptslikeenumerationsandcollectionsindevelopingmodularand efficient programs	
CO2	Buildclient-serverapplicationsandTCP/IPsocketprograms	
CO3	Illustratedatabaseaccess anddetailsformanaging informationusingtheJDBC-API	
CO4	Describehowservlets fitintoJava-based webapplicationarchitecture	
CO5	DevelopreusablesoftwarecomponentsusingJavaBeans	

Year/ SEM:3 <sup>rd</sup> year/ 5 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:ARTIFICIALINTELLIGENCE–18CS562</b>		
CO1	IdentifytheAIbasedproblems.	
CO2	ApplytechartosolvetheAI problems	
CO3	Definelearning and explainvariouslearning techniques	
CO4	Discussexpertsystems	



<b>Year/SEM : 3<sup>rd</sup>year/5<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:COMPUTERNETWORKLABORATORY–18CSL57</b>		
<b>CO1</b>	AnalyzeandComparevariousnetworkingprotocols.	
<b>CO2</b>	Demonstratetheworkingofdifferentconcepts ofnetworking.	
<b>CO3</b>	Implement,analyzeandevaluatetenetworkingprotocolsinNS2/NS3	

<b>Year/ SEM:3<sup>rd</sup>year/ 5<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:DBMSLABORATORYWITHMINIPROJECT–18CSL58</b>		
<b>CO1</b>	UseStructuredQueryLanguage (SQL)fordatabaseCreationand manipulation	
<b>CO2</b>	Demonstratetheworkingofdifferentconcepts ofDBMS	
<b>CO3</b>	Implementandtesttheproject developedforanapplication.	

<b>Year/SEM : 3<sup>rd</sup>year/6<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>Course Name: CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW – 18CS61</b>		
<b>CO1</b>	Discusscryptography anditsneedtovarious applications	
<b>CO2</b>	Designanddevelop simplecryptography algorithms	
<b>CO3</b>	Understandcybersecurityand needcyberLaw	

<b>Year/SEM : 3<sup>rd</sup>year/6<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:COMPUTERGRAPHICS ANDVISUALIZATION–18CS62</b>		
<b>CO1</b>	Designandimplementalgorithmsfor2Dgraphics primitivesandattributes.	
<b>CO2</b>	IllustrateGeometrictransformationsonboth2D and3Dobjects.	
<b>CO3</b>	Understand theconceptsofclippingandvisiblesurface detectionin2Dand3Dviewing,and Illumination Models.	
<b>CO4</b>	Discussaboutsuitablehardwareandsoftwarefordeveloping graphicspackagesusingOpenGL.	

Year/ SEM:3 <sup>rd</sup> year/ 6 <sup>th</sup> sem		Year of Study:2022-23
<b>CourseName:SYSTEMSOFTWAREANDCOMPILERDESIGN-18CS63</b>		
CO1	Illustrate software such as assemblers, loaders, linkers and system macroprocessors	
CO2	Designanddevelop lexicalanalyzers, parsersandcodegenerators	
CO3	Discussaboutlexandyac toolsforimplementingdifferent concepts of system software	

Year/ SEM:3 <sup>rd</sup> year/ 6 <sup>th</sup> sem		Year of Study:2022-23
<b>CourseName:OPERATING SYSTEMS–18CS64</b>		
CO1	Demonstrateneedfor OSanddifferenttypes ofOS	
CO2	Discussuitabletechniquesformanagementofdifferentresources	
CO3	Illustrateprocessor,memory,storageand filesystem commands	
CO4	ExplainthedifferentconceptsofOSinplatformofusage throughcasestudies	

Year/ SEM:3 <sup>rd</sup> year/ 6 <sup>th</sup> sem		Year of Study:2022-23
<b>CourseName:OPERATIONRESEARCH–18CS653</b>		
CO1	Explainoptimizationtechniques forvarious problems.	
CO2	Understandthegivenproblemastransportationandassignmentproblemandsolve .	
CO3	Illustrategametheory fordecisionsupportsystem.	

Year/SEM : 3 <sup>rd</sup> year/6 <sup>th</sup> sem		Year of Study:2022-23
<b>CourseName:PYTHONAPPLICATIONPROGRAMMING–18CS664</b>		
CO1	Understand Python syntax and semantics and be fluent in the use of Python flowcontrolandfunctions.	
CO2	Demonstrateproficiency inhandlingStringsandFileSystems.	
CO3	ImplementPythonProgramsusingcoredatastructureslikeLists,Dictionariesanduse RegularExpressions.	
CO4	InterprettheconceptsofObject-Oriented ProgrammingasusedinPython.	

<b>CO5</b>	Implement exemplary applications related to Network Programming, WebServices and Databases in Python
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<b>Year/ SEM:3<sup>rd</sup>year/ 6<sup>th</sup>sem</b>	<b>Year of Study:2022-23</b>
<b>Course Name: SYSTEM SOFTWARE AND OPERATING SYSTEM LABORATORY – 18CSL67</b>	
<b>CO1</b>	Implement and demonstrate Lexer's and Parser's
<b>CO2</b>	Implement differential algorithms required for management, scheduling, allocation and communication used in operating system..

<b>Year/SEM : 3<sup>rd</sup>year/6<sup>th</sup>sem</b>	<b>Year of Study:2022-23</b>
<b>CourseName:COMPUTERGRAPHICSLABORATORYWITHMINIPROJECT– 18CSL68</b>	
<b>CO1</b>	Apply the concepts of computer graphics
<b>CO2</b>	Implement computer graphics applications using OpenGL
<b>CO3</b>	Implement real world problems using OpenGL

<b>Year/ SEM:4<sup>th</sup>year / 7<sup>th</sup>sem</b>	<b>Year of Study:2022-23</b>
<b>CourseName:WEBTECHNOLOGYANDITSAPPLICATIONS–18CS71</b>	
<b>CO1</b>	Adapt HTML and CSS syntax and semantic to build webpages.
<b>CO2</b>	Construct and visually format tables and forms using HTML and CSS
<b>CO3</b>	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
<b>CO4</b>	Appraise the principles of object oriented development using PHP
<b>CO5</b>	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features

Year/ SEM:4 <sup>th</sup> year / 7 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:ADVANCEDCOMPUTERARCHITECTURES–18CS72</b>		
CO1	Explaintheconceptsofparallelcomputingandhardware technologies	
CO2	Compareand contrasttheparallelarchitectures	
CO3	Illustrateparallelprogrammingconcepts	

Year/SEM:4 <sup>th</sup> year/7 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:MACHINELEARNING–18CS73</b>		
CO1	Identifytheproblems formachinelearning. Andselecttheithersupervised,unsupervisedorreinforcement learning.	
CO2	Explaintheoryofprobabilityand statisticsrelated tomachinelearning	
CO3	Investigateconceptlearning,ANN,Bayes classifier,knearestneighbor,Q,	

Year/ SEM:4 <sup>th</sup> year / 7 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:UNIXSYSTEMPROGRAMMING–18CS744</b>		
CO1	AbilitytounderstandandreasonouttheworkingofUnixSystems	
CO2	Buildanapplication/serviceoveraUnixsystem.	

Year/ SEM:4 <sup>th</sup> year / 7 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:STORAGEAREANETWORKS–18CS754</b>		
CO1	Identifykeychallenges inmanaging informationandanalyzedifferentstoragenetworkingtechnologiesand virtualization	
CO2	Explaincomponentsandthe implementationofNAS	
CO3	DescribeCASarchitecture and types ofarchivesand formsofvirtualization	
CO4	Illustratethestorageinfrastructureandmanagementactivities	

Year/ SEM:4 <sup>th</sup> year / 7 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:MACHINELEARNINGLABORATORY–18CSL76</b>		
CO1	Understand the implementation procedures for the machine learning algorithms.	
CO2	Design Java/Python programs for various Learning algorithms.	
CO3	Apply appropriate datasets to the Machine Learning algorithms.	
CO4	Identify and apply Machine Learning algorithms to solve real world problems.	

Year/SEM:4 <sup>th</sup> year/7 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:WEBTECHNOLOGYLABORATORYWITHMINIPROJECT–18CSL77</b>		
CO1	Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.	
CO2	Have a good understanding of Web Application Terminologies, Internet Tools other web services.	
CO3	Learn how to link and publish websites	

Year/SEM:4 <sup>th</sup> year/8 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:IOTTECHNOLOGY–18SCS81</b>		
CO1	Interpret the impact and challenges posed by IoT networks leading to new architectural models	
CO2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.	
CO3	Appraise the role of IoT protocols for efficient network communication	
CO4	Elaborate the need for Data Analytics and Security in IoT.	
CO5	Illustrate different sensor technologies for sensing real world identities and identify the applications of IoT in Industry.	

<b>Year/ SEM:4<sup>th</sup>year / 8<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:BIGDATAANALYTICS–18CS82</b>		
<b>CO1</b>	MastertheconceptsofHDFSand MapReduceframework	
<b>CO2</b>	InvestigateHadoop related toolsforBigDataAnalyticsandperformbasicHadoopAdministration	
<b>CO3</b>	Recognize the role of Business Intelligence, Data warehousing and Visualizationindecisionmaking	
<b>CO4</b>	Infertheimportanceofcoredataminingtechniques fordata analytics	
<b>CO5</b>	Compareand contrastdifferentTextMiningTechniques	

<b>Year/SEM:4<sup>th</sup>year/8<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:MODERNINTERFACEDESIGN–18CS832</b>		
<b>CO1</b>	Designtheuserinterface, design,menucreationand windowscreationandconnectionbetween menuand windows	

**PROGRAMME OUTCOME,  
PROGRAMMESPECIFIC OUTCOMES AND  
COURSEOUTCOMESOFALLDEPARTMENT  
S–**

**2022-23 (CRITERIA-2)**

**DepartmentofCivilEngineering**

**2.6.1 Program outcomes, program specific outcomes and course outcomes**

**ProgramOutcomes:**

<b>PSO-1:</b>	<b>Competence in Civil Engineering:</b> Educating students with fundamental mathematical, scientific, and Engineering knowledge to have a significant and positive long-term impact on the field of civil engineering.
<b>PSO-2:</b>	<b>Usage of Cutting Edge Technology:</b> Inspiring students and preparing them for successful professional careers using appropriate techniques, resources and modern attitudes and modeling to complex engineering activities with practical knowledge and research exposure.
<b>PSO-3:</b>	<b>Continuous improvement:</b> Motivate students in learning to learn and the ability to keep learning for a lifetime to increase their professionalism, update and deepen their knowledge through the development of the profession.

### Course Outcomes (COs)

Year/ SEM: 2 <sup>nd</sup> year/3 <sup>rd</sup> sem		Year of Study:2022-23
<b>CourseName: GeodeticEngineering –21CV32</b>		
CO1	Execute surveyusingcompass andplanetable	
CO2	Findthelevelof groundsurfaceandCalculationofareaandvolumes	
CO3	Operatetheodoliteforfieldexecution	
CO4	Estimatethe capacityof reservoir	
CO5	Interpretsatelliteimageries	

Year/ SEM: 2 <sup>nd</sup> year/3 <sup>rd</sup> sem		Year of Study:2022-23
<b>Course Name:– STRENGTHOFMATERIALS -21CV33</b>		
CO1	Evaluate the behaviour when a solid material is subjected to various types of forces (namelyCompressive, Tensile, Thermal, Shear, flexure, Torque, internal fluid pressure) and estimatestressesand correspondingstrain developed. (L3)	
CO2	Estimate the forces developed and draw schematic diagram for stresses, forces, moments forsimplebeamswithdifferent typesofsupport and aresubjectedto varioustypesof loads(L3).	
CO3	Evaluate the behaviour whena solid material is subjected to Torque and internal fluidpressureand estimatestresses and correspondingstraindeveloped. (L3)	
CO4	Distinguish the behaviour of shortand long column and calculate load at failure & explainthebehaviour ofspringto estimatedeflectionandstiffness (L3)	
CO5	ExamineandEvaluatethemechanicalpropertiesofvariousmaterialsunderdifferentloading	

Year/ SEM: 2 <sup>nd</sup> year/3 <sup>rd</sup> sem		Year of Study:2022-23
<b>CourseName:– Earth ResourcesandEngineering –21CV34</b>		
CO1	Applygeologicalknowledgeindifferentcivil engineeringpractice.	
CO2	Studentswillacquireknowledgeondurabilityandcompetenceoffoundationrocks,andconfide nceenough to usethe best buildingmaterials.	
CO3	Competentenoughtoprovideservicesforthesafety,stability,economyandlifeofthestructurest hattheyconstruct	
CO4	.Abletosolvevariousissuesrelatedtogroundwaterexploration,buildupdams,bridges,tunnels whichareoften confronted with ground water problems	
CO5	IntelligentenoughtoapplyGIS,GPSandremotesensingasalatesttoolindifferentcivil	



Year/SEM:2 <sup>nd</sup> year /3 <sup>rd</sup> sem		Year ofStudy:2022-23
<b>CourseName: COMPUTERAIDEDBUILDINGPLANNINGANDDRAWING –21CVL35</b>		
CO1	Prepare, readandinterpretthedrawingsinaprofessionalsetup.	
CO2	Know the procedures of submission of drawings and Develop working and submissiondrawingsforbuilding.	
CO3	Plananddesignofresidential orpublicbuildingasperthegivenrequirements.	

Year/ SEM: 2 <sup>nd</sup> year/3 <sup>rd</sup> sem		Year ofStudy:2022-23
<b>CourseName: SOCIALCONNECT&amp;RESPONSIBILITIES –21SCR36</b>		
CO1	Understandsocialresponsibility	
CO2	Practicesustainabilityandcreativity	
CO3	Showcaseplanningandorganizationalskills	

Year/ SEM: 2 <sup>nd</sup> year/3 <sup>rd</sup> sem		Year ofStudy:2022-23
<b>CourseName: Constitution ofIndiaandProfessionalEthics(CIP)– 21CIP37/47</b>		
CO1	Haveconstitutionalknowledgeandlegalliteracy.	
CO2	UnderstandEngineeringandProfessionaethicsandresponsibilitiesofEngineers.	

Year/SEM:2 <sup>nd</sup> year /3 <sup>rd</sup> sem		Year ofStudy:2022-23
<b>CourseName: ProblemSolvingwithPython 21CV381</b>		
CO1	UnderstandPythonsyntaxandsemanticsandbefluentintheuseofPythonflowcontrolandfunctions.	
CO2	DemonstrateproficiencyinhandlingStrings andFileSystems.	
CO3	RepresentcompounddatausingPythonlists,tuples,Strings,dictionaries.	
CO4	Readandwritedatafrom/tofilesinPythonPrograms	

Year/SEM: 2 <sup>nd</sup> year/ 4 <sup>th</sup> sem		Year ofStudy:2022-23
<b>CourseName: FluidMechanicsandHydraulics 21CV42</b>		
CO1	Understand fundamental properties of fluids and solve problems on Hydrostatics	
CO2	Apply Principles of Mathematics to represent Kinematics and Bernoulli's principles	
CO3	Compute discharge through pipes, notches and weirs	
CO4	Design of open channels of various cross sections	
	Design of turbines for the given data and understand their operation characteristics	
Year/SEM: 2 <sup>nd</sup> year/4 <sup>th</sup> sem		Year ofStudy:2022-23
<b>CourseName: PUBLICHEALTHENGINEERING -21CV43</b>		
CO1	Estimateaverageand peakwaterdemand for acommunity.	
CO2	Evaluatewaterqualityandenvironmentalsignificanceofvariousparametersandplansuitabletr eatmentsystem.	
CO3	Designthedifferent unitsofwatertreatmentplant	
CO4	Understandanddesignthevariousunits ofwastewatertreatmentplant	
CO5	Acquirecapabilitytoconductexperimentsandestimatetheconcentrationofdifferntparameter sandcomparethe obtainedresultswiththeconcernedguidelines andregulations..	
Year / SEM:2 <sup>nd</sup> year/4 <sup>th</sup> sem		Year ofStudy:2022-23
<b>CourseName: ANALYSISOFSTRUCTURES 21CV44</b>		
CO1	Evaluate slope and deflections in beams using geometrical methods.	
CO2	Determine deflections in trusses and frames using energy principles.	
CO3	Analyse arches and cables for stress resultants.	
CO4	Apply slope defection method in analysing indeterminate structures and construct bending moment diagram.	
CO5	Analyse continuous beams, frames and trusses using stiffness matrix method of analysis.	

Year / SEM:2 <sup>nd</sup> year/4 <sup>th</sup> sem		Year ofStudy:2022-23
<b>Course Name EarthResourcesandEngineeringLaboratory -21CVL46</b>		
CO1	Comprehend the relations between minerals and rocks based on their physicalproperties	
CO2	Assessthe suitability of materials used in building construction	
CO3	Differentiate geological investigations necessary for the construction of dams, bridges,and tunnels	
CO4	Describe the groundwater investigation using resistivity methods	

Year/SEM: 3 <sup>rd</sup> year/5 <sup>th</sup> sem		Year of Study:2022-23
<b>Course Name CONSTRUCTIONMANAGEMENTANDENTREPRENEURSHIP –18CV51</b>		
<b>CO1</b>	Prepare a project plan based on requirements and prepare schedule of a project by understanding the activities and their sequence.	
<b>CO2</b>	Understand labour output, equipment efficiency to allocate resources required for an activity / project to achieve desired quality and safety.	
<b>CO3</b>	Analyze the economics of alternatives and evaluate benefits and profits of a construction activity based on monetary value and time value.	
<b>CO4</b>	Establish as an ethical entrepreneur and establish an enterprise utilizing the provisions offered by the federal agencies.	

Year/SEM: 3 <sup>rd</sup> year/5 <sup>th</sup> sem		Year of Study : 2022-23
<b>Course Name: ANALYSISOFINDETERMINATESTRUCTURES –18CV52</b>		
<b>CO1</b>	Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope deflection method	
<b>CO2</b>	Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method.	
<b>CO3</b>	Construct the bending moment diagram for beams and frames by Kani's method.	
<b>CO4</b>	Construct the bending moment diagram for beams and frames using flexibility method	
<b>CO5</b>	Analyze the beams and indeterminate frames by system stiffness method.	

Year/SEM: 3 <sup>rd</sup> year/5 <sup>th</sup> sem		Year of Study : 2022-23
<b>Course Name: DESIGNOFRCSTRUCTURALELEMENTS –18CV53</b>		
<b>CO1</b>	Understand the design philosophy and principles.	
<b>CO2</b>	Solve engineering problems of RC elements subjected to flexure, shear and torsion.	
<b>CO3</b>	Demonstrate the procedural knowledge in designs of RC structural elements such as slabs, columns and footings.	
<b>CO4</b>	Owns professional and ethical responsibility	
<b>CO5</b>	Understand the design philosophy and principles.	

Year/SEM: 3 <sup>rd</sup> year/5 <sup>th</sup> sem		Year ofStudy:2022-23
<b>CourseName: BASICGEOTECHNICALENGINEERING –18CV54</b>		
CO1	Ability to plan and execute geotechnical site investigation program for different civil engineering projects	
CO2	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils	
CO3	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures	
CO4	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure	
CO5	Capable of estimating load carrying capacity of single and group of piles	

Year/SEM: 3 <sup>rd</sup> year/5 <sup>th</sup> sem		Year ofStudy:2022-23
<b>CourseName: MUNICIPALWASTEWATERENGINEERING –18CV55</b>		
CO1	Select the appropriate sewer appurtenances and materials in sewer network.	
CO2	Design the sewers network and understand the self purification process in flowing water.	
CO3	Deisgn the varies physic- chemical treatment units	
CO4	Design the various biological treatment units	
CO5	Design various AOPs and low cost treatment units.	

Year / SEM:3 <sup>rd</sup> year/5 <sup>th</sup> sem		Year ofStudy:2022-23
<b>CourseName: HIGHWAYENGINEERING –18CV56</b>		
CO1	Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data.	
CO2	Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction.	
CO3	Design road geometrics, structural components of pavement and drainage.	
CO4	Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts.	

Year/SEM: 3 <sup>rd</sup> year/5 <sup>th</sup> sem		Year ofStudy:2022-23
<b>CourseName: SURVEYINGPRACTICE –18CVL57</b>		
CO1	Apply the basic principles of engineering surveying and for linear and angular	

	measurements.
<b>CO2</b>	Comprehend effectively field procedure srequiredforaprofessionalsurveyor.
<b>CO3</b>	Use techniques, skills and conventional surveying instrument necessary engineering practice

<b>Year / SEM:3<sup>rd</sup>year/5<sup>th</sup>sem</b>	<b>Year ofStudy:2022-23</b>
<b>CourseName:ConcreteandHighwayMaterialsLaboratory–18CVL58</b>	
<b>CO1</b>	Able to interpret the experimental results of concrete and highway materials based on laboratory tests.
<b>CO2</b>	Determine the quality and suitability of cement.
<b>CO3</b>	Design appropriate concrete mix Using Professional codes.
<b>CO4</b>	Determine strength and quality of concrete.
<b>CO5</b>	Evaluate the strength of structural elements using NDT techniques.
<b>CO6</b>	Test the soil for its suitability as sub grade soil for pavements.

<b>Year / SEM:3<sup>rd</sup>year/6<sup>th</sup>sem</b>	<b>Year ofStudy:2022-23</b>
<b>CourseName: DESIGNOFSTEELSTRUCTURALELEMENTS –18CV61</b>	
<b>CO1</b>	Possess knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions and plastic behaviour of structural steel.
<b>CO2</b>	Understand the Concept of Bolted and Welded connections.
<b>CO3</b>	Understand the Concept of Design of compression members, built-up columns and columns splices.
<b>CO4</b>	Understand the Concept of Design of tension members, simple slab base and gusseted base.
<b>CO5</b>	Possess knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions and plastic behaviour of structural steel.

<b>Year / SEM:3<sup>rd</sup>year/6<sup>th</sup>sem</b>		<b>Year ofStudy:2022-23</b>
<b>CourseName: APPLIEDGEOTECHNICALENGINEERING – 18CV62</b>		
<b>CO1</b>	Ability to plan and execute geotechnical site investigation program for different civil engineering projects	
<b>CO2</b>	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils	
<b>CO3</b>	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures	
<b>CO4</b>	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure	
<b>CO5</b>	Capable of estimating load carrying capacity of single and group of piles	

<b>Year/SEM: 3<sup>rd</sup>year/6<sup>th</sup>sem</b>		<b>Year ofStudy:2022-23</b>
<b>CourseName: HYDROLOGYANDIRRIGATIONENGINEERING -18CV63</b>		
<b>CO1</b>	Understand the importance of hydrology and its components.	
<b>CO2</b>	Measure precipitation and analyze the data and analyze the losses in precipitation.	
<b>CO3</b>	Estimate runoff and develop unit hydrographs	
<b>CO4</b>	Find the benefits and ill-effects of irrigation.	
<b>CO5</b>	Find the quantity of irrigation water and frequency of irrigation for various crops.	
<b>CO6</b>	Find the canal capacity, design the canal and compute the reservoir capacity.	

Year/SEM: 3 <sup>rd</sup> year/6 <sup>th</sup> sem		Year ofStudy:2022-23
<b>CourseName: ALTERNATEBUILDINGMATERIALS -18CV643</b>		
<b>CO1</b>	Estimateaverageandpeak waterdemandforacomunity.	
<b>CO2</b>	Evaluateavailablesourcesofwater, quantitativelyand qualitativelyandmakeappropriate choiceforacomunity.	
<b>CO3</b>	Evaluatewaterqualityand environmentalsignificanceofvariousparameters andplansuitabletreatment system.	
<b>CO4</b>	Designacomprehensivewatertreatmentanddistributionsystem topurifyanddistributewaterto therequired qualitystandards.	

Year / SEM:3 <sup>rd</sup> year/6 <sup>th</sup> sem		Year ofStudy:2022-23
<b>CourseName: ENVIRONMENTALENGINEERING LABORATORY -18CVL67</b>		
<b>CO1</b>	Acquire capability to conduct experiments and estimate the concentration of different parameters.	
<b>CO2</b>	Compare the result with standards and discuss based on the purpose of analysis.	
<b>CO3</b>	Determine type of treatment, degree of treatment for water and waste water.	
<b>CO4</b>	Identify the parameter to be analyzed for the student project work in environmental stream	

Year/SEM: 3 <sup>rd</sup> year/6 <sup>th</sup> sem		Year ofStudy:2022-23
<b>CourseName:ExtensiveSurveyProject/Camp–18CVP68</b>		
<b>CO1</b>	ApplySurveyingknowledgeandtooleffectivelyfortheprojects	
<b>CO2</b>	UnderstandingTaskenvironment,Goals,responsibilities,Taskfocus,workingin Teamstowardscommongoals,Organizationalperformanceexpectations,technicalandbehavioral competencies.	
<b>CO3</b>	Applicationofindividualeffectivenessskillsinteamandorganizationalcontext,goalsetting,ti memangement, communicationand presentation skills.	
<b>CO4</b>	Professionaletiquettesatworkplace,meetingandgeneral	
<b>CO5</b>	Establishingtrust-basedrelationshipsinteam&organizationalenvironment	

Year / SEM:3 <sup>rd</sup> year/7 <sup>th</sup> sem		Year ofStudy:2022-23
<b>CourseName: QUANTITYSURVEYINGANDCONTRACTMANAGEMENT 18CV71</b>		
<b>CO1</b>	Taking out quantities and work out the cost and preparation of abstract for the estimated cost for various civil engineering works.	
<b>CO2</b>	Prepare detailed and abstract estimates for various road works, structural works and water supply and sanitary works.	
<b>CO3</b>	Prepare the specifications and analyze the rates for various items of work.	
<b>CO4</b>	Assess contract and tender documents for various construction works.	
<b>CO5</b>	Prepare valuation reports of buildings	

Year/SEM: 3 <sup>rd</sup> year/7 <sup>th</sup> sem		Year ofStudy:2022-23
<b>CourseName: DESIGNOFRCCANDSTEELSTRUCTURES –18CV72</b>		
<b>CO1</b>	Students will acquire the basic knowledge in design of RCC and Steel Structures.	
<b>CO2</b>	Students will have the ability to follow design procedures as per codal provisions and skills to arrive at structurally safe RC and Steel members.	

Year/SEM: 3 <sup>rd</sup> year/7 <sup>th</sup> sem		Year ofStudy:2022-23
<b>CourseName: AIRPOLLUTIONANDCONTROL –18CV732</b>		
<b>CO1</b>	Identify the major sources of air pollution and understand their effects on health and environment.	
<b>CO2</b>	Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.	
<b>CO3</b>	Ascertain and evaluate sampling techniques for atmospheric and stack pollutants.	
<b>CO4</b>	Choose and design control techniques for particulate and gaseous emissions.	



<b>Year/SEM : 3<sup>rd</sup>year/7<sup>th</sup>sem</b>		<b>Year of Study:2022-23</b>
<b>CourseName: URBANTRANSPORTPLANNING –18CV745</b>		
<b>CO1</b>	Design,conductandadministersurveystoprovidethedatarequiredfortransportationplanning.	
<b>CO2</b>	Supervisetheprocessofdatacollectionabouttravelbehaviorandanalyzethedataforuseintransportplanning.	
<b>CO3</b>	Developandcalibratemodalsplit,tripgenerationratesforspecifictypesoflandusedevelopments.	
<b>CO4</b>	Adoptthestepsthatarenecessarytocompletealong-termtransportationplan.	

## Department of Electronics & Communication Engineering

### PROGRAM SPECIFIC OUTCOMES (PSOs):

**Engineering Graduates will be able to:**

<b>PSO-1:</b>	The ability to understand and apply principles of Electronics and Communication Engineering in the analysis, design and development of various types of integrated electronics systems as well as to interpret and synthesize the experimental data leading to valid conclusions.
<b>PSO-2:</b>	To solve real time problems with creative ideas, enabling the students to have successful career in industry and also motivate for higher education to promote research and development activities.

### Course Outcomes:

Year / SEM : 2 <sup>nd</sup> year / 3 <sup>rd</sup> sem	Year of Study : 2022-2023
<b>Course Name: 21MAT31 TRANSFORM CALCULUS, FOURIER SERIES AND NUMERICAL TECHNIQUES</b>	
<b>C31.1</b>	To solve ordinary differential equations using Laplace transform.
<b>C31.2</b>	Demonstrate the Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.
<b>C31.3</b>	To use Fourier transforms to analyze problems involving continuous-time signals and to apply Z-Transform techniques to solve difference equations
<b>C31.4</b>	To solve mathematical models represented by initial or boundary value problems involving partial differential equations
<b>C31.5</b>	Determine the extremals of functionals variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

Year / SEM : 2 <sup>nd</sup> year / 3 <sup>rd</sup> sem	Year of Study : 2022-2023
<b>Course Name: 21EC32 Digital System Design Using Verilog</b>	
<b>C32.1</b>	Simplify Boolean functions using K-map and Quine-McCluskey minimization technique.
<b>C32.2</b>	Analyze and design for combinational logic circuits.

<b>C32.3</b>	Analyze the concepts of Flip Flops (SR, D, T and JK) and to design the synchronous sequential circuits using Flip Flops.
<b>C32.4</b>	Model Combinational circuits (adders, subtractors, multiplexers) and sequential

<b>Year / SEM :2<sup>nd</sup> year / 3<sup>rd</sup> sem</b>		<b>Year of Study : 2022-2023</b>
<b>Course Name: 21EC33 Basic Signal Processing</b>		
<b>C33.1</b>	Understand the basics of Linear Algebra	
<b>C33.2</b>	Analyse different types of signals and systems	
<b>C33.3</b>	Analyse the properties of discrete-time signals & systems	
<b>C33.4</b>	Analyse discrete time signals & systems using Z transforms	

<b>Year / SEM :2<sup>nd</sup> year / 3<sup>rd</sup> sem</b>		<b>Year of Study : 2022-2023</b>
<b>Course Name:21EC34 Analog Electronic Circuits</b>		
<b>C34.1</b>	Understand the characteristics of BJTs and FETs for switching and amplifier circuits.	
<b>C34.2</b>	Design and analyze FET amplifiers and oscillators with different circuit configurations and biasing conditions	
<b>C34.3</b>	Understand the feedback topologies and approximations in the design of amplifiers and oscillators.	
<b>C34.4</b>	Design of circuits using linear ICs for wide range applications such as ADC, DAC, filters and timers.	
<b>C34.5</b>	Understand the power electronic device components and its functions for basic power electronic circuits.	

<b>Year / SEM :2<sup>nd</sup> year / 3<sup>rd</sup> sem</b>		<b>Year of Study : 2022-2023</b>
<b>Course Name:21ECL35 Analog and Digital Electronics Lab</b>		
<b>C35.1</b>	Design and analyze the BJT/FET amplifier and oscillator circuits.	
<b>C35.2</b>	Design and test Opamp circuits to realize the mathematical computations, DAC and precision rectifiers.	
<b>C35.3</b>	Design and test the combinational logic circuits for the given specifications.	
<b>C35.4</b>	Test the sequential logic circuits for the given functionality.	
<b>C35.5</b>	Demonstrate the basic electronic circuit experiments using SCR and 555 timer	

<b>Year / SEM :2<sup>nd</sup> year / 3<sup>rd</sup> sem</b>		<b>Year of Study : 2022-2023</b>
<b>Course Name:21SCR36 SOCIAL CONNECT &amp; RESPONSIBILITIES</b>		
<b>C36.1</b>	Understand social responsibility	
<b>C36.2</b>	Practice sustainability and creativity	

<b>C36.3</b>	Showcase planning and organizational skills
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<b>Year / SEM :2<sup>nd</sup> year / 3<sup>rd</sup> sem</b>		<b>Year of Study : 2022-2023</b>
<b>Course Name:21EC383LIC (Linear Integrated Circuits) Lab using Pspice / MultiSIM</b>		
<b>C38.1</b>	Sketch/draw circuit schematics, construct circuits, analyze and troubleshoot circuits containing op-amps, resistors, diodes, capacitors and independent sources.	
<b>C38.2</b>	Relate to the manufacturer's data sheets of IC 555 timer and IC $\mu$ 741 op-amp.	
<b>C38.3</b>	Realize and verify the operation of analog integrated circuits like Amplifiers, Precision Rectifiers, Comparators and Waveform generators.	
<b>C38.4</b>	Design and implement analog integrated circuits like Oscillators, Active filters, Timer circuits, Data converters and compare the experimental results with theoretical values.	

<b>Year / SEM :2<sup>nd</sup> year / 4<sup>th</sup> sem</b>		<b>Year of Study : 2022-2023</b>
<b>Course Name:21MAT41 COMPLEX ANALYSIS, PROBABILITY AND STATISTICAL METHODS</b>		
<b>C41.1</b>	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.	
<b>C41.2</b>	Utilize conformal transformation and complex integral arising in foil theory, fluid flow visualization and image processing.	
<b>C41.3</b>	Apply discrete and continuous probability distributions in analyzing the probability	
<b>C41.4</b>	Apply discrete and continuous probability distributions in analyzing the probability models	
<b>C41.5</b>	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.	

<b>Year / SEM :2<sup>nd</sup> year / 4<sup>th</sup> sem</b>		<b>Year of Study : 2022-2023</b>
<b>Course Name:21EC42 Digital Signal Processing</b>		
<b>C42.1</b>	Determine response of LTI systems using time domain and DFT techniques	
<b>C42.2</b>	Compute DFT of real and complex discrete time signals	
<b>C42.3</b>	Compute DFT using FFT algorithms	
<b>C42.4</b>	Design FIR and IIR Digital Filters.	
<b>C42.5</b>	Design of Digital Filters using DSP processor	

<b>Year / SEM :2<sup>nd</sup> year / 4<sup>th</sup> sem</b>		<b>Year of Study : 2022-2023</b>
<b>Course Nam:21EC43 Circuits &amp; Controls</b>		
<b>C43.1</b>	Analyse and solve Electric circuit, by applying, loop analysis, Nodal analysis and by applying network Theorems	
<b>C43.2</b>	Evaluate two port parameters of a network and Apply Laplace transforms to solve electric networks.	

C43.3	Deduce transfer function of a given physical system, from differential equation representation or Block Diagram representation and SFG representation.
C43.4	Calculate time response specifications and analyse the stability of the system
C43.5	Draw and analyse the effect of gain on system behaviour using root loci.
C43.6	Perform frequency response Analysis and find the stability of the system.
C43.7	Represent State model of the system and find the time response of the system.

Year / SEM :2 <sup>nd</sup> year / 4 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:21EC44 Communication Theory</b>		
C44.1	Understand the amplitude and frequency modulation techniques and perform time and	
C44.2	Analyze and model the Random events in typical communication events to extract quantitative statistical parameters.	
C44.3	Analyze and model typical signal sets in terms of a basis function set of Amplitude, phase and Frequency.Root-locus technique.	
C44.4	Demonstrate by way of simulation or emulation the ease of analysis employing basis functions, statistical representation and Eigen values.Root-locus technique.	

Year / SEM :2 <sup>nd</sup> year / 4 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:21EC45 SIGNALS AND SYSTEMS</b>		
C45.1	Understand the amplitude and frequency modulation techniques and perform time and	
C45.2	Identify the schemes for amplitude and frequency modulation and demodulation of	
C45.3	Characterize the influence of channel noise on analog modulated signals.	
C45.4	. Understand the characteristics of pulse amplitude modulation, pulse position modulation and pulse code modulation systems.	
C45.5	Illustration of digital formatting representations used for Multiplexers, Vocoders and Video transmission	

Year / SEM :2 <sup>nd</sup> year / 4 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18EC46 Communication Laboratory I</b>		
C46.1	Demonstrate the AM and FM modulation and demodulation by representing the signals in time and frequency domain.	
C46.2	Design and test the sampling, Multiplexing and PAM with relevant circuits.	
C46.3	Demonstrate the basic circuitry and operations used in AM and FM receivers.	
C46.4	Illustrate the operation of PCM and delta modulations for different input conditions	

Year / SEM :2 <sup>nd</sup> year / 4 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:21EC481</b> Embedded C Basics		
C47.1	Write C programs in 8051 for solving simple problems that manipulate input data using different instructions of 8051 C.	
C47.2	Develop testing and experimental procedures on 8051 Microcontroller, analyze their operation under different cases.	
C47.3	Develop programs for 8051 Microcontroller to implement real world problems.	
C47.4	Design and Develop Mini projects	

Year / SEM :2 <sup>nd</sup> year / 4 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:21EC482 C++ Basics</b>		
C48.1	Write C++ program to solve simple and complex problems	
C48.2	Apply and implement major object-oriented concepts like message passing, function overloading, operator overloading and inheritance to solve real-world problems.	
C48.3	Use major C++ features such as Templates for data type independent designs and File I/O to deal with large data set.	
C48.4	Analyze, design and develop solutions to real-world problems applying OOP concepts of C++	

Year / SEM :3 <sup>rd</sup> year / 5 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18ES51 TECHNOLOGICAL INNOVATION MANAGEMENT AND ENTREPRENEURSHIP</b>		
C51.1	Understand the fundamental concepts of Management and Entrepreneurship and opportunities in order to setup a business	
C51.2	Describe the functions of Managers, Entrepreneurs and their social responsibilities	
C51.3	Understand the components in developing a business plan	
C51.4	Awareness about various sources of funding and institutions supporting entrepreneurs	

Year / SEM :3 <sup>rd</sup> year / 5 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18EC52 DIGITAL SIGNAL PROCESSING</b>		
C52.1	Determine response of LTI systems using time domain and DFT techniques.	
C52.2	Compute DFT of real and complex discrete time signals.	
C52.3	Computation of DFT using FFT algorithms and linear filtering approach.	
C52.4	Design and realize FIR and IIR digital filters	
C52.5	Understand the DSP processor architecture.	
Year / SEM :3 <sup>rd</sup> year / 5 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18EC53</b> PRINCIPLES OF COMMUNICATION SYSTEMS		

<b>C53.1</b>	Analyze and compute performance of AM and FM modulation in the presence of noise at the receiver
<b>C53.2</b>	Analyze and compute performance of digital formatting processes with quantization noise.
<b>C53.3</b>	Multiplex digitally formatted signals at Transmitter and demultiplex the signals and reconstruct digitally formatted signals at the receiver.
<b>C53.4</b>	Design/Demonstrate the use of digital formatting in Multiplexers, Vocoders and Video transmission.

<b>Year / SEM :3<sup>rd</sup> year / 5<sup>th</sup> sem</b>	<b>Year of Study 2022-2023</b>
<b>Course Name:18EC54INFORMATION THEORY and CODING</b>	
<b>C54.1</b>	Explain concept of Dependent & Independent Source, measure of information, Entropy, Rate of Information and Order of a source
<b>C54.2</b>	Represent the information using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms.
<b>C54.3</b>	Model the continuous and discrete communication channels using input, output and joint probabilities digitally formatted signals at the receiver.
<b>C54.4</b>	Determine a codeword comprising of the check bits computed using Linear Block codes, cyclic codes & convolutional codes.
<b>C54.5</b>	Design the encoding and decoding circuits for Linear Block codes, cyclic codes, convolutional codes, BCH and Golay codes.

<b>Year / SEM :3<sup>rd</sup> year / 5<sup>th</sup> sem</b>	<b>Year of Study : 2022-2023</b>
<b>Course Name:18EC55ELECTROMAGNETIC WAVES</b>	
<b>C55.1</b>	Evaluate problems on electrostatic force, electric field due to point, linear, volume charges by applying conventional methods and charge in a volume.
<b>C55.2</b>	Apply Gauss law to evaluate Electric fields due to different charge distributions and Volume Charge distribution by using Divergence Theorem.
<b>C55.3</b>	Determine potential and energy with respect to point charge and capacitance using Laplace equation and Apply Biot-Savart's and Ampere's laws for evaluating Magnetic field for different current
<b>C55.4</b>	Calculate magnetic force, potential energy and Magnetization with respect to magnetic materials and voltage induced in electric circuits. & convolutional codes.
<b>C55.5</b>	Apply Maxwell's equations for time varying fields, EM waves in free space and conductors and Evaluate power associated with EM waves using Poynting theorem

<b>Year / SEM :3<sup>rd</sup> year / 5<sup>th</sup> sem</b>	<b>Year of Study 2022-2023</b>
<b>Course Name:18EC56Verilog HDL</b>	
<b>C56.1</b>	Write Verilog programs in gate, dataflow (RTL), behavioral and switch modeling levels of Abstraction.
<b>C56.2</b>	Design and verify the functionality of digital circuit/system using test benches.

<b>C56.3</b>	Identify the suitable Abstraction level for a particular digital design.
<b>C56.4</b>	Write the programs more effectively using Verilog tasks, functions and directives..
<b>C56.5</b>	Perform timing and delay Simulation
<b>C56.6</b>	Interpret the various constructs in logic synthesis.

<b>Year / SEM :3<sup>rd</sup> year / 5<sup>th</sup> sem</b>		<b>Year of Study 2022-2023</b>
<b>Course Name:18ECL57 DIGITAL SIGNAL PROCESSING LABORATORY</b>		
<b>C57.1</b>	Understand the concepts of analog to digital conversion of signals and frequency domain sampling of signals.	
<b>C57.2</b>	Modeling of discrete time signals and systems and verification of its properties and results.	
<b>C57.3</b>	Implementation of discrete computations using DSP processor and verify the results.	
<b>C57.4</b>	Realize the digital filters using a simulation tool and analyze the response of the filter for an audio signal.	

<b>Year / SEM :3<sup>rd</sup> year / 5<sup>th</sup> sem</b>		<b>Year of Study : 2022-2023</b>
<b>Course Name:18ECL58 HDL LABORATORY</b>		
<b>C58.1</b>	Write the Verilog/VHDL programs to simulate Combinational circuits in Dataflow, Behavioral and Gate level Abstractions.	
<b>C58.2</b>	Describe sequential circuits like flip flops and counters in Behavioral description and obtain simulation waveforms.	
<b>C58.3</b>	Synthesize Combinational and Sequential circuits on programmable ICs and test the hardware.	
<b>C58.4</b>	Interface the hardware to the programmable chips and obtain the required output signal.	

<b>Year / SEM :3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-2023</b>
<b>Course Name:18EC61 DIGITAL COMMUNICATION</b>		
<b>C61.1</b>	Associate and apply the concepts of Bandpass sampling to well specified signals and channels.	
<b>C61.2</b>	Analyze and compute performance parameters and transfer rates for low pass and bandpass symbol under ideal and corrupted non band limited channels.	
<b>C61.3</b>	Test and validate symbol processing and performance parameters at the receiver under ideal and corrupted bandlimited channels.	
<b>C61.4</b>	Demonstrate that bandpass signals subjected to corruption and distortion in a bandlimited channel can be processed at the receiver to meet specified performance criteria.	



Year / SEM :3 <sup>rd</sup> year / 6 <sup>th</sup> sem		Year of Study :2022-2023
<b>Course Name:18EC62 EMBEDDED SYSTEMS</b>		
C62.1	Describe the architectural features and instructions of 32 bit microcontroller ARM Cortex M3.	
C62.2	Apply the knowledge gained for Programming ARM Cortex M3 for different applications.	
C62.3	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.	
C62.4	Develop the hardware software co-design and firmware design approaches.	
C62.5	Explain the need of real time operating system for embedded system applications.	

Year / SEM :3 <sup>rd</sup> year / 6 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18EC63 MICROWAVE and ANTENNAS</b>		
C63.1	Describe the use and advantages of microwave transmission	
C63.2	Analyze various parameters related to microwave transmission lines and waveguides	
C63.3	Identify microwave devices for several applications	
C63.4	Analyze various antenna parameters necessary for building a RF system	
C63.5	Recommend various antenna configurations according to the applications.	

Year / SEM :3 <sup>rd</sup> year / 6 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18EC641OPERATING SYSTEM</b>		
C641.1	Explain the goals, structure, operation and types of operating systems.	
C641.2	Apply scheduling techniques to find performance factors..	
C641.3	Explain organization of file systems and IOCS.	
C641.4	Apply suitable techniques for contiguous and non-contiguous memory allocation.	
C641.5	Describe message passing, deadlock detection and prevention methods.	

Year / SEM :3 <sup>rd</sup> year / 6 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18EC644DIGITAL SYSTEM DESIGN USING VERILOG</b>		
C644.1	Construct the combinational circuits, using discrete gates and programmable logic devices.	
C644.2	Describe how arithmetic operations can be performed for each kind of code, and also combinational circuits that implement arithmetic operations.	
C644.3	Design a semiconductor memory for specific chip design.	
C644.4	Design embedded systems using small microcontrollers, larger CPUs/DSPs, or hard or soft processor cores.	
C644.5	Synthesize different types of I/O controllers that are used in embedded system.	

Year / SEM :3 <sup>rd</sup> year / 6 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18EC 646 PYTHON APPLICATION PROGRAMMING</b>		
<b>C646.1</b>	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.	
<b>C646.2</b>	Demonstrate proficiency in handling Strings and File Systems.	
<b>C646.3</b>	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions..	
<b>C646.4</b>	Interpret the concepts of Object-Oriented Programming as used in Python.	
<b>C646.5</b>	Implement exemplary applications related to Network Programming, Web Services and Databases in Python.	

Year / SEM :3 <sup>rd</sup> year / 6 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18ECL66 EMBEDDED SYSTEMS LAB</b>		
<b>C66.1</b>	Understand the instruction set of 32 bit microcontroller ARM Cortex M3, and the software tool	
<b>C66.2</b>	Develop assembly language programs using ARM Cortex M3 for different applications.	
<b>C66.3</b>	Interface external devices and I/O with ARM Cortex M3.	
<b>C66.4</b>	Develop C language programs and library functions for embedded system applications.	

Year / SEM :3 <sup>rd</sup> year / 6 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18ECL67 COMMUNICATION LAB</b>		
<b>C67.1</b>	Determine the characteristics and response of microwave waveguide.	
<b>C67.2</b>	Determine the characteristics of microstrip antennas and devices and compute the parameters associated	
<b>C67.3</b>	Design and test the digital and analog modulation circuits and display the waveforms.	
<b>C67.4</b>	Simulate the digital modulation systems and compare the error performance of basic digital modulation	

Year / SEM :4 <sup>rd</sup> year / 7 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18EC71 COMPUTER NETWORKS</b>		
<b>C71.1</b>	Understand the concepts of networking thoroughly.	
<b>C71.2</b>	Identify the protocols and services of different layers.	
<b>C71.3</b>	Distinguish the basic network configurations and standards associated with each network.	
<b>C71.4</b>	Analyze a simple network and measurement of its parameters.	

Year / SEM :4 <sup>th</sup> year / 7 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18EC72 VLSI DESIGN</b>		
<b>C72.1</b>	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling.	
<b>C72.2</b>	Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects.	
<b>C72.3</b>	Demonstrate ability to design Combinational, sequential and dynamic logic circuits as per the requirements	
<b>C72.4</b>	Interpret Memory elements along with timing considerations	
<b>C72.5</b>	Interpret testing and testability issues in VLSI Design	

Year / SEM :4 <sup>th</sup> year / 7 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18EC732 SATELLITE COMMUNICATION</b>		
<b>C732.1</b>	Describe the satellite orbits and its trajectories with the definitions of parameters associated with it..	
<b>C732.2</b>	Describe the electronic hardware systems associated with the satellite subsystem and earth station.	
<b>C732.3</b>	Describe the various applications of satellite with the focus on national satellite system.	
<b>C732.4</b>	Compute the satellite link parameters under various propagation conditions with the illustration of multiple access techniques.	

Year / SEM :4 <sup>th</sup> year / 7 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18EC741 IoT &amp; WIRELESS SENSOR NETWORKS</b>		
<b>C741.1</b>	Understand choice and application of IoT & M2M communication protocols.	
<b>C741.2</b>	Describe Cloud computing and design principles of IoT.	
<b>C741.3</b>	Awareness of MQTT clients, MQTT server and its programming.	
<b>C741.4</b>	Develop an architecture and its communication protocols of of WSNs..	

Year / SEM :4 <sup>th</sup> year / 7 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18EC743 MULTIMEDIA COMMUNICATION</b>		
<b>C743.1</b>	Understand basics of different multimedia networks and applications.	
<b>C743.2</b>	Understand different compression techniques to compress audio and video.	
<b>C743.3</b>	Describe multimedia Communication across Networks.	
<b>C743.4</b>	Analyse different media types to represent them in digital form.	
<b>C743.5</b>	Compress different types of text and images using different compression techniques.	

Year / SEM :4 <sup>th</sup> year / 7 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18EC744 CRYPTOGRAPHY</b>		
<b>C744.1</b>	Explain basic cryptographic algorithms to encrypt and decrypt the data.	
<b>C744.2</b>	Use symmetric and asymmetric cryptography algorithms to encrypt and decrypt the information.	
<b>C744.3</b>	Apply concepts of modern algebra in cryptography algorithms.	
<b>C744.4</b>	Apply pseudo random sequence in stream cipher algorithms.	

Year / SEM :4 <sup>th</sup> year / 7 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18ECL76 COMPUTER NETWORKS LAB</b>		
<b>C76.1</b>	Use the network simulator for learning and practice of networking algorithms.	
<b>C76.2</b>	Illustrate the operations of network protocols and algorithms using C programming.	
<b>C76.3</b>	Simulate the network with different configurations to measure the performance parameters.	
<b>C76.4</b>	Implement the data link and routing protocols using C programming.	
Year / SEM :4 <sup>th</sup> year / 7 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18ECL77 VLSI LAB</b>		
<b>C77.1</b>	Design and simulate combinational and sequential digital circuits using Verilog HDL.	
<b>C77.2</b>	Understand the Synthesis process of digital circuits using EDA tool	
<b>C77.3</b>	Perform ASIC design flow and understand the process of synthesis, synthesis constraints and evaluating the synthesis reports to obtain optimum gate level net list	
<b>C77.4</b>	Design and simulate basic CMOS circuits like inverter, common source amplifier and differential amplifiers.	
<b>C77.5</b>	Perform RTL-GDSII flow and understand the stages in ASIC design.	

Year / SEM :4 <sup>th</sup> year / 8 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18EC81 WIRELESS AND CELLULAR COMMUNICATION</b>		
<b>C81.1</b>	Explain concepts of propagation mechanisms like Reflection, Diffraction, Scattering in wireless channels.	
<b>C81.2</b>	Develop a scheme for idle mode, call set up, call progress handling and call tear down in a GSM cellular network.	
<b>C81.3</b>	Develop a scheme for idle mode, call set up, call progress handling and call tear down in a CDMA cellular network.	
<b>C81.4</b>	Understand the Basic operations of Air interface in a LTE 4G system.	

Year / SEM :4 <sup>th</sup> year / 8 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18EC821 NETWORK SECURITY</b>		
<b>C821.1</b>	Explain network security services and mechanisms and explain security concepts channels.	
<b>C821.2</b>	Understand the concept of Transport Level Security and Secure Socket Layer.	
<b>C821.3</b>	Explain Security concerns in Internet Protocol security	
<b>C821.4</b>	Explain Intruders, Intrusion detection and Malicious Software.	
<b>C821.5</b>	Describe Firewalls, Firewall Characteristics, Biasing and Configuration	

Year / SEM :4 <sup>th</sup> year / 8 <sup>th</sup> sem		Year of Study : 2022-2023
<b>Course Name:18EC823 RADAR ENGINEERING</b>		
<b>C823.1</b>	Understand the radar fundamentals and radar signals.	
<b>C823.2</b>	Explain the working principle of pulse Doppler radars, their applications and limitations.	
<b>C823.3</b>	Describe the working of various radar transmitters and receivers.	
<b>C823.4</b>	Analyze the range parameters of pulse radar system which affect the system performance.	

Year/SEM: 2 <sup>nd</sup> year/3 <sup>rd</sup> sem		Year of Study: 2022-23
<b>Course Name: TRANSFORM CALCULUS, FOURIER SERIES AND NUMERICAL TECHNIQUES(21MAT31)</b>		
<b>CO1</b>	Use Laplace transform and inverse Laplace transform in solving differential/integral equation arising in network analysis, control systems and other fields of engineering.	
<b>CO2</b>	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.	
<b>CO3</b>	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.	
<b>CO4</b>	Solve first and second order ordinary differential equations arising in engineering problems using single step and multi step numerical methods.	
<b>CO5</b>	Determine the external force functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.	

Year/SEM: 2 <sup>nd</sup> year/3 <sup>rd</sup> sem		Year of Study: 2022-23
<b>Course Name: ELECTRIC CIRCUIT ANALYSIS TECHNIQUES(21EE32)</b>		
<b>CO1</b>	Understand the basic concepts, basic laws and methods of analysis of DC and AC networks and reduce the complexity of network using source shifting, source transformation and network reduction using transformations	
<b>CO2</b>	Solve complex electric circuits using network theorems.	
<b>CO3</b>	Discuss resonance in series and parallel circuits and also the importance of initial conditions and their evaluation.	
<b>CO4</b>	Synthesize typical waveforms using Laplace transformation.	
<b>CO5</b>	Solve unbalanced three phase systems and also evaluate the performance of two port networks.	

Year/SEM: 2 <sup>nd</sup> year/3 <sup>rd</sup> sem		Year of Study:2022-23
<b>CourseName:TRANSFORMERSANDGENERATORS(21EE33)</b>		
<b>CO1</b>	Understandtheconstructionandoperationof1-phase, 3-Phase transformersandAutotransformer	
<b>CO2</b>	Analyze the performance of transformers by polarity test, Sumpner's Test, phase conversion, 3-phase connection, and parallel operation	
<b>CO3</b>	Understand the construction and working of AC and DC Generators.	
<b>CO4</b>	Analyze the performance of the AC Generators on infinite bus and parallel operation.	
<b>CO5</b>	Determine the regulation of AC Generator by Slip test, EMF, MMF, and ZPFM methods	

Year/SEM: 2 <sup>nd</sup> year/3 <sup>rd</sup> sem		Year of Study:2022-23
<b>CourseName:ANALOG ELECTRONIC CIRCUITS(21EE34)</b>		
<b>CO1</b>	Obtain the output characteristics of clipper and clamper circuits.	
<b>CO2</b>	Design and compare biasing circuits for transistor amplifiers & explain the transistor switching	
<b>CO3</b>	Explain the concept of feedback, its types and design of feedback circuits	
<b>CO4</b>	Design and analyze the power amplifier circuits and oscillators for different frequencies.	
<b>CO5</b>	Design and analysis of FET and MOSFET amplifiers	

Year /SEM:2 <sup>nd</sup> year /3 <sup>rd</sup> sem		Year of Study:2022-23
<b>CourseName:DIGITAL SYSTEM DESIGN(21EE35)</b>		
<b>CO1</b>	Develop simplified switching equation using Karnaugh Maps and Quine McClusky techniques	
<b>CO2</b>	Design Multiplexer, Encoder, Decoder, Adder, Subtractors and Comparator as digital combinational control circuits.	
<b>CO3</b>	Design flipflops, counters, shift registers as sequential control circuits.	
<b>CO4</b>	Develop Mealy/Moore Models and state diagrams for the given clocked sequential circuits.	
<b>CO5</b>	Explain the functioning of Read only and Read/Write Memories, Programmable ROM, EPROM and Flash memory.	

Year/SEM:2 <sup>nd</sup> year/3 <sup>rd</sup> sem		Year ofStudy:2022-23
CourseName:ELECTRICALANDELECTRONICMEASUREMENTS(21EE36)		
CO1	Measure resistance, inductance and capacitance using bridges and determine earth resistance.	
CO2	Explain the working of various meters used for measurement of Power, Energy & understand the adjustments, calibration & errors in energy meters.	
CO3	Understand methods of extending the range of instruments & instrument transformers.	
CO4	Explain the working of different electronic instruments.	
CO5	Explain the working of different display and recording devices.	

Year /SEM:2 <sup>nd</sup> year /3 <sup>rd</sup> sem		Year ofStudy:2022-23
CourseName:ELECTRICALMACHINESLABORATORY-1(21EEL37)		
CO1	Evaluate the performance of transformers from the test data obtained.	
CO2	Connect and operate two single phase transformers of different KVArating in parallel.	
CO3	Connect single phase transformers for three phase operation and phase conversion.	
CO4	Compute the voltage regulation of synchronous generator using the test data obtained in the laboratory.	
CO5	Evaluate the performance of synchronous generators from the test data and assess the performance of synchronous generator connected to infinite bus.	



Year /SEM:2 <sup>nd</sup> year /3 <sup>rd</sup> sem		Year ofStudy:2022-23
<b>CourseName:ELECTRONICSLABORATORY(21EEL38)</b>		
<b>CO1</b>	Designand testrectifiercircuitswithand withoutcapacitorfilters.	
<b>CO2</b>	Determineh-parameter modelsoftransistorforallmodes.	
<b>CO3</b>	Designand testBJTand FETamplifierand oscillatorcircuits.	
<b>CO4</b>	RealizeBooleaneexpressions,addersandsubtractors usinggates.	
<b>CO5</b>	Design and test Ring counter/Johnson counter, Sequence generator and 3bitcounters.	

Year /SEM:2 <sup>nd</sup> year /4 <sup>th</sup> sem		Year ofStudy:2022-23
<b>CourseName:ADDITIONAL MATHEMATICS– I(21MATDIP31)onlyforlateralentrystudents</b>		
<b>CO1</b>	Apply concepts of complex numbers and vector algebra to analyze the problems arising in related area	
<b>CO2</b>	Use derivatives and partial derivatives to calculate rate of change of multivariate functions.	
<b>CO3</b>	Analyze position, velocity and acceleration in two and three dimensions of vector valued functions	
<b>CO4</b>	Learn techniques of integration including the evaluation of double and triple integrals.	
<b>CO5</b>	Identify and solve first order ordinary differential equations.	

Year / SEM: 2 <sup>nd</sup> year / 4 <sup>th</sup> sem		Year of Study: 2022-23
<b>Course Name: COMPLEX ANALYSIS, PROBABILITY AND STATISTICAL METHODS(21MAT41)</b>		
<b>CO1</b>	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory	
<b>CO2</b>	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.	
<b>CO3</b>	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory	
<b>CO4</b>	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.	

Year / SEM: 2 <sup>nd</sup> year / 4 <sup>th</sup> sem		Year of Study: 2022-23
<b>Course Name: POWER GENERATION AND ECONOMICS(21EE42)</b>		
<b>CO1</b>	Describe the working of hydroelectric, steam, nuclear power plants and state functions of major equipment of the power plants.	
<b>CO2</b>	Classify various substations and explain the functions of major equipments in substations.	
<b>CO3</b>	Explain the types of grounding and its importance.	
<b>CO4</b>	Infer the economic aspects of power system operation and its effects.	
<b>CO5</b>	Explain the importance of power factor improvement.	

Year/ SEM:2 <sup>nd</sup> year/4 <sup>th</sup> sem	Year ofStudy:2022-23
<b>CourseName:TRANSMISSIONANDDISTRIBUTION(21EE43)</b>	
<b>CO1</b>	Explain transmission and distribution scheme, identify the importance of different transmission systems and types of insulators
<b>CO2</b>	Analyze and compute the parameters of the transmission line for different configurations.
<b>CO3</b>	Assess the performance of overhead lines.
<b>CO4</b>	Interpret corona, explain the use of underground cables.
<b>CO5</b>	Classify different types of distribution systems; examine its quality & reliability

Year/SEM:2 <sup>nd</sup> year/4 <sup>th</sup> sem	Year ofStudy:2022-23
<b>CourseName:ELECTRICMOTORS(21EE44)</b>	
<b>CO1</b>	Explain the construction, operation and classification of DC Motor, AC motor and special purpose motors.
<b>CO2</b>	Describe the performance characteristics & applications of Electric motors.
<b>CO3</b>	Demonstrate and explain the methods of testing of DC machines and determine losses and efficiency.
<b>CO4</b>	Control the speed of DC motor and induction motor.
<b>CO5</b>	Explain the starting methods, equivalent circuit and phasor diagrams, torque angle, effect of change in excitation and change in load, hunting and damping of synchronous motors

<b>CO2</b>	Design filters and signal generators using linear ICs.
<b>CO3</b>	Demonstrate the application of Linear ICs as comparators and rectifiers.
<b>CO4</b>	Analyze voltage regulators for given specification using op-amp and IC voltage regulators.
<b>CO5</b>	Summarize the basics of PLL and Timer.

<b>Year/SEM: 2<sup>nd</sup> year / 4<sup>th</sup> sem</b>	<b>Year of Study: 2022-23</b>
<b>Course Name: ELECTROMAGNETIC FIELD THEORY (21EE45)</b>	
<b>CO1</b>	Use different coordinate systems, Coulomb's Law and Gauss Law for the evaluation of electric fields produced by different charge configurations.
<b>CO2</b>	Calculate the energy and potential due to a system of charges & Explain the behavior of electric field across boundary conditions.
<b>CO3</b>	Explain the Poisson's, Laplace equations and behavior of steady magnetic fields
<b>CO4</b>	Explain the behavior of magnetic fields and magnetic materials.
<b>CO5</b>	Assess time-varying fields and propagation of waves in different media.

Year / SEM: 2 <sup>nd</sup> year / 4 <sup>th</sup> sem		Year of Study: 2022-23
<b>Course Name: ELECTRICAL MACHINES LABORATORY-2 (21EEL47)</b>		
<b>CO1</b>	Test DC machines to determine their characteristics and also to control the speed of DC motor.	
<b>CO2</b>	Pre-determine the performance characteristics of DC machines by conducting suitable tests.	
<b>CO3</b>	Perform load test on single phase and three phase induction motor to assess its performance.	
<b>CO4</b>	Conduct test on induction motor to pre-determine the performance characteristics.	
<b>CO5</b>	Conduct test on synchronous motor to draw the performance curves.	

Year / SEM: 2 <sup>nd</sup> year / 4 <sup>th</sup> sem		Year of Study: 2022-23
<b>Course Name: OP-AMP AND LINEAR IC'S LABORATORY (21EEL48)</b>		
<b>CO1</b>	To conduct experiment to determine the characteristic parameters of OP-Amp	
<b>CO2</b>	To design test the OP-Amp as Amplifier, adder, subtractor, differentiator and integrator.	
<b>CO3</b>	To design test the OP-Amp as oscillators and filters.	
<b>CO4</b>	Design and study of Linear IC's as multivibrator power supplies.	

rd <sup>th</sup> Year/ SEM:3 year/5 sem		Year of Study:2022-23
CourseName:MANAGEMENTANDENTREPRENEURSHIP(18EE51)		
CO1	Explain the field of management, task of the manager, planning and steps in decision making	
CO2	Discuss the structure of organization, importance of staffing, leadership styles, modes of communication, techniques of coordination and importance of managerial control in business	
CO3	Explain the concepts of entrepreneurship and a businessman's social responsibilities towards different groups	
CO4	Show an understanding of role of SSI's in the development of country and state/central level institutions/agencies supporting business enterprises.	
CO5	Discuss the concepts of project management, capital budgeting, project feasibility studies, need for project report and new control techniques	

rd <sup>th</sup> Year/ SEM:3 year/5 sem		Year of Study:2022-23
CourseName:MICROCONTROLLER18EE52)		
CO1	Outline the 8051 architecture, registers, internal memory organization, addressing modes.	
CO2	Discuss 8051 addressing modes, instruction set of 8051, accessing data and I/O port programming.	
CO3	Develop 8051C programs for time delay, I/O operations, I/O bit manipulation, logic and arithmetic operations, data conversion and timer/counter programming.	
CO4	Summarize the basics of serial communication and interrupts, also develop 8051 programs for serial data communication and interrupt programming.	
CO5	Program 8051 to work with external devices for ADC, DAC, Stepper motor control, DC motor control, Elevator control	

rd <sup>th</sup> Year/ SEM:3 year/5 sem		Year of Study:2022-23
CourseName:POWER ELECTRONICS(18EE53)		
CO1	To give an overview of applications power electronics, different types of power semiconductor devices, their switching characteristics, power diode characteristics, types, their operation and the effects of power diodes on RL circuits	

<b>CO2</b>	To explain the techniques for design and analysis of single phase dioderectifier circuits
<b>CO3</b>	To explain different power transistors, their steady state and switchingcharacteristicsandlimitations.
<b>CO4</b>	To explain different types of Thyristors, their gate characteristics and gatecontrolrequirements
<b>CO5</b>	To explain the design, analysis techniques, performance parameters andcharacteristics of controlled rectifiers, DC- DC, DC -AC converters andVoltage controllers.

<b>rd<sup>th</sup></b>		<b>Year ofStudy:2022-23</b>
<b>Year/ SEM:3 year/5 sem</b>		
<b>CourseName: SIGNALSANDSYSTEMS(18EE54)</b>		
<b>CO1</b>	Explain the generation of signals, behavior of system and the basic operations that canbeperformed on signalsandpropertiesofsystems.	
<b>CO2</b>	Apply convolution in both continuous and discrete domain for the analysis ofsystemsgiven impulseresponseofa system.	
<b>CO3</b>	Solve the continuous time and discrete time systems by various methods andtheirrepresentationby block diagram	
<b>CO4</b>	Perform Fourier analysis for continuous and discrete time, linear time invariantystems	
<b>CO5</b>	Apply Z-transform and properties of Z transform for the analysis of discrete timesystems.	

<b>rd<sup>th</sup></b>		<b>Year ofStudy:2022-23</b>
<b>Year/ SEM:3 year/5 sem</b>		
<b>CourseName:ELECTRICALMACHINEDESIGN(18EE55)</b>		
<b>CO1</b>	Identify and list, limitations, modern trends in design, manufacturing of electricalmachinesand propertiesofmaterialsusedintheelectricalmachines	
<b>CO2</b>	Derive the output equation of DC machine, discuss selection of specific loadingsand magnetic circuits of DC machines, design the field windings of DC machine,anddesignstatorand rotorcircuitsofa DCmachine.	
<b>CO3</b>	Derive the output equations of transformer, discuss selection of specific loadings,estimate the number of cooling tubes, no load current and leakage reactance ofcoretype transformer.	
<b>CO4</b>	Develop the output equation of induction motor, discuss selection of specificloadings and magnetic circuits of induction motor, design stator and rotor circuitsof ainductionmotor.	

<b>CO5</b>	Formulate the output equation of alternator, design the field windings of Synchronous machine, discuss short circuit ratio and its effects on performance of synchronous machines, design salient pole and non-salient pole alternators for given specifications
<b>Year /SEM: 3rd year /5th sem</b>	
<b>Year of Study: 2022-23</b>	
<b>Course Name: HIGH VOLTAGE ENGINEERING (18EE56)</b>	
<b>CO1</b>	Explain conduction and breakdown phenomenon in gases, liquid dielectrics and breakdown phenomenon in solid dielectrics.
<b>CO2</b>	Summarize generation of high voltages and currents
<b>CO3</b>	Outline measurement techniques for high voltages and currents
<b>CO4</b>	Summarize overvoltage phenomenon and insulation coordination in electric power systems.
<b>CO5</b>	Explain non-destructive testing of materials and electric apparatus, high-voltage testing of electric apparatus

<b>rd th</b>	
<b>Year / SEM: 3 year / 5 sem</b>	
<b>Year of Study: 2022-23</b>	
<b>Course Name: MICROCONTROLLER LABORATORY (18EEL57)</b>	
<b>CO1</b>	Write assembly language programs for data transfer, arithmetic, Boolean and logical instructions and code conversions.
<b>CO2</b>	Write ALP using subroutines for generation of delays, counters, configuration of SFRs for serial communication and timers
<b>CO3</b>	Perform interfacing of stepper motor and dc motor for controlling the speed, elevator, LCD, external ADC and temperature control.
<b>CO4</b>	Generate different waveforms using DAC interface.
<b>CO5</b>	Work with a small team to carry out experiments using microcontroller concepts and prepare reports that present lab work.



rd <sup>th</sup> Year/ SEM:3 year/5 sem		Year of Study:2022-23
CourseName:POWER ELECTRONICSLABORATORY(18EEL58)		
CO1	Obtain static characteristics of semiconductor devices to discuss their performance.	
CO2	Trigger the SCR by different methods	
CO3	Verify the performance of single phase controlled full wave rectifier and AC voltage controller with R and RL loads.	
CO4	Control the speed of a DC motor, universal motor and stepper motors.	
CO5	Verify the performance of single phase full bridge inverter connected to resistive load.	

rd <sup>th</sup> Year/ SEM:3 year/6 sem		Year of Study:2022-23
CourseName:CONTROL SYSTEMS (18EE61)		
CO1	Analyze and model electrical and mechanical system using analogues.	
CO2	Formulate transfer functions using block diagram and signal flow graphs.	
CO3	Analyze the stability of control system, ability to determine transient and steady state time response.	
CO4	Illustrate the performance of a given system in time and frequency domains, stability analysis using Root locus and Bode plots.	
CO5	Discuss stability analysis using Nyquist plots, Design controller and compensator for a given specification.	

<b>CourseName:POWERSYSTEMANALYSIS-1(18EE62)</b>	
<b>CO1</b>	Model the power system components & construct per unit impedance diagram of power system.
<b>CO2</b>	Analyze three phase symmetrical faults on power system.
<b>CO3</b>	Compute unbalanced phasors in terms of sequence components and vice versa, also develop sequence networks.
<b>CO4</b>	Analyze various unsymmetrical faults on power system.
<b>CO5</b>	Examine dynamics of synchronous machine and determine the power system stability.

<b>rd<sup>th</sup></b>	<b>Year of Study:2022-23</b>
<b>Year/ SEM:3<sup>rd</sup> year/6<sup>th</sup> sem</b>	
<b>CourseName:DIGITAL SIGNAL PROCESSING(18EE63)</b>	
<b>CO1</b>	Apply DFT and IDFT to perform linear filtering techniques on given sequences to determine the output.
<b>CO2</b>	Apply fast and efficient algorithms for computing DFT and inverse DFT of a given sequence
<b>CO3</b>	Design and realize infinite impulse response Butterworth and Chebyshev digital filters using impulse invariant and bilinear transformation techniques.
<b>CO4</b>	Develop a digital IIR filter by direct, cascade, parallel, ladder and FIR filter by direct, cascade and linear phase methods of realization
<b>CO5</b>	Design and realize FIR filters by use of window function and frequency sampling method.

<b>rd<sup>th</sup></b>	<b>Year of Study:2022-23</b>
<b>Year/ SEM:3<sup>rd</sup> year/6<sup>th</sup> sem</b>	
<b>CourseName:DIGITAL SIGNAL PROCESSING(18EE64)</b>	
<b>CO1</b>	Apply DFT and IDFT to perform linear filtering techniques on given sequences to determine the output.

<b>CO2</b>	Apply fast and efficient algorithms for computing DFT and inverse DFT of a given sequence
<b>CO3</b>	Design and realize infinite impulse response Butterworth and Chebyshev digital filters using impulse invariant and bilinear transformation techniques.
<b>CO4</b>	Develop a digital IIR filter by direct, cascade, parallel, ladder and FIR filter by direct, cascade and linear phase methods of realization
<b>CO5</b>	Design and realize FIR filters by use of window function and frequency sampling method.

<b>rd<sup>th</sup></b>		<b>Year of Study: 2022-23</b>
<b>Year/ SEM: 3<sup>rd</sup> year/ 6<sup>th</sup> sem</b>		
<b>Course Name: COMPUTER AIDED ELECTRICAL DRAWING (18EE651)</b>		
<b>CO1</b>	Discuss the terminology and types of DC and AC armature windings.	
<b>CO2</b>	Develop armature winding diagram for DC and AC machines	
<b>CO3</b>	Develop a layout for substation using the standard symbols for substation equipment..	
<b>CO4</b>	Draw sectional views of core and shell type transformers using the design data	
<b>CO5</b>	Draw sectional views of assembled DC machine or its parts using the design data or the sketches	

<b>rd<sup>th</sup></b>		<b>Year of Study: 2022-23</b>
<b>Year/ SEM: 3<sup>rd</sup> year/ 6<sup>th</sup> sem</b>		
<b>Course Name: SENSORS AND TRANSDUCERS (18EE662)</b>		
<b>CO1</b>	Discuss need of transducers, their classification, advantages and disadvantages	
<b>CO2</b>	Show an understanding of working of various transducers and sensors	
<b>CO3</b>	Discuss recent trends in sensor technology and their selection	
<b>CO4</b>	Discuss basics of signal conditioning and signal conditioning equipment.	

<b>CO5</b>	Explain measurement of non-electrical quantities -temperature, flow, speed, force, torque, power and viscosity
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<b>Year/ SEM :4<sup>th</sup>year/ 7<sup>th</sup>sem</b>		<b>Year of Study:2022-23</b>
<b>CourseName:POWERSYSTEMANALYSIS–2–18EE71</b>		
<b>CO1</b>	Formulate network matrices and models for solving load flow problems.	
<b>CO2</b>	Perform steady state power flow analysis of power systems using numerical iterative techniques.	
<b>CO3</b>	Suggest a method to control voltage profile.	
<b>CO4</b>	Show knowledge of optimal operation of generators on a bus bar, optimal unit commitment,	
<b>CO5</b>	Discuss optimal scheduling for hydro-thermal system, power system security and reliability.	
<b>CO6</b>	Analyze short circuit faults in power system networks using bus impedance matrix.	
<b>CO7</b>	Perform numerical solution of swing equation for multi-machine stability	

<b>Year/ SEM :4<sup>th</sup>year/ 7<sup>th</sup>sem</b>		<b>Year of Study:2022-23</b>
<b>CourseName:POWERSYSTEMPROTECTION–18EE72</b>		
<b>CO1</b>	Discuss performance of protective relays, components of protection scheme and relay terminology overcurrent protection.	
<b>CO2</b>	Explain the working of distance relays and the effects of arc resistance, power swings, line length and source impedance on performance of distance relays.	
<b>CO3</b>	Discuss pilot protection; wire pilot relaying and carrier pilot relaying.	

<b>CO4</b>	Discuss construction, operating principles and performance of differential relays for differential protection.
<b>CO5</b>	Discuss protection of generators, motors, Transformer and Bus Zone Protection.
<b>CO6</b>	Explain the principle of circuit interruption in different types of circuit breakers.
<b>CO7</b>	Describe the construction and operating principle of different types of fuses and to give the definitions of different terminologies related to a fuse.
<b>CO8</b>	Discuss protection against Overvoltages and Gas Insulated Substation (GIS)

<b>Year/ SEM :4<sup>th</sup> year/ 7<sup>th</sup> sem</b>	<b>Year of Study:2022-23</b>
<b>Course Name:HIGH VOLTAGE ENGINEERING–18EE73</b>	
<b>CO1</b>	Explain conduction and breakdown phenomenon in gases, liquid dielectrics.
<b>CO2</b>	Explain breakdown phenomenon in solid dielectrics.
<b>CO3</b>	To explain different geological storage methods including storage in coal seams, depleted gas reservoirs
<b>CO4</b>	Explain generation of high voltages and currents
<b>CO5</b>	Discuss measurement techniques for high voltages and currents.
<b>CO6</b>	Discuss overvoltage phenomenon and insulation coordination in electric power systems.
<b>CO7</b>	Discuss non-destructive testing of materials and electric apparatus and high-voltage testing of electric apparatus

Year/ SEM :4 <sup>th</sup> year/ 7 <sup>th</sup> sem	Year ofStudy:2022-23
<b>CourseName:ADVANCEDCONTROLSYSTEMSS(ProfessionalElective)–18EE741</b>	
<b>CO1</b>	Discuss state variable approach for linear time invariant systems in both the continuous and discrete time systems.
<b>CO2</b>	Develop of state models for linear continuous–time and discrete–time systems.
<b>CO3</b>	Apply vector and matrix algebra to find the solution of state equations for linear continuous– time and discrete– time systems.
<b>CO4</b>	Define controllability and observability of a system and test for controllability and observability of a given system.
<b>CO5</b>	Design pole assignment and state observer using state feedback.
<b>CO6</b>	Develop the describing function for the nonlinearity present to assess the stability of the system.
<b>CO7</b>	Develop Lyapunov function for the stability analysis of nonlinear systems.

Year/ SEM :4 <sup>th</sup> year/ 7 <sup>th</sup> sem	Year ofStudy:2022-23
<b>CourseName:UTILIZATION OF ELECTRICAL POWER(Professional Elective)–18EE742</b>	
<b>CO1</b>	Discuss electric heating, air-conditioning and electric welding.
<b>CO2</b>	Explain laws of electrolysis, extraction and refining of metals and electrodeposition.
<b>CO3</b>	Explain the terminology of illumination, laws of illumination, construction and working of electric lamps.
<b>CO4</b>	Design interior and exterior lighting systems- illumination levels for factory lighting-flood lighting-street lighting.
<b>CO5</b>	Discuss systems of electric traction, speed time curves and mechanics of train movement.

<b>CO6</b>	Explain the motors used for electric traction and their control.
<b>CO7</b>	Discuss braking of electric motors, traction systems and power supply and other traction systems.
<b>CO8</b>	Explain the working of electric and hybrid electric vehicles.

<b>Year/ SEM :4<sup>th</sup>year/ 7<sup>th</sup>sem</b>	<b>Year of Study:2022-23</b>
<b>Course Name: CARBON CAPTURE AND STORAGE (Professional Elective)-18EE743</b>	
<b>CO1</b>	Discuss the impacts of climate change and the measures that can be taken to reduce emissions.
<b>CO2</b>	Discuss carbon capture and carbon storage.
<b>CO3</b>	Explain the fundamentals of power generation.
<b>CO4</b>	Explain methods of carbon capture from power generation and industrial processes.
<b>CO5</b>	Explain different carbon storage methods: storage in coal seams, depleted gas reservoirs and saline formations.
<b>CO6</b>	Explain Carbon dioxide compression and pipeline transport.

<b>Year/ SEM:4<sup>th</sup>year/ 7<sup>th</sup>sem</b>	<b>Year of Study:2022-23</b>
<b>Course Name: POWER SYSTEM PLANNING (Professional Elective)-18EE744</b>	
<b>CO1</b>	Discuss primary components of power system planning, planning methodology for optimum power system expansion, various types of generation, transmission and distribution.
<b>CO2</b>	Show knowledge of forecasting of future load requirements of both demand and energy by deterministic and statistical techniques using forecasting tools.
<b>CO3</b>	Discuss methods to mobilize resources to meet the investment requirement for the power sector

<b>CO4</b>	Understand economic appraisal to allocate the resources efficiently and appreciate the investment decisions
<b>CO5</b>	Discuss expansion of power generation and planning for system energy in the country, evaluation of operating states of transmission system, their associated contingencies and the stability of the system.
<b>CO6</b>	Discuss principles of distribution planning, supply rules, network development and the system studies
<b>CO7</b>	Discuss reliability criteria for generation, transmission, distribution and reliability evaluation and analysis, grid reliability, voltage disturbances and their remedies
<b>CO8</b>	Discuss planning and implementation of electric –utility activities, market principles and the norms framed by CERC for online trading and exchange in the interstate power market.

<b>Year/ SEM :4<sup>th</sup>year/ 7<sup>th</sup>sem</b>	<b>Year of Study:2022-23</b>
<b>Course Name:FACTS AND HVDC TRANSMISSION (Professional Elective)-18EE751</b>	
<b>CO1</b>	Discuss transmission interconnections, flow of Power in an AC System, limits of the loading capability, dynamic stability considerations of a transmission interconnection and controllable parameters.
<b>CO2</b>	Explain the basic concepts, definitions of flexible ac transmission systems and benefits from FACTS technology.
<b>CO3</b>	Describe shunt controllers, Static Var Compensator and Static Compensator for injecting reactive power in the transmission system in enhancing the controllability and power transfer capability.
<b>CO4</b>	Describe series Controllers Thyristor-Controlled Series Capacitor (TCSC) and the Static Synchronous Series Compensator (SSSC) for control of the transmission line current.
<b>CO5</b>	Explain advantages of HVDC power transmission, overview and organization of HVDC system
<b>CO6</b>	Describe the basic components of a converter, the methods for compensating the reactive power demanded by the converter.
<b>CO7</b>	Explain converter control for HVDC systems, commutation failure, control functions



Year/SEM: 4 <sup>th</sup> year/7 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:TESTINGANDCOMMISSIONINGOFPOWERSYSTEM APPARATUS(ProfessionalElective)–18EE752</b>		
<b>CO1</b>	Describe the process to plan, control and implement commissioning of electricalequipment's.	
<b>CO2</b>	Differentiatetheperformancespecificationsoftransformerandinductionmotor.	
<b>CO3</b>	Demonstrate the routine tests for synchronous machine, induction motor,transformer & switchgears.	
<b>CO4</b>	Describecorrectiveandpreventivemaintenanceofelectricalequipment's.	
<b>CO5</b>	Explain the operation of an electrical equipment's such as isolators, circuitbreakers,induction motorand synchronousmachines.	

Year/SEM: 4 <sup>th</sup> year/7 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:POWERSYSTEMSIMULATIONLABORATORY–18EEL76</b>		
<b>CO1</b>	Develop a program in MATLAB to assess the performance of medium and longtransmissionlines.	
<b>CO2</b>	Develop a program in MATLAB to obtain the power angle characteristics ofsalientandnon-salient polealternator.	
<b>CO3</b>	Develop aprograminMATLABtoassessthetransientstabilityunder threephasefaultatdifferen locationsinaof radialpower systems.	
<b>CO4</b>	Develop programs inMATLABtoformulatebusadmittanceandbusimpedancematrixesof interconnectedpowersystems.	
<b>CO5</b>	UseMi-Powerpackagetosolvepowerflowproblemfor simplepowersystems.	
<b>CO6</b>	Use Mi-Power package to study unsymmetrical faults at different locations inradialpowersystems	

<b>Year/ SEM :4<sup>th</sup>year/ 7<sup>th</sup>sem</b>	<b>Yearof Study:2022-23</b>
<b>CourseName:POWERSYSTEMSIMULATIONLABORATORY–18EEL76</b>	
<b>CO1</b>	Develop a program in MATLAB to assess the performance of medium and long transmission lines.
<b>CO2</b>	Develop a program in MATLAB to obtain the power angle characteristics of salient and non-salient pole alternator.
<b>CO3</b>	Develop a program in MATLAB to assess the transient stability under three phase fault at different locations in a radial power systems.
<b>CO4</b>	Develop programs in MATLAB to formulate bus admittance and bus impedance matrices of interconnected power systems.
<b>CO5</b>	Use Mi-Power package to solve power flow problem for simple power systems.
<b>CO6</b>	Use Mi-Power package to study unsymmetrical faults at different locations in radial power systems
<b>CO7</b>	Use of Mi-Power package to study optimal generation scheduling problems for thermal power plants.

<b>Year/SEM: 4<sup>th</sup>year/7<sup>th</sup>sem</b>	<b>Yearof Study:2022-23</b>
<b>CourseName:RELYANDHIGHVOLTAGE LABORATORY–18EEL77</b>	
<b>CO1</b>	Experimentally verify the characteristics of over current, over voltage, undervoltage and negative sequencer relays both electromagnetic and static type.
<b>CO2</b>	Experimentally verify the characteristics of microprocessor based over current, over voltage, under voltage relays and distance relay.
<b>CO3</b>	Show knowledge of protecting generator, motor and feeders.

<b>CO4</b>	Analyze the spark over characteristics for both uniform and non-uniform configurations using High AC and DC voltages
<b>CO5</b>	Measure high AC and DC voltages and breakdown strength of transformer oil.
<b>CO6</b>	<b>Draw electric field</b> and measure the capacitance of different electrode configuration models.
<b>CO7</b>	Show knowledge of generating standard lightning impulse voltage to determine efficiency, energy of impulse generator and 50% probability flashover voltage for air insulation.

<b>Year/SEM: 4<sup>th</sup> year/7<sup>th</sup> sem</b>	<b>Year of Study: 2022-23</b>
<b>Course Name: PROJECT PHASE – I AND SEMINAR – 18EEP78</b>	
<b>CO1</b>	Demonstrate sound technical knowledge of their selected project topic.
<b>CO2</b>	Undertake problem identification, formulation and solution.
<b>CO3</b>	Design engineering solutions to complex problems utilising a systems approach.
<b>CO4</b>	Communicate with engineers and the community at large in written and oral forms.
<b>CO5</b>	Demonstrate the knowledge, skills and attitudes of a professional engineer.

<b>Year/SEM: 4<sup>th</sup> year/8<sup>th</sup> sem</b>	<b>Year of Study: 2022-23</b>
<b>Course Name: POWER SYSTEM OPERATION AND CONTROL (Core Course) – 18EE81</b>	
<b>CO1</b>	Describe various levels of controls in power systems, the vulnerability of the system, components, architecture and configuration of SCADA.
<b>CO2</b>	Solve unit commitment problems

<b>CO3</b>	Explain issues of hydrothermal scheduling and solutions to hydrothermal problems
<b>CO4</b>	Explain basic generator control loops, functions of Automatic generation control, speed governors
<b>CO5</b>	Develop and analyze mathematical models of Automatic Load Frequency Control
<b>CO6</b>	Explain automatic generation control, voltage and reactive power control in an interconnected power system.
<b>CO7</b>	Explain reliability, security, contingency analysis, state estimation and related issues of power systems. ■

<b>Year/SEM: 4<sup>th</sup> year/8<sup>th</sup> sem</b>		<b>Year of Study: 2022-23</b>	
<b>Course Name: INDUSTRIAL DRIVES AND APPLICATIONS (Core Course) – 18EE82</b>			
<b>CO1</b>	Explain the advantages and choice of electric drive.		
<b>CO2</b>	Explain dynamics and different modes of operation of electric drives.		
<b>CO3</b>	Suggest a motor for a drive and control of dc motor using controlled rectifiers.		
<b>CO4</b>	Analyze the performance of induction motor drives under different conditions.		
<b>CO5</b>	Control induction motor, synchronous motor and stepper motor drives.		
<b>CO6</b>	Suggest a suitable electrical drive for specific application in the industry.		

<b>Year/ SEM : 4<sup>th</sup> year/ 8<sup>th</sup> sem</b>		<b>Year of Study: 2022-23</b>	
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<b>CourseName:OPERATIONANDMAINTENANCEOFSOLARELECTRICSYSTEMS (ProfessionalElective)–18EE832</b>	
<b>CO1</b>	Discussbasicsofsolarresource data, itsacquisitionandusage.
<b>CO2</b>	ExplainPVtechnology, buyingthePVmodulesand connectingthemodulestoformarrays.
<b>CO3</b>	Explain the use of inverters, other system components, cabling used to connect thecomponentsandmountingmethods ofthePVsystem.
<b>CO4</b>	Assessthesitefor PVsysteminstallation.
<b>CO5</b>	Designagridconnectedsystem andcomputeitssize.
<b>CO6</b>	Explaininstallation,commissioning,operation andmaintenanceofPVsystems.
<b>CO7</b>	Explainthetypes offinancialincentivesavailable, calculationofpaybacktime

<b>Year/ SEM :4<sup>th</sup>year/ 8<sup>th</sup>sem</b>	<b>Yearof Study:2022-23</b>
<b>CourseName:INTERNSHIP/PROFESSIONALPRACTICE –18EE84</b>	
<b>CO1</b>	Gain practicalexperiencewithinindustryinwhich theinternshipisdone.
<b>CO2</b>	Acquire knowledge ofthe industryinwhichtheinternshipisdone.
<b>CO3</b>	Applyknowledgeandskillslearnedtoclassroomwork.
<b>CO4</b>	Develop a greater understanding about career options while more clearly definingpersonalcareergoals
<b>CO5</b>	Experiencetheactivitiesand functionsofprofessionals.

<b>Year/ SEM :4<sup>th</sup>year/ 8<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:PROJECTWORKPHASE-II-18EEP85</b>		
<b>CO1</b>	Present the project and be able to defend it.	
<b>CO2</b>	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task.	
<b>CO3</b>	Habituated to critical thinking and use problem-solving skills	
<b>CO4</b>	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms.	
<b>CO5</b>	Work in a team to achieve a common goal.	
<b>CO6</b>	Learn on their own, reflect on their learning and take appropriate actions to improve it.	

<b>Year/SEM: 4<sup>th</sup>year/ 8<sup>th</sup>sem</b>		<b>YearofStudy: 2022-23</b>
<b>CourseName:SEMINAR18EES86</b>		
<b>CO1</b>	Attain, use and develop knowledge in the field of electrical and electronics engineering and other disciplines through independent learning and collaborative study.	
<b>CO2</b>	Identify, understand and discuss current, real-time issues	
<b>CO3</b>	Improve oral and written communication skills	
<b>CO4</b>	Explore an appreciation of the self in relation to its larger diverse social and academic contexts.	
<b>CO5</b>	Apply principles of ethics and respect in interaction with others.	

# Department of Information Science and Engineering

## 2.6.1 Program outcomes, program specific outcomes and course outcomes

### Program Outcomes:

#### PROGRAM SPECIFIC OUTCOMES (PSOs):

#### Engineering Graduates will be able to:

<b>PSO-1:</b>	Understand the principles of Information Science and Engineering and enrich knowledge in recent advancements and developments in Information Technology.
<b>PSO-2:</b>	Competent in programming and computing skills, ability to apply software development methodologies and modeling to solve real world problems in the field of Information Technology.

#### Course Outcomes:

Year / SEM: 2 <sup>nd</sup> year / 3 <sup>rd</sup> sem		Year of Study: 2022-23
<b>Course Name: -- TRANSFORM CALCULUS, FOURIER SERIES AND NUMERICAL TECHNIQUES-21MAT31</b>		
<b>CO1</b>	To have an insight into solving ordinary differential equations by using Laplace transform techniques	
<b>CO2</b>	Learn to use the Fourier series to represent periodical physical phenomena in engineering analysis.	
<b>CO3</b>	To enable the students to study Fourier Transforms and concepts of infinite Fourier Sine and Cosine transforms and to learn the method of solving difference equations by the z-transform method	
<b>CO4</b>	To develop the proficiency in solving ordinary and partial differential equations arising in engineering applications, using numerical methods	

Year / SEM: 2 <sup>nd</sup> year / 3 <sup>rd</sup> sem		Year of Study: 2022-23
<b>Course Name: -- DATA STRUCTURES AND APPLICATIONS-21CS32</b>		
<b>CO1</b>	Explain the fundamentals of data structures and their applications essential for implementing solutions to problems.	
<b>CO2</b>	Illustrate representation of data structures: Stack, Queues, Linked Lists, Trees and Graphs.	
<b>CO3</b>	Design and Develop Solutions to problems using Arrays, Structures, Stack, Queues, Linked Lists	
<b>CO4</b>	Explore usage of Trees and Graph for application development.	
<b>CO5</b>	Apply the Hashing techniques in mapping key value pairs.	

<b>Year / SEM:2<sup>nd</sup>year/ 3<sup>rd</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:ANALOG ANDDIGITALELECTRONICS– 21CS33</b>		
<b>CO1</b>	Explain the use of photo electronics devices, 555 timer IC, Regulator ICs and uA741	
<b>CO2</b>	Make use of simplifying techniques in the design of combinational circuits.	
<b>CO3</b>	Illustrate combinational and sequential digital circuits	
<b>CO4</b>	Demonstrate the use of flipflops and apply for registers	
<b>CO5</b>	Design and test counters, Analog-to-Digital and Digital-to-Analog conversion techniques.	

<b>Year /SEM: 2<sup>nd</sup>year /3<sup>rd</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:COMPUTERORGANIZATION–21CS34</b>		
<b>CO1</b>	Understand the organization and architecture of computer systems, their structure and operation	
<b>CO2</b>	Illustrate the concept of machine instructions and programs	
<b>CO3</b>	Demonstrate different ways of communicating with I/O devices	
<b>CO4</b>	Describe different types memory devices and their functions	
<b>CO5</b>	Explain arithmetic and logical operations with different data types	
<b>CO6</b>	Demonstrate processing unit with parallel processing and pipeline architecture	

<b>Year /SEM: 2<sup>nd</sup>year /3<sup>rd</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:OBJECT ORIENTED PROGRAMMING WITH JAVA LABORATORY –21CSL35</b>		
<b>CO1</b>	Demonstrate the use of Eclipse/Netbeans IDE to create Java Applications.	
<b>CO2</b>	Using java programming to develop programs for solving real-world problems.	
<b>CO3</b>	Reinforce the understanding of basic object-oriented programming concepts.	

<b>Year /SEM: 2<sup>nd</sup>year /3<sup>rd</sup>sem</b>		<b>Year ofStudy:2022-23</b>
<b>CourseName:MASTERING OFFICE –21CSL381</b>		



<b>CO1</b>	Understand the basics of computers and prepare documents and small presentations.
<b>CO2</b>	Attain the knowledge about spreadsheet/worksheet with various options.
<b>CO3</b>	Create simple presentations using templates various options available.
<b>CO4</b>	Demonstrate the ability to apply application software in an office environment.
<b>CO5</b>	Use MS Office to create projects, applications.
<b>Year / SEM:2<sup>nd</sup>year/4<sup>th</sup>sem</b>	
<b>Year ofStudy:2022-23</b>	
<b>CourseName:DESIGNANDANALYSISOFALGORITHMS–21CS42</b>	
<b>CO1</b>	Explain the methods of analysing the algorithms and to analyze performance of algorithms.
<b>CO2</b>	State algorithm's efficiencies using asymptotic notations.
<b>CO3</b>	Solve problems using algorithm design methods such as the brute force method, greedy method, divide and conquer, decrease and conquer, transform and conquer, dynamic programming, backtracking and branch and bound.
<b>CO4</b>	Choose the appropriate data structure and algorithm design method for a specified application.
<b>CO5</b>	Introduce P and NP classes.

<b>Year /SEM: 2<sup>nd</sup>year / 4<sup>th</sup>sem</b>	
<b>Year ofStudy:2022-23</b>	
<b>CourseName:OPERATING SYSTEMS– 21CS44</b>	
<b>CO1</b>	Demonstrate the need for OS and different types of OS
<b>CO2</b>	Apply suitable techniques for management of different resources
<b>CO3</b>	Use processor, memory, storage and file system commands
<b>CO4</b>	Realize the different concepts of OS in platform of usage through case studies

<b>Year/ SEM:2<sup>nd</sup>year/ 4<sup>th</sup>sem</b>	
<b>Yearof Study:2022-23</b>	
<b>CourseName:MICROCONTROLLERANDEMBEDDEDSYSTEMS– 21CS43</b>	
<b>CO1</b>	Understand the fundamentals of ARM-based systems, including programming modules with registers and the CPSR
<b>CO2</b>	Use the various instructions to program the ARM controller.
<b>CO3</b>	Program various embedded components using the embedded C program
<b>CO4</b>	Identify various components, their purpose, and their application to the embedded system's applicability.
<b>CO5</b>	Understand the embedded system's real-time operating system and its application in IoT

<b>CO6</b>	Demonstrate the need of real-time operating system for embedded system applications
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<b>Year /SEM: 2<sup>nd</sup> year / 4<sup>th</sup> sem</b>		<b>Year of Study:2022-23</b>
<b>CourseName:PYTHON PROGRAMMING LABORATORY-21CSL46</b>		
<b>CO1</b>	Demonstrate the use of IDLE or PyCharm IDE to create Python Applications	
<b>CO2</b>	Using Python programming language to develop programs for solving real-world problems	
<b>CO3</b>	Implement the Object-Oriented Programming concepts in Python.	
<b>CO4</b>	Appraise the need for working with various documents like Excel, PDF, Word and Others	
<b>CO5</b>	Demonstrate regular expression using python programming	

<b>Year /SEM: 2<sup>nd</sup> year / 4<sup>th</sup> sem</b>		<b>Year of Study:2022-23</b>
<b>CourseName:WEB PROGRAMMING-21CSL481</b>		
<b>CO1</b>	Learn Web tool box and history of web browsers.	
<b>CO2</b>	Learn HTML, XHTML tags with utilizations.	
<b>CO3</b>	Know CSS with dynamic document utilizations.	
<b>CO4</b>	Learn JavaScript with Element access in JavaScript.	
<b>CO5</b>	. Logically plan and develop web pages..	

<b>Year/ SEM:2<sup>nd</sup>year/ 4<sup>th</sup>sem</b>		<b>Year of Study:2022-23</b>
<b>CourseName:DESIGNANDANALYSISOFALGORITHM LABORATORY-21CSL42</b>		
<b>CO1</b>	Analyze the performance of the algorithms, state the efficiency using asymptotic notations and analyze mathematically the complexity of the algorithm.	
<b>CO2</b>	Apply divide and conquer approaches and decrease and conquer approaches in solving the problems analyze the same	
<b>CO3</b>	Apply the appropriate algorithmic design technique like greedy method, transform and conquer approaches and compare the efficiency of algorithms to solve the given problem.	
<b>CO4</b>	Apply and analyze dynamic programming approaches to solve some problems. and improve an algorithm time efficiency by sacrificing space.	
<b>CO5</b>	Apply and analyze backtracking, branch and bound methods and to describe P, NP and NPComplete problems.	

<b>Year / SEM:2<sup>nd</sup>year / 4<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:MICROCONTROLLERANDEMBEDDEDSYSTEMSLABORATORY–21CSL48</b>		
<b>CO1</b>	Explain C-Compilers and optimization	
<b>CO2</b>	Describe the ARM microcontroller's architectural features and program module	
<b>CO3</b>	Apply the knowledge gained from programming on ARM to different applications.	
<b>CO4</b>	Program the basic hardware components and their application selection method.	
<b>CO5</b>	Demonstrate the need for a real-time operating system for embedded system applications	

<b>Year/SEM : 3<sup>rd</sup>year/5<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:MANAGEMENTANDENTREPRENEURSHIPFORITINDUSTRY–18CS51</b>		
<b>CO1</b>	Definemanagement,organization,entrepreneur,planning,staffing,ERPandoutl inetheirimportancein entrepreneurship	
<b>CO2</b>	Utilizetheresourcesavailableeffectively through ERP	
<b>CO3</b>	MakeuseofIPRs andinstitutionalsupportinentrepreneurship	

<b>Year/SEM : 3<sup>rd</sup>year/5<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:COMPUTERNETWORKS–18CS52</b>		
<b>CO1</b>	Explainprinciplesofapplication layerprotocols	
<b>CO2</b>	Outlinetransport layerservices andinferUDPandTCPprotocols	
<b>CO3</b>	Classifyrouters, IP and RoutingAlgorithmsinnetworklayer	

<b>CO4</b>	UnderstandtheWireless andMobileNetworks coveringIEEE802.11Standard
<b>CO5</b>	DescribeMultimediaNetworkingandNetworkManagement

<b>Year/ SEM:3<sup>rd</sup>year/ 5<sup>th</sup>sem</b>	<b>Yearof Study:2022-23</b>
<b>CourseName:DATABASEMANAGEMENTSYSTEM–18CS53</b>	
<b>CO1</b>	Summarizetheconceptsofdatabaseobjects;enforceintegrityconstraintsonadatabase using RDBMS.
<b>CO2</b>	UseStructuredQuery Language (SQL)fordatabasemanipulation.
<b>CO3</b>	Designandbuildsimplifiedatabasesystems
<b>CO4</b>	Developapplicationtointeractwithdatabases.

Year/SEM : 3 <sup>rd</sup> year/5 <sup>th</sup> sem		Year of Study:2022-23
<b>CourseName:AUTOMATATHEORYANDCOMPUTABILITY–18CS54</b>		
CO1	Tellthecoreconceptsinautomatatheoryand TheoryofComputation	
CO2	Explainhowtotranslatebetweendifferent modelsofComputation(e.g.,DeterministicandNon-deterministicandSoftwaremodels).	
CO3	InterpretGrammarsandAutomata(recognizers)fordifferentlanguage classes and become knowledgeable about restricted models of Computation(Regular,Context Free) and theirrelativepowers.	
CO4	Develop skillsinformalreasoningandreduction ofaproblemtoaformalmodel,with anemphasis onsemanticprecisionand conciseness	
CO5	Classifya problemwithrespecttodifferentmodelsofComputation.	

Year/SEM : 3 <sup>rd</sup> year/5 <sup>th</sup> sem		Year of Study:2022-23
<b>CourseName:ADVANCEDJAVAANDJ2EE–18CS553</b>		
CO1	Interprettheneedforadvanced Javaconceptslikeenumerationsandcollectionsindevelopingmodularand efficient programs	
CO2	Buildclient-serverapplicationsandTCP/IPsocketprograms	
CO3	Illustratedatabaseaccess anddetailsformanaging informationusingtheJDBC-API	
CO4	Describehowservlets fitintoJava-based webapplicationarchitecture	
CO5	DevelopreusablesoftwarecomponentsusingJavaBeans	

Year/ SEM:3 <sup>rd</sup> year/ 5 <sup>th</sup> sem		Year of Study:2022-23
<b>CourseName:ARTIFICIALINTELLIGENCE–18CS562</b>		
CO1	IdentifytheAIbasedproblems.	
CO2	ApplytechartosolveAI problems	
CO3	Definelearning and explainvariouslearning techniques	
CO4	Discussexpertsystems	

<b>Year/SEM : 3<sup>rd</sup>year/5<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:COMPUTERNETWORKLABORATORY–18CSL57</b>		
<b>CO1</b>	AnalyzeandComparevariousnetworkingprotocols.	
<b>CO2</b>	Demonstratetheworkingofdifferentconcepts ofnetworking.	
<b>CO3</b>	Implement,analyzeandevaluatetenetworkingprotocolsinNS2/NS3	

<b>Year/ SEM:3<sup>rd</sup>year/ 5<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:DBMSLABORATORYWITHMINIPROJECT–18CSL58</b>		
<b>CO1</b>	UseStructuredQueryLanguage (SQL)fordatabaseCreationand manipulation	
<b>CO2</b>	Demonstratetheworkingofdifferentconcepts ofDBMS	
<b>CO3</b>	Implementandtesttheproject developedforanapplication.	

<b>Year/SEM : 3<sup>rd</sup>year/6<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>Course Name: CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW – 18CS61</b>		
<b>CO1</b>	Discusscryptography anditsneedtovarious applications	
<b>CO2</b>	Designanddevelop simplecryptography algorithms	
<b>CO3</b>	Understandcybersecurityand needcyberLaw	

<b>Year/SEM : 3<sup>rd</sup>year/6<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:COMPUTERGRAPHICS ANDVISUALIZATION–18CS62</b>		
<b>CO1</b>	Designandimplementalgorithmsfor2Dgraphics primitivesandattributes.	
<b>CO2</b>	IllustrateGeometrictransformationsonboth2D and3Dobjects.	
<b>CO3</b>	Understand theconceptsofclippingandvisiblesurface detectionin2Dand3Dviewing,and Illumination Models.	
<b>CO4</b>	Discussaboutsuitablehardwareandsoftwarefordeveloping graphicspackagesusingOpenGL.	

Year/ SEM:3 <sup>rd</sup> year/ 6 <sup>th</sup> sem		Year of Study:2022-23
<b>CourseName:SYSTEMSOFTWAREANDCOMPILERDESIGN-18CS63</b>		
CO1	Illustrate software such as assemblers, loaders, linkers and system macroprocessors	
CO2	Designanddevelop lexicalanalyzers, parsersandcodegenerators	
CO3	Discussaboutlexandyac toolsforimplementingdifferent concepts of system software	

Year/ SEM:3 <sup>rd</sup> year/ 6 <sup>th</sup> sem		Year of Study:2022-23
<b>CourseName:OPERATING SYSTEMS–18CS64</b>		
CO1	Demonstrateneedfor OSanddifferenttypes ofOS	
CO2	Discussuitabletechniquesformanagementofdifferentresources	
CO3	Illustrateprocessor,memory,storageand filesystem commands	
CO4	ExplainthedifferentconceptsofOSinplatformofusage throughcasestudies	

Year/ SEM:3 <sup>rd</sup> year/ 6 <sup>th</sup> sem		Year of Study:2022-23
<b>CourseName:OPERATIONRESEARCH–18CS653</b>		
CO1	Explainoptimizationtechniques forvarious problems.	
CO2	Understandthegivenproblemastransportationandassignmentproblemandsolve .	
CO3	Illustrategametheory fordecisionsupportsystem.	

Year/SEM : 3 <sup>rd</sup> year/6 <sup>th</sup> sem		Year of Study:2022-23
<b>CourseName:PYTHONAPPLICATIONPROGRAMMING–18CS664</b>		
CO1	Understand Python syntax and semantics and be fluent in the use of Python flowcontrolandfunctions.	
CO2	Demonstrateproficiency inhandlingStringsandFileSystems.	
CO3	ImplementPythonProgramsusingcoredatastructureslikeLists,Dictionariesanduse RegularExpressions.	
CO4	InterprettheconceptsofObject-Oriented ProgrammingasusedinPython.	

<b>CO5</b>	Implement exemplary applications related to Network Programming, WebServices and Databases in Python
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<b>Year/ SEM:3<sup>rd</sup>year/ 6<sup>th</sup>sem</b>	<b>Year of Study:2022-23</b>
<b>Course Name: SYSTEM SOFTWARE AND OPERATING SYSTEM LABORATORY – 18CSL67</b>	
<b>CO1</b>	Implement and demonstrate Lexer's and Parser's
<b>CO2</b>	Implement differential algorithms required for management, scheduling, allocation and communication used in operating system..

<b>Year/SEM : 3<sup>rd</sup>year/6<sup>th</sup>sem</b>	<b>Year of Study:2022-23</b>
<b>CourseName:COMPUTERGRAPHICSLABORATORYWITHMINIPROJECT– 18CSL68</b>	
<b>CO1</b>	Apply the concepts of computer graphics
<b>CO2</b>	Implement computer graphics applications using OpenGL
<b>CO3</b>	Implement real world problems using OpenGL

<b>Year/ SEM:4<sup>th</sup>year / 7<sup>th</sup>sem</b>	<b>Year of Study:2022-23</b>
<b>CourseName:WEBTECHNOLOGYANDITSAPPLICATIONS–18CS71</b>	
<b>CO1</b>	Adapt HTML and CSS syntax and semantic to build web pages.
<b>CO2</b>	Construct and visually format tables and forms using HTML and CSS
<b>CO3</b>	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
<b>CO4</b>	Appraise the principles of object oriented development using PHP
<b>CO5</b>	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features



Year/ SEM:4 <sup>th</sup> year / 7 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:ADVANCEDCOMPUTERARCHITECTURES–18CS72</b>		
CO1	Explaintheconceptsofparallelcomputingandhardware technologies	
CO2	Compareand contrasttheparallelarchitectures	
CO3	Illustrateparallelprogrammingconcepts	

Year/SEM:4 <sup>th</sup> year/7 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:MACHINELEARNING–18CS73</b>		
CO1	Identifytheproblems formachinelearning. Andselecttheithersupervised,unsupervisedorreinforcement learning.	
CO2	Explaintheoryofprobabilityand statisticsrelated tomachinelearning	
CO3	Investigateconceptlearning,ANN,Bayes classifier,knearestneighbor,Q,	

Year/ SEM:4 <sup>th</sup> year / 7 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:UNIXSYSTEMPROGRAMMING–18CS744</b>		
CO1	AbilitytounderstandandreasonouttheworkingofUnixSystems	
CO2	Buildanapplication/serviceoveraUnixsystem.	

Year/ SEM:4 <sup>th</sup> year / 7 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:STORAGEAREANETWORKS–18CS754</b>		
CO1	Identifykeychallenges inmanaging informationandanalyzedifferentstoragenetworkingtechnologiesand virtualization	
CO2	Explaincomponentsandthe implementationofNAS	
CO3	DescribeCASarchitecture and types ofarchivesand formsofvirtualization	
CO4	Illustratethestorageinfrastructureandmanagementactivities	

Year/ SEM:4 <sup>th</sup> year / 7 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:MACHINELEARNINGLABORATORY–18CSL76</b>		
CO1	Understand the implementation procedures for the machine learning algorithms.	
CO2	Design Java/Python programs for various Learning algorithms.	
CO3	Apply appropriate datasets to the Machine Learning algorithms.	
CO4	Identify and apply Machine Learning algorithms to solve real world problems.	

Year/SEM:4 <sup>th</sup> year/7 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:WEBTECHNOLOGYLABORATORYWITHMINIPROJECT–18CSL77</b>		
CO1	Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.	
CO2	Have a good understanding of Web Application Terminologies, Internet Tools other web services.	
CO3	Learn how to link and publish websites	

Year/SEM:4 <sup>th</sup> year/8 <sup>th</sup> sem		Yearof Study:2022-23
<b>CourseName:IOTTECHNOLOGY–18SCS81</b>		
CO1	Interpret the impact and challenges posed by IoT networks leading to new architectural models	
CO2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.	
CO3	Appraise the role of IoT protocols for efficient network communication	
CO4	Elaborate the need for Data Analytics and Security in IoT.	
CO5	Illustrate different sensor technologies for sensing real world identities and identify the applications of IoT in Industry.	

<b>Year/ SEM:4<sup>th</sup>year / 8<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:BIGDATAANALYTICS–18CS82</b>		
<b>CO1</b>	MastertheconceptsofHDFSand MapReduceframework	
<b>CO2</b>	InvestigateHadoop related toolsforBigDataAnalyticsandperformbasicHadoopAdministration	
<b>CO3</b>	Recognize the role of Business Intelligence, Data warehousing and Visualizationindecisionmaking	
<b>CO4</b>	Infertheimportanceofcoredataminingtechniques fordata analytics	
<b>CO5</b>	Compareand contrastdifferentTextMiningTechniques	

<b>Year/SEM:4<sup>th</sup>year/8<sup>th</sup>sem</b>		<b>Yearof Study:2022-23</b>
<b>CourseName:MODERNINTERFACEDESIGN–18CS832</b>		
<b>CO1</b>	Designtheuserinterface, design,menucreationand windowscreationandconnectionbetween menuand windows	

## Department of Master of Business Administration

### 2.6.1 Program outcomes, program specific outcomes and course outcomes



#### Program Outcomes:

- PO1:** Students are given sufficient theoretical knowledge and are enabled to apply them to solve practical problems in business and other organizations/institutions of importance
- PO2:** Students are provided effective communication skills with a high degree of lateral and critical thinking that enhances learn ability, developed for being continuously employable. Students are instilled with leadership qualities, ethically sound, enabled with decision making skills that reflect a high degree of social consciousness
- PO3:** Students are trained for sustained research orientation to comprehend a growingly complex, economic, legal and ethical environment
- PO4:** Students are equipped with self-sustaining entrepreneurship qualities that encourage calculated risk-taking.

**Course outcomes(COs) :**

<b>Year/SEM:1<sup>st</sup>year/1<sup>st</sup>sem</b>		<b>Year of Study:2022-23</b>
<b>Course Name:MANAGEMENT&amp;ORGANIZATIONALBEHAVIOUR– 22MBA11</b>		
<b>CO1</b>	GainpracticalexperienceinthefieldofManagementandOrganizationBehaviour	
<b>CO2</b>	AcquiretheconceptualknowledgeofManagement,variousfunctionsofManagementandtheoriesinOrganizationalBehaviour.	
<b>CO3</b>	Applymanagerialandbehaviourknowledgeinrealworldsituations.	
<b>CO4</b>	DevelopagreaterunderstandingaboutManagementandBehaviouralaspectstoanalysetheconceptsrelatedtoindividualbehavior,attitude,perceptionand personality.	
<b>CO5</b>	Understandanddemonstratetheirexposureonrecenttrends inmanagement.	

<b>Year/SEM:1<sup>st</sup>year/1<sup>st</sup>sem</b>		<b>Year of Study 2022-23</b>
<b>CourseName:MANAGERIALECONOMICS-22MBA12</b>		
<b>CO1</b>	ThestudentwillunderstandtheapplicationofEconomicPrinciples inManagementdecisionmaking.	
<b>CO2</b>	ThestudentwilllearnthemicroeconomicconceptsandapplythemforeffectivefunctioningofaFirmandIndustry.	
<b>CO3</b>	TheStudentwillbeabletounderstand,assessandforecastDemand.	
<b>CO4</b>	Thestudentwillapplytheconceptsofproductionand costforoptimizationofproduction.	
<b>CO5</b>	ThestudentwilldesignCompetitivestrategieslike pricing,productdifferentiationetc.andmarketingaccordingtothemarketstructure.	
<b>CO6</b>	Thestudentwillbeabletounderstandmacroeconomicconcepts.	

Year/SEM:1 <sup>st</sup> year/1 <sup>st</sup> sem		Yearof Study: 2022-23
<b>CourseName:ACCOUNTING FORMANAGERS-22MBA13</b>		
<b>CO1</b>	Demonstratetheoreticalknowledgeanditsapplicationinrealtimeaccounting.	
<b>CO2</b>	Capableofpreparingfinancialstatementofcompanies.	
<b>CO3</b>	Independentlyundertakefinancialstatementanalysisandtakedecisions.	
<b>CO4</b>	ComprehendemergingtrendsinaccountingandcomputerizationofAccountingsystems.	

Year/SEM:1 <sup>st</sup> year/1 <sup>st</sup> sem		Yearof Study: 2022-23
<b>CourseName:BUSINESSSTATISTICS22MBA14</b>		
<b>CO1</b>	Facilitateobjectivesolutionsinbusinessdecisionmakingundersubjectiveconditions.	
<b>CO2</b>	Demonstratedifferent statisticaltechniquesinbusiness/real-lifesituations.	
<b>CO3</b>	Understandtheimportanceofprobabilityindecisionmaking.	
<b>CO4</b>	Understandtheneedandapplicationofanalytics.	
<b>CO5</b>	Understandandapplyvariousdataanalysisfunctionsforbusinessproblems.	

Year/SEM:1 <sup>st</sup> year/1 <sup>st</sup> sem		Yearof Study: 2022-23
<b>CourseName:MARKETINGMANAGEMENT– 22MBA15</b>		
<b>CO1</b>	Developanabilitytoassesstheimpactoftheenvironmentonmarketingfunction.	
<b>CO2</b>	Toformulatemarketingstrategiesthatincorporatepsychologicalandsociologicalfactorswhic hinfluencebuying.	
<b>CO3</b>	UnderstandconceptofBranding, developmentofproductandsignificanceofmarket segmentation,targetingandpositioning.	
<b>CO4</b>	Identifying marketingchannelsandtheconceptofproductdistribution.	
<b>CO5</b>	Identifyingtechniquesofsalespromotion, significanceofmarketingresearch.	
<b>CO6</b>	Synthesize ideasintoaviable marketingplanforvariousmodesofmarketing	

Year/SEM:1 <sup>st</sup> year/1 <sup>st</sup> sem		Yearof Study: 2022-23
<b>CourseName:MANAGERIALCOMMUNICATION -22MBA16</b>		
<b>CO1</b>	Thestudentswillbeawareoftheir communicationskillsand knowtheir potentialtobecome successfulmanagers.	
<b>CO2</b>	Thestudentswillgetenabled withthemechanicsofwritingandcancomposethebusinessletters inEnglishpreciselyandeffectively.	
<b>CO3</b>	Studentswillgetexposureindraftingbusinessproposalstomeetthechallengesofcompetitive environment.	
<b>CO4</b>	Thestudentswillbeintroducedtothemanagerialcommunicationpractices inbusinessthose areinvogue.	
<b>CO5</b>	Students will get trained in the art of Interpersonal communication and technologicaladvancementandsocialmediausage incommunications,withemphasisonanalysingbusinesssituations.	

Year/SEM:1 <sup>st</sup> Year/2 <sup>nd</sup> sem		Yearof Study: 2022-23
<b>CourseName:HUMANRESOURCEMANAGEMENT-22MBA21</b>		
<b>CO1</b>	Gainpracticalexperienceinthefield ofHumanResourceConcepts,functionsandtheories.	
<b>CO2</b>	AcquiretheconceptualinsightofHumanResourceandvariousfunctionsofHR.	
<b>CO3</b>	Applypersonnel,managerialandwelfareaspectsofHR.	
<b>CO4</b>	DevelopgreaterunderstandingaboutHRpractices, analysethetrendsinthefieldofHR.	

Year/SEM:1 <sup>st</sup> Year/2 <sup>nd</sup> sem		Yearof Study: 2022-23
CourseName:FINANCIALMANAGEMENT-22MBA22		
CO1	Understandthebasicfinancialconcepts	
CO2	Applytimevalueofmoney	
CO3	Evaluatethe investment decisions	
CO4	Estimateworkingcapitalrequirements	
CO5	Analyzeethecapitalstructureanddividenddecisions	

Year/SEM:1 <sup>st</sup> Year/2 <sup>nd</sup> sem		Yearof Study: 2022-23
CourseName:RESEARCHMETHODOLOGY -22MBA23		
CO1	Understandvariousresearchapproaches,techniquesandstrategiesintheappropriateinbusiness.	
CO2	Applya rangeofquantitative/qualitativeresearchtechniquestobusinessanddaytodaymanagementproblems.	
CO3	Demonstrateknowledgeandunderstandingofdataanalysis,interpretationandreportwriting.	
CO4	Developnecessarycriticalthinkingskills inordertoevaluate differentresearchapproachesinBusinessusingexcelinparticular	



Year/SEM:1 <sup>st</sup> Year/2 <sup>nd</sup> sem		Yearof Study: 2022-23
CourseName:OPERATIONSRESEARCH-22MBA24		
CO1	Getaninsightintothefundamentals ofOperationsResearchanditsdefinition,characteristicsandphases	
CO2	Useappropriatequantitativetechniquestogetfeasibleandoptimalsolutions	
CO3	Understandtheusageofgametheory,QueuingTheoryandSimulationfor SolvingBusiness Problems	
CO4	Understandandapplythenetworkdiagramfor projectcompletion	

Year/SEM:1 <sup>st</sup> Year/2 <sup>nd</sup> sem		Yearof Study: 2022-23
CourseName:-STRATEGICMANAGEMENT-22MBA25		
CO1	StudentshouldgetclearideaabouttheconceptofStrategicManagement,itsrelevance,Characteristics,process natureandpurpose.	
CO2	Studenttoacquireanunderstandingofhowfirmssuccessfullyinstitutionalizeastrategyand create an organizational structure for domestic and overseas operations and gaincompetitive advantage.	
CO3	Togivesthestudentsan insightonstrategyatdifferentlevelsofanorganizationto gaincompetitive advantage.	
CO4	Tohelpstudentsunderstandthestrategicdriveinmultinationalfirmsandtheirdecisionsindifferentmarkets.	
CO5	Toenablethestudentsto gainknowledgeofstrategyimplementationand thecontrolmeasuresforeffective decision-making.	

Year/SEM:1 <sup>st</sup> Year/2 <sup>nd</sup> sem		Yearof Study: 2022-23
CourseName:-ENTREPRENEURSHIPANDLEGALASPECTS-22MBA26		
CO1	Displaykeeninterestandorientationtowardsentrepreneurship, entrepreneurial opportunityModules' inordertosetupabusinessandtothinkcreatively.	

<b>CO2</b>	To know about the various business models and B-Plans across Business sectors.
<b>CO3</b>	Able to understand the importance of marketing and different forms of businesses.
<b>CO4</b>	Become aware about various sources of funding and institutions supporting entrepreneurs.
<b>CO5</b>	Awareness about legal aspects and ways to protect the ideas.
<b>CO6</b>	To understand the ways of starting a company and to know how to protect their ideas.

<b>Year/SEM: 2<sup>nd</sup> Year/3<sup>rd</sup> sem</b>	<b>Year of Study: 2022-23</b>
<b>Course Name: EMERGING EXPONENTIAL TECHNOLOGIES-20MBA301</b>	
<b>CO1</b>	Identify different emerging technologies
<b>CO2</b>	Select appropriate technology and tools for a given task
<b>CO3</b>	Identify necessary inputs for application of emerging technologies
<b>CO4</b>	Understand the latest developments in the area of technology to support business

<b>Year/SEM: 2<sup>nd</sup> Year/3<sup>rd</sup> sem</b>	<b>Year of Study: 2022-23</b>
<b>Course Name: Technology &amp; Operational Strategy-20MBA302</b>	
<b>CO1</b>	Acquire the knowledge about the concepts of production and operation management
<b>CO2</b>	Demonstrate the basic concepts of process mapping
<b>CO3</b>	Evaluate the importance of Lean Manufacturing
<b>CO4</b>	Develop strategies of Total quality management
<b>CO5</b>	Understand the roles of ISO standards and production system

Year/SEM:2 <sup>nd</sup> Year/3 <sup>rd</sup> sem		Yearof Study: 2022-23
CourseName:-SERVICESMARKETING -20MBA303		
CO1	DevelopanunderstandingaboutthevariousconceptsandimportanceofServicesMarketing.	
CO2	Enhanceknowledgeaboutemergingissuesandtrendsinthefutureservicesector.	
CO3	Learntoimplementservicestrategiestomeetnewchallenges.	

Year/SEM:2 <sup>nd</sup> Year/3 <sup>rd</sup> sem		Yearof Study: 2022-23
CourseName:MARKETINGRESEARCH&ANALYTIC-20MBA304		
CO1	ComprehendtheobjectivesofMarketresearch&itsapplicationinsolvingmarketingproblems.	
CO2	Appreciatetheuseofdifferentdatacollectionmethods, samplingdesigntechniques,measurementmethods toanalyze thedata.	
CO3	Generalizeandinterpretthedatawiththehelpofvarious measurementtechniques.	
CO4	Tounderstandtheemergenceofnewtrendsinresearch.	

Year/SEM:2 <sup>nd</sup> Year/3 <sup>rd</sup> sem		Yearof Study: 2022-23
CourseName:-CONSUMERBEHAVIOUR -20MBA305		
CO1	Explainthebackgroundandconcepts vitalforunderstandingConsumerBehaviour.	
CO2	IdentifytheroleofvariablesthatdeterminesConsumerBehaviourinSocial&culturaldomain.	
CO3	Identifyingthepsychologicalandbehaviouralpracticesadoptedbyorganizationstoenhance theConsumerBehaviour.	

Year/SEM:2 <sup>nd</sup> Year/3 <sup>rd</sup> sem	Yearof Study: 2022-23
<b>CourseName:-RETAILMANAGEMENT-20MBA306</b>	
<b>CO1</b>	Careerdevelopmentinthe fieldofsales
<b>CO2</b>	Managementofsales
<b>CO3</b>	Findoutthecontemporaryretailmanagement, issues, andstrategies.
<b>CO4</b>	Evaluatetherecenttrendsinretailingandits impactinthesuccessofmodernbusiness.
<b>CO5</b>	Relatestoremanagementandvisualmerchandisingpracticesforeffectiveretailing.

Year/SEM:2 <sup>nd</sup> Year/3 <sup>rd</sup> sem	Yearof Study: 2022-23
<b>CourseName: -INVESTMENTMANAGEMENT-20MBAFM303</b>	
<b>CO1</b>	ThestudentwillunderstandthecapitalmarketandvariousInstrumentsforInvestment.
<b>CO2</b>	The learnerwillbeabletoassesstheriskandreturnassociatedwithinvestmentsandmethodstovaluescurities.
<b>CO3</b>	ThestudentwillbeabletoanalysetheEconomy,IndustryandCompanyframeworkforInvestmentManagement.
<b>CO4</b>	ThestudentwilllearnthetheoriesofPortfoliomanagementandalsothetoolsandtechniquesforefficientportfoliomanagement.

Year/SEM:2 <sup>nd</sup> Year/3 <sup>rd</sup> sem	Yearof Study: 2022-23
<b>CourseName:-DIRECTTAXATION-20MBAFM304</b>	
<b>CO1</b>	Understandthebasicsoftaxationand processofcomputingresidentialstatus.
<b>CO2</b>	Calculatetaxableincomeunderdifferentheads.
<b>CO3</b>	Understanddeductionsand calculationoftaxliabilityofIndividuals.
<b>CO4</b>	Knowthecorporatetaxsystem.

Year/SEM:2 <sup>nd</sup> Year/3 <sup>rd</sup> sem		Yearof Study: 2022-23
<b>CourseName:-BANKING&amp;FINANCIALSERVICES-20MBAFM305</b>		
<b>CO1</b>	TheStudentwillbeacquaintedtovariousBankingandNon-BankingfinancialservicesinIndia.	
<b>CO2</b>	TheStudentwillunderstandtheactivitiesofMerchantBankingandcreditrating.	
<b>CO3</b>	TheStudentwillbeequippedtounderstandmicro financingandotherfinancialservicesinIndia.	
<b>CO4</b>	TheStudentwillunderstandhowtoevaluateandcompareleasing&hirepurchase.	

Year/SEM:2 <sup>nd</sup> Year/3 <sup>rd</sup> sem		Yearof Study:2022-23
<b>CourseName:ADVANCEDFINANCIALMANAGEMENT-20MBAFM306</b>		
<b>CO1</b>	Getanoverview ofcapitalstructuretheories.	
<b>CO2</b>	Understandandassessthe dividendpolicyofthefirm.	
<b>CO3</b>	Realizetheimportanceofmanagementofworkingcapitalinanorganization.	
<b>CO4</b>	Beawareofthetechniquesofcash,inventoryandreceivablesmanagement	

Year/SEM:2 <sup>nd</sup> Year/3 <sup>rd</sup> sem		Yearof Study: 2022-23
<b>CourseName:-RECRUITMENTANDSELECTION-20MBAHR303</b>		
<b>CO1</b>	Gainthepracticalinsightofvariousprinciplesandpracticesofrecruitmentandselection.	
<b>CO2</b>	Acquireknowledgeoflatestconceptualframeworkusedinrecruitmentandselectionprocessandprocedureappliedinvariousindustries.	
<b>CO3</b>	Illustratetheapplicationofrecruitmentandselectiontoolsandtechniquesinvarioussectors.	
<b>CO4</b>	Developagreaterunderstandingaboutstrategiesforworkforceplanningandassessment,analysethehiringmanagementsystemfollowedin variousindustries.	

Year/SEM:2 <sup>nd</sup> Year/3 <sup>rd</sup> sem		Yearof Study: 2022-23
<b>CourseName: HUMANRESOURCEANALYTICS-20MBAHR304</b>		
<b>CO1</b>	GainpracticalinsightofHRProcesses,HRanalyticsandpredictivemodellingusedinHRfunctions.	
<b>CO2</b>	AcquireconceptualknowledgeofHRAframeworks,modelsandapproaches.	
<b>CO3</b>	IllustratetheapplicationofdataficationofHR,predictiveanalyticstoolsandtechniques.	
<b>CO4</b>	Analysetheemployeedataset,consideringthevariousconceptsandfunctionsofHR,facilitatingthe decisionmakinginbusinesscontext.	

Year/SEM:2 <sup>nd</sup> Year/3 <sup>rd</sup> sem		Yearof Study: 2022-23
<b>CourseName:INDUSTRIALRELATIONS ANDLABOURLAWS-20MBAHR305</b>		
<b>CO1</b>	Gainpracticalexperiercerelatedtolabour legislationsinIndiaacrossvarioussectors.	
<b>CO2</b>	AcquireconceptualknowledgeofIndustrialrelationsandlabourlaws followedwithinindustries.	
<b>CO3</b>	Developthegreater understandingofIRconceptsanditsapplicationinsolvingvariousissuesinIR.	
<b>CO4</b>	ApplytheIRandlabour lawsconcepts invarious industriesinIndia.	

Year/SEM:2 <sup>nd</sup> Year/3 <sup>rd</sup> sem		Yearof Study: 2022-23
<b>CourseName:COMPENSATION MANAGEMENTANDREWARDSYSTEM-20MBAHR306</b>		
<b>CO1</b>	Gain insightsofvariousconceptualaspectsofCompensationandBenefitstoachieveorganizationalgoals.	
<b>CO2</b>	Determinetheperformancebasedcompensationsystemforbusinessexcellenceandsolve various cases.	
<b>CO3</b>	Designingthecompensationstrategiesforattraction,motivationandretaininghighqualityworkforce.	

<b>CO4</b>	Understand the Legal & Administrative Issues in global compensation to prepare compensation plan, CTC, wages survey and calculate various bonus.
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<b>Year/SEM: 2<sup>nd</sup> Year/4<sup>th</sup> sem</b>	<b>Year of Study: 2022-23</b>
<b>Course Name: B2B MARKETING MANAGEMENT-20MBAMM401</b>	
<b>CO1</b>	Understands significance of B2B marketing.
<b>CO2</b>	Ability to create an integrated marketing communications plan which includes promotional strategies.
<b>CO3</b>	Effectively use marketing communication for customer acquisition
<b>CO4</b>	Define and apply knowledge of various aspects of managerial decision making related to marketing communications strategy and tactics.

<b>Year/SEM: 2<sup>nd</sup> Year/4<sup>th</sup> sem</b>	<b>Year of Study: 2022-23</b>
<b>Course Name: LOGISTICS AND SUPPLY CHAIN MANAGEMENT-20MBAMM402</b>	
<b>CO1</b>	Demonstrate knowledge of the functions of logistics and supply chain management.
<b>CO2</b>	To relate concepts and activities of the supply chain to actual organizations.
<b>CO3</b>	Highlight the role of technology in logistics and supply chain management.
<b>CO4</b>	Evaluate cases for effective supply chain management and its implementation.

<b>Year/SEM: 2<sup>nd</sup> Year/4<sup>th</sup> sem</b>	<b>Year of Study: 2022-23</b>
<b>Course Name: DIGITAL MARKETING MANAGEMENT-20MBAMM403</b>	
<b>CO1</b>	Recognize appropriate e-marketing objectives.
<b>CO2</b>	Appreciate the e-commerce framework and technology.
<b>CO3</b>	Illustrate the use of search engine marketing, online advertising and marketing strategies.
<b>CO4</b>	Develop social media strategy to solve business problems.

Year/SEM:2 <sup>nd</sup> Year/4 <sup>th</sup> sem		Year of Study: 2022-23
<b>CourseName: -STRATEGICBRANDMANAGEMENT-20MBAMM404</b>		
<b>CO1</b>	Comprehend&correlateallthemanagementfunctionswhicharehappeningaroundwithfundamentalconcepts andprinciples ofmanagement.	
<b>CO2</b>	Understandtheoverviewofmanagement,theoryofmanagementandpracticalapplicationsofthesame.	
<b>CO3</b>	Effectivelyusetheirskillsforself-grooming,workinggroupsandtoachieveorganizationalgoals .	
<b>CO4</b>	Demonstratetheiracumeninapplyingmanagerialandbehavioralconceptinrealworld/situation.	
<b>CO5</b>	Understandanddemonstratetheirexposureonrecenttrendsinmanagement	

Year/SEM:2 <sup>nd</sup> Year/4 <sup>th</sup> sem		Year of Study: 2022-23
<b>CourseName:AGRIBUSINESSMARKETING-20MBAMM405</b>		
<b>CO1</b>	HighlightthecharacteristicsofIndianruralmarketsanddescribethedifferencesbetweenruralandtheurbaneconomy.	
<b>CO2</b>	Analyze the roadblocks of Indian rural market and advocate solutions for the problems ofruralmarkets.	
<b>CO3</b>	EmphasizethedifferentstrategiesadoptedbyIndiancompaniesfor ruralmarkets.	
<b>CO4</b>	Applythestrategiestobeadoptedfor influencingtheruralconsumers	

Year/SEM:2 <sup>nd</sup> Year/4 <sup>th</sup> sem		Year of Study: 2022-23
<b>CourseName:INTERNATIONALMARKETINGMANAGEMENT-20MBAMM406</b>		
<b>CO1</b>	Understandthedifferencesbetweendomesticmarketingand internationalmarketing.	
<b>CO2</b>	Understandtheconceptofinternationalpricinganddistributiondecision.	
<b>CO3</b>	Acquiretheknowledgeofimportexportdocumentation.	



Year/SEM:2 <sup>nd</sup> Year/4 <sup>th</sup> sem		Yearof Study: 2022-23
<b>CourseName:FINANCIALDERIVATIVES-20MBAFM402</b>		
<b>CO1</b>	Understandthe mechanismofforwards/futures,options,financialswaps,variouscreditderivativesandVaRwiththeirfeatures,meritsanddemerits.	
<b>CO2</b>	Assesstheapplicationofforwards/futures,options,financialswaps,variouscreditderivativesandVaRusingnumericalproblems.	
<b>CO3</b>	Applicationoffinancialderivatives inriskmanagement.	
<b>CO4</b>	Criticallyevaluatevariousfinancialderivatives.	

Year/SEM:2 <sup>nd</sup> Year/4 <sup>th</sup> sem		Yearof Study: 2022-23
<b>CourseName: INDIRECTTAXATION-20MBAFM403</b>		
<b>CO1</b>	HaveclarityaboutGSTsysteminIndia	
<b>CO2</b>	Understandingoflevyand collectionofGSTinIndia	
<b>CO3</b>	Haveanoverview ofcustomsdutyinIndia	
<b>CO4</b>	Understandingofvaluationforcustomsduty.	

Year/SEM:2 <sup>nd</sup> Year/4 <sup>th</sup> sem		Yearof Study: 2022-23
<b>CourseName: MERGERS,ACQUISITIONS&amp;CORPORATERESTRUCTURING -20MBAFM404</b>		
<b>CO1</b>	UnderstandM&Awithitsdifferentclassifications,strategies,theories,synergyetc.	
<b>CO2</b>	ConductfinanciaevaluationofM&A	
<b>CO3</b>	CriticallyevaluatedifferenttypesofM&A, takeoverandantitakeoverstrategies	
<b>CO4</b>	Analysetheresultsafterevaluation	

Year/SEM:2 <sup>nd</sup> Year/4 <sup>th</sup> sem	Yearof Study: 2022-23
<b>CourseName:CORPORATEVALUATION-20MBAFM405</b>	
<b>CO1</b>	Understandcorporatevaluationandvaluationprocess
<b>CO2</b>	Familiarizewiththestandardtechniquesofcorporatevaluation
<b>CO3</b>	Developanalyticalskillsrelevantforcorporatevaluation andvalue based management
<b>CO4</b>	CriticallyevaluateIPOs,M&As,Bankruptacycases

Year/SEM:2 <sup>nd</sup> Year/4 <sup>th</sup> sem	Yearof Study: 2022-23
<b>CourseName:INTERNATIONALFINANCIALMANAGEMENT -20MBAFM406</b>	
<b>CO1</b>	ThestudentwillhaveanunderstandingoftheInternationalFinancialEnvironment.
<b>CO2</b>	Thestudentwilllearnabouttheforeignexchangemarket,participantsandtransactions.
<b>CO3</b>	Thestudentwillbeabletousederivatives inforeignexchangeriskmanagement.
<b>CO4</b>	ThestudentwillbeabletoevaluatetheFirm'sExposuretoriskinInternational environmentandvariousstheoriesassociatedwithit.

Year/SEM:2 <sup>nd</sup> Year/4 <sup>th</sup> sem	Yearof Study: 2022-23
<b>CourseName:ORGANISATIONALLEADERSHIP -20MBAHR401</b>	
<b>CO1</b>	Understandthefundamentalconceptsandprinciples, theoriesofOrganizationalLeadership.
<b>CO2</b>	Analyzetheorganizationalleadershipstyle, approachesandtraits,its impactonthefollowersbyusingleadershiptheoriesandinstruments.
<b>CO3</b>	Developing betterinsightinunderstandingtheliderhiptraitsthatinflucethemtoworkeffectivelyingrou p.
<b>CO4</b>	Demonstratetheir abilitytoapplyoftheir knowledgeinorganizationalleadership.

Year/SEM:2 <sup>nd</sup> Year/4 <sup>th</sup> sem	Yearof Study: 2022-23
<b>CourseName: PERSONALGROWTHANDINTERPERSONALEFFECTIVENESS -20MBAHR402</b>	
<b>CO1</b>	Havein-depthunderstandingthevariouspersonalitytraitswhichpromotespersonalgrowth.
<b>CO2</b>	Analyzetheconceptsofhumanpersonality,behaviourandfunctioning ofmind
<b>CO3</b>	Learnand applythepsychometricstestsinunderstanding thepersonalitytraits.
<b>CO4</b>	Developthegreater insightofself,andothersthroughvarious theoriesandpreparethedevelopmentalplanforinterpe rsonaleffectiveness.

Year/SEM:2 <sup>nd</sup> Year/4 <sup>th</sup> sem	Yearof Study: 2022-23
<b>CourseName:- INTERNATIONALHUMANRESOURCESMANAGEMENT -20MBAHR403</b>	
<b>CO1</b>	Gainconceptualknowledgeand practicalexperienceinunderstandingtheHRconceptsglobally.
<b>CO2</b>	ComprehendandcorrelatethestrategicapproachestoHRaspectsamongstPCN's,TCN'sand HCN's
<b>CO3</b>	Developknowledgeand applytheconceptsofHRinglobalperspective
<b>CO4</b>	HaveabetterinsightofHRconcepts, policiesandpracticesbycriticallyanalysingtheimpactofcontemporaryissuesglobally.

Year/SEM:2 <sup>nd</sup> Year/4 <sup>th</sup> sem	Yearof Study: 2022-23
<b>CourseName: ORGANISATIONALCHANGEANDDEVELOPMENT -20MBAHR404</b>	
<b>CO1</b>	Gainconceptualinsightofchange managementmodels,ODprocessesandinterventions.
<b>CO2</b>	Developtheunderstanding ofODtoapplyODaspectsinprivateandpublicsectorsinIndia
<b>CO3</b>	Analysethetoolsandtechniquesavailabletoimplementchanges intheorganizationenvironment
<b>CO4</b>	HandletheODinterventionsbyanalysingtheroleofODconsultant.

Year/SEM:2 <sup>nd</sup> Year/4thsem	Year of Study: 2022-23
<b>Course Name:HUMAN RECOURSEAUDIT-20MBAHR405</b>	
<b>CO1</b>	GainconceptualknowledgeandpracticalexperienceinunderstandingtheHRAudit.
<b>CO2</b>	ComprehendandcorrelatethestrategicapproachestoHRAuditaspects
<b>CO3</b>	DevelopknowledgeandapplytheconceptsofHRAuditintheorganisation
<b>CO4</b>	HaveabetterinsightofHRAuditconcepts,policiesandpracticesbycriticallyanalysingtheimpactofcontemporaryissuesinthe organisation.

Year/SEM:2 <sup>nd</sup> Year/4thsem	Year of Study: 2022-23
<b>CourseName:MANAGEMENTCONSULTINGFORBUSINESSEXCELLENCE -20MBAHR406</b>	
<b>CO1</b>	GainthepracticalinsightofvariousprinciplesandpracticesofConsultantandConsultancy
<b>CO2</b>	Acquire knowledge of latest conceptual framework used by Consultant and Consultancyprocessandprocedureappliedinvarious sectors
<b>CO3</b>	IllustratetheapplicationofConsultantandConsultancytoolsandtechniques invarioussectors.
<b>CO4</b>	Developagreaterunderstandingaboutstrategiesadopted/undertakenbyConsultantandConsultancy

# Department of Master of Computer Applications

## 2.6.1 Program outcomes, program specific outcomes and course outcomes

### Program Outcomes:



<b>Program Outcomes (POs)</b>	
At the end of the MCA program, students are expected to have developed the following outcomes.	
<b>PO1: Engineering knowledge:</b>	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO2: Problem analysis:</b>	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO3: Design/development of solutions:</b>	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

<b>PO4: Conduct investigations of complex problems:</b> 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.
<b>PO5: Modern tool usage:</b> 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.
<b>PO6: The engineer and society:</b> 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.
<b>PO7: Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for, sustainable development
<b>PO8: Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO9: Individual and teamwork:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO10: Communication:</b> 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.
<b>PO11: Project management and finance:</b> 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.
<b>PO12: Life-long learning:</b> 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

**PROGRAM SPECIFIC OUTCOMES (PSOs):**

**Engineering Graduates will be able to:**

<b>PSO-1:</b>	Understand the principles of Computer Applications and enrich knowledge in recent advancements and developments in Software Industries.
<b>PSO-2:</b>	Competent in programming and computing skills, ability to apply software development methodologies and modeling to solve real world problems.

**Courseoutcomes(COs)**

Year/SEM:2 <sup>nd</sup> year/3 <sup>rd</sup> sem		YearofStudy:2022-23
CourseName:DatabaseManagementsystem		SubCode: 18MCA31
CO1	Demonstratethefundamentalsofdatamodelsandconceptualizeanddepictadatabase systemandmake use ofERdiagramindevelopingER Model	
CO2	TosummarizeSQLandrelationaldatabasedesign	
CO3	Illustratetransactionprocessing, concurrencycontroltechniquesandrecovery	
CO4	Inferencedatabasedesign ntherealworldentities	

Year/SEM:2 <sup>nd</sup> year/3 <sup>rd</sup> sem		YearofStudy:2022-23
CourseName: Programmingusingpython		SubCode:18MCA32
CO1	Understandandcomprehendthebasicsofpythonprogramming	
CO2	Applyknowledgeinrealtimeapplications	
CO3	Understandabout filesanditsapplications	
CO4	Usestandardprogrammingconcepts	

Year/SEM:2 <sup>nd</sup> year/3 <sup>rd</sup> sem		YearofStudy:2022-23
CourseName: Design and analysisofalgorithms		SubCode:18MCA33
CO1	CO1:problemsbasedontheircharacteristicsandpracticalimportance.	
CO2	CO2:DevelopAlgorithmsusingiterative/recursiveapproach	
CO3	CO3:Computheefficiencyofalgorithmsintermsofasymptoticnotations	
CO4	CO4:Designalgorithmusinganappropriatedesignparadigmforsolvingagivenproblem	

Year/ SEM:2 <sup>nd</sup> year/3 <sup>rd</sup> sem		YearofStudy:2022-23
CourseName:SystemSoftware		Sub Code:18MCA34
CO1	Understandtheintroductoryconceptsofsystemsoftware,sicandsic/xemachinearchitecture.	
CO2	Understandthedesignandimplementationofassemblerswithimplementationexamples	
CO3	Designand implementthelinkersandloaders,macroimplementationexamples	
CO4	Learnthebasic designandworking ofcompilers	

Year/SEM:2 <sup>nd</sup> year/3 <sup>rd</sup> sem		YearofStudy:2022-23
CourseName:SoftwareTesting		SubCode: 18MCA351
CO1	Acquireknowledgeofbasicprinciplesandknowledgeofsoftwaretestingand Debuggingandtestcases.	
CO2	Understandtheperceptionsontestinglikelevelsoftesting,generalizedpseudocodeandwithrelat edexamples	
CO3	Studythevarioustypesoftesting.	
CO4	Analyzehedifferencebetweenfunctional testingandstructuraltesting.	

Year/SEM:2 <sup>nd</sup> year/3 <sup>rd</sup> sem		YearofStudy:2022-23
CourseName:DBMSLab		SubCode:18MCA36
CO1	Understand,appreciatetheunderlyingconceptsofdatasetechnologies	
CO2	AbletocreatedatabasewithdifferenttypesofintegrityconstraintsandusetheSQLcommandssuch asDDL,DML,DCL,TCLtoaccessdata fromdatabase objects.	
CO3	Designandimplementadatabaseschemaforagivenproblem domain	
CO4	Performembeddedandnestedqueries	

Year/SEM:2 <sup>nd</sup> year/3 <sup>rd</sup> sem		YearofStudy:2022-23
CourseName: PythonProgrammingLab		SubName:18MCA37
CO1	Applyobject-orientedprogrammingconceptstodevelop dynamicinteractivePython applications.	
CO2	Usetheproceduralstatements:assignments,conditionalstatements,loops,methodcallsandarrays	
CO3	Design,code,andtestsmallPythonprogramswithabasicunderstandingoftop-down design.	
CO4	LearnhowtocreateGUIandsolveareal-worldproblemusinglanguageidioms,datastructuresand standardlibrary	



<b>Year/SEM:2<sup>nd</sup>year/3<sup>rd</sup>sem</b>		<b>YearofStudy:2022-23</b>
<b>CourseName:AlgorithmsLab</b>		<b>SubName:18MCA38</b>
<b>CO1</b>	Implementtheconceptsof timeandspacecomplexity,divide-and-conquerstrategy,dynamicprogramming, greedyand approximatealgorithms.	
<b>CO2</b>	Describethe methodologiesofhowtoanalyzeanalgorithm	
<b>CO3</b>	Chooseabetteralgorithmtosolvetheproblems.	

<b>Year/SEM:2<sup>nd</sup>year/4<sup>th</sup>sem</b>		<b>YearofStudy:2022-23</b>
<b>CourseName:AdvancedJavaProgramming</b>		<b>SubCode:18MCA41</b>
<b>CO1</b>	Learntheconcept ofServletandits lifecycle,understandJSPtagsandits services	
<b>CO2</b>	Createpackagesandinterfaces,BuildDatabaseconnection	
<b>CO3</b>	DevelopjavaserverpagesapplicationsusingJSPtagsanddevelopEnterprisejavabeanapplications.	
<b>CO4</b>	DevelopJavaServerPagesapplicationsusingJSPTags.	

<b>Year/ SEM:2<sup>nd</sup>year/ 4<sup>th</sup>sem</b>		<b>YearofStudy:2022-23</b>
<b>CourseName:AdvancedWebProgramming</b>		<b>SubCode:18MCA42</b>
<b>CO1</b>	Acquireknowledgeofbuildingthewebapplications usingPHP,Ruby,Bootstrap,AJAX,and XML.	
<b>CO2</b>	DesigntheAsynchronousWebApplicationusingAJAX,UnderstandtheterminologyofbuildingwebA pplicationusingMVCarchitecture.	
<b>CO3</b>	Designresponsiveweb applicationsusingBootstrap.	
<b>CO4</b>	Acquiretheknowledgeof webapplication.	

<b>Year/SEM:2<sup>nd</sup>year/4<sup>th</sup>sem</b>		<b>YearofStudy:2022-23</b>
<b>CourseName:ObjectOrientedModeling andDesign</b>		<b>SubCode:18MCA43</b>
<b>CO1</b>	AcquireknowledgeofBasicUMLconceptsandterminologies,LifeCycleofObject orientedDevelopment,ModelingConcepts.	
<b>CO2</b>	Identify the basic principles of software modeling and apply them in real worldapplications,Produceconceptualmodelsforsolvingoperationalproblemsinsoftware andITenvironmentusingUML.	
<b>CO3</b>	Analyze the development of object oriented software models in terms of static behavior, Evaluateandimplementvariousdesignpatterns.	
<b>CO4</b>	Analyze the development of Object Oriented Software models in terms of	

	<p style="text-align: center;">Staticbehaviour -Dynamicbehaviour</p>
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<b>Year/ SEM:2<sup>nd</sup>year/ 4<sup>th</sup>sem</b>	<b>YearofStudy:2022-23</b>
<b>CourseName::CyberSecurity</b>	
<b>SubCode:18MCA442</b>	
<b>CO1</b>	Defineandillustratecybersecurityconcepts andapplications,Analyzeheworkingofcyber securityprinciples tosystemdesign.
<b>CO2</b>	Illustrateappropriatetechniques tosolvecybersecuritythreats.
<b>CO3</b>	Evaluateandimplement cybersecuritythroughnetworksecurityprotocols.
<b>CO4</b>	Evaluateandimplementcybersecuritythroughnetworksecurityprotocols

<b>Year/SEM:2<sup>nd</sup>year/4<sup>th</sup>sem</b>	<b>YearofStudy:2022-23</b>
<b>CourseName:BigDataAnalytics</b>	
<b>SubCode:18MCA454</b>	
<b>CO1</b>	UnderstandtheMap ReducetechniqueforsolvingBigdataprobblems;understandalgorithmsforBigDatabydecidingontheap tFeaturesset.
<b>CO2</b>	Applyalgorithmsforhandlingpetabytesofdatasets, AnalyzemainmemoryconsumptionforBigData analytics.
<b>CO3</b>	Understandandanalyzetheusageofmap reducetechniques forsolvingbigdataprobblems.
<b>CO4</b>	AnalyzemainmemoryconsumptionforBigDataanalytics

<b>Year/SEM:2<sup>nd</sup>year/4<sup>th</sup>sem</b>	<b>YearofStudy:2022-23</b>
<b>CourseName:ProfessionalCommunication&amp;ReportWriting</b>	
<b>SubCode:18MCA46</b>	
<b>CO1</b>	Understandtheprofessionalcommunicationatworkplace,Acquiretheknowledgeoftechnical writingandbusinessreporting.
<b>CO2</b>	Developtheleadershipqualities.
<b>CO3</b>	Acquiretheknowledgeoftechnicalwritingandbusinessreporting.
<b>CO4</b>	Understandandimplementethicalbehavioratworkplace.

<b>Year/SEM:2<sup>nd</sup>year/4<sup>th</sup>sem</b>	<b>YearofStudy:2022-23</b>
<b>CourseName:AdvancedJavaProgrammingLab</b>	
<b>SubCode:18MCA47</b>	

<b>CO2</b>	Implementing Dynamic HTML using Servlet and demonstration of service methods, auto web page refresh, Session tracking using cookie and HttpSession in Servlet.
<b>CO3</b>	Learn the fundamental of connecting to the database.
<b>CO4</b>	Demonstrate JSP (page attributes, action tags and all basic tags) and types of EJB applications.

<b>Year/SEM: 2<sup>nd</sup> year/4<sup>th</sup> sem</b>		<b>Year of Study: 2022-23</b>	
<b>Course Name: Advanced Web Programming Lab</b>		<b>Sub Code: 18MCA48</b>	
<b>CO1</b>	Understand, analyze and apply the role of server-side scripting languages.		
<b>CO2</b>	Build web application using PHP, Ruby, jQuery, XML and store values in MySQL.		
<b>CO3</b>	Build web applications using Ruby and Rails		

<b>Year/SEM: 2<sup>nd</sup> year/4<sup>th</sup> sem</b>		<b>Year of Study: 2022-23</b>	
<b>Course Name: Object Oriented Modeling and Design Lab</b>		<b>Sub Code: 18MCA49</b>	
<b>CO1</b>	Understand the fundamental principles of Object-Oriented analysis, design, development and programming		
<b>CO2</b>	Demonstrate and represent the UML model elements, to enable visual representation of the system being developed		
<b>CO3</b>	Implement object-oriented design model with the help of modern tool, Rational software Architect		
<b>CO4</b>	Analyze and differentiate the static and dynamic behavior of the system for achieving the intended functionalities of the system		

<b>Year/SEM: 3<sup>rd</sup> year/5<sup>th</sup> sem</b>		<b>Year of Study: 2022-23</b>	
<b>Sub Code: 18MCA51</b>		<b>Sub Name: Programming Using C#.NET</b>	
<b>CO1</b>	Understand C# & client-server concepts using .Net Framework components.		
<b>CO2</b>	Apply delegates, events and exception handling to incorporate with ASP, WinForm, ADO.NET, Analyze the use of .NET components depending on the problem statement		
<b>CO3</b>	Implement & Develop a web-based and console-based application with database connectivity.		
<b>CO4</b>	Analyze the use of .Net Components depending on the problem statement.		

Year/SEM: 3 <sup>rd</sup> year/5 <sup>th</sup> sem		Yearof Study:2022-23
<b>SubCode: 18MCA52</b>		<b>SubName:MobileApplications</b>
<b>CO1</b>	Illustrateeffectiveuser interfacesthatleverageevolvingmobiledevicecapabilitiesanddevelopapplicationsusingsoftwaredevelopmentkits,frameworksandtoolkits.	
<b>CO2</b>	Establish various methods to integrate database and server side technologies and develop opensourcesoftwarebasedmobileapplications.	
<b>CO3</b>	Buildanddeploycompetentmobiledevelopmentapplications	
<b>CO4</b>	Designanddevelopopensourcesoftwarebasedmobileapplications	

Year/SEM: 3 <sup>rd</sup> year/5 <sup>th</sup> sem		Yearof Study:2022-23
<b>SubCode:18MCA53</b>		<b>SubName:MachineLearning</b>
<b>CO1</b>	Developandappreciationforwhatisinvolvedinlearningmodels fromdata	
<b>CO2</b>	Differentiatesupervisedandunsupervisedlearning;understand neuralnetworkandclassificationtechniques.	
<b>CO3</b>	Understandmachinelearningalgorithmsandstatisticalanalysis	
<b>CO4</b>	Understandtheoryofprobabilityandstatisticsrelatedtomachinelearning.	

Year/SEM: 3 <sup>rd</sup> year/5 <sup>th</sup> sem		YearofStudy:2022-23
<b>CourseName:18MCA542</b>		<b>SubName:InternetOfThings</b>
<b>CO1</b>	UnderstandthechallengesofIOTnetworks,Smartobjects.	
<b>CO2</b>	AppraisetheroleofIOTprotocoland understandtheneed ofdataanalysisandsecurityinIOTnetwork	
<b>CO3</b>	Learndifferentsensor technologiesforsensingrealworldentities	
<b>CO4</b>	Analyze,designordeveloppartsofanInternetof Thingsolution andmapittowardselectedbusinessmodel(s)	

Year/SEM: 3 <sup>rd</sup> year/5 <sup>th</sup> sem		YearofStudy:2022-23
<b>SubCode:18MCA553</b>		<b>SubName:SoftwareArchitecture</b>
<b>CO1</b>	Acquire knowledgeofapplicationsofarchitecturalpatterns	

<b>CO2</b>	<b>Modeling quality attributes and understand the requirement gathering techniques</b>
<b>CO3</b>	<b>Understand different design patterns</b>
<b>CO4</b>	<b>Understand techniques of requirements gathering through interviewing stakeholders, etc.</b>

<b>Year/SEM: 3<sup>rd</sup> year/5<sup>th</sup> sem</b>		<b>Year of Study: 2022-23</b>	
<b>SubCode: 18MCA56</b>		<b>SubName: C#.net Lab</b>	
<b>CO1</b>	Understand C# and client-server concepts using .Net Framework Components		
<b>CO2</b>	Apply delegates, event and exception handling to incorporate with ASP, WinForm, ADO.NET		
<b>CO3</b>	Analyze the use of .Net Components depending on the problem statement		
<b>CO4</b>	Implement & develop a web based and Console based application with Database		

<b>Year/SEM: 3<sup>rd</sup> year/5<sup>th</sup> sem</b>		<b>Year of Study: 2022-23</b>	
<b>SubCode: 18MCA57</b>		<b>SubName: Mobile Applications Lab</b>	
<b>CO1</b>	Illustrate effective user interfaces that leverage evolving mobile device capabilities		
<b>CO2</b>	Develop applications using software development kits (SDKs), frameworks and toolkits		
<b>CO3</b>	Establish various methods to integrate database and server-side technologies		
<b>CO4</b>	Design and develop open source software based mobile applications.		

<b>Year/SEM: 3<sup>rd</sup> year/5<sup>th</sup> sem</b>		<b>Year of Study: 2022-23</b>	
<b>SubCode: 18MCA58</b>		<b>SubName: Mini Project</b>	
<b>CO1</b>	Identify a suitable problem making use of the technical and engineering knowledge gained from previous courses with the awareness of impact of technology on the society and their ethical responsibilities.		
<b>CO2</b>	Ability to segregate work and execute/implement projects using appropriate tools.		
<b>CO3</b>	Develop skills to disseminate technical and general information by means of oral as well as written presentations skills.		

<b>Year/ SEM:3<sup>rd</sup>year/ 6<sup>th</sup>sem</b>		<b>YearofStudy:2022-23</b>	
<b>CourseName:Subcode: 18MCA61,62,63</b>		<b>Subname:Internship,Projectwork,Seminar</b>	
<b>CO1</b>	Identify the suitable problem making use of the technical and engineering knowledge gained from previous courses with the awareness of impact of technology on the society and ethical responsibilities		
<b>CO2</b>	Ability to segregate work and execute/implement project using appropriate tools		
<b>CO3</b>	Develop skills to disseminate technical and general information by means of oral as well as return presentation and professional skills.		

## Department of Mechanical Engineering

### 2.6.1 Program outcomes, program specific outcomes and course outcomes

**PO1 - Engineering Knowledge:**

**PO2 - Problem Analysis:**

**PO3 - Design/Development of solutions:**

**PO4 - Conduct Investigations of Complex problems:**

**PO5 - Modern Tool Usage.**

**PO6 - The Engineer and Society:**

**PO7 - Environment and Sustainability:**

**PO8 - Ethics:**

**PO9 - Individual and Team Work:**

**PO10 -Communication:**

**PO11 -Project Management and Finance**

**PO12 -Life-Long Learning:**

### **PROGRAM SPECIFIC OUTCOMES(PSOs):**

**Engineering Graduates will be able to:**

<b>PSO-1</b>	Students acquire knowledge in basic science, technical and managerial skills that develop self-confidence for lifelong learning.
<b>PSO-2</b>	Students acquire theoretical knowledge of advance engineering tools in Design, Thermal and Manufacturing Science that they are capable of applying it for solving real time problems.

**Course Outcomes:**

<b>Year / SEM : 3<sup>rd</sup> year / 5<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: THEORY OF MACHINES– 21ME51</b>		
<b>CO1</b>	To understand the concept of machines, mechanisms and to analyze a mechanism for displacement, velocity and acceleration at any point in a moving link.	
<b>CO2</b>	To understand the force-motion relationship in components subjected to external forces and analysis of standard mechanisms	
<b>CO3</b>	To understand the theory of gears and gear trains.	
<b>CO4</b>	To understand the undesirable effects of unbalances resulting from prescribed motions in mechanism.	
<b>CO5</b>	To understand the principles in mechanisms used for speed control and stability control.	
<b>CO6</b>	To compute the natural and damped frequencies of free 1-DOF mechanical systems and to analyze the vibrational motion of 1-DOF mechanical systems under harmonic excitation conditions.	

<b>Year / SEM : 3<sup>rd</sup> year / 5<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: THERMO-FLUIDS ENGINEERING (IPCC)– 21ME52</b>		
<b>CO1</b>	To understand the concepts of testing of I. C. Engines and methods to estimate Indicated, Brake and Frictional Power and efficiencies.	
<b>CO2</b>	To understand theory and performance Calculation of Reciprocating compressor and positive displacement pumps.	
<b>CO3</b>	To understand the concepts related to Refrigeration, refrigeration cycles and Air conditioning and get conversant with Psychrometric Charts, Psychrometric processes, human comfort conditions.	
<b>CO4</b>	Understand typical construction of a Turbo machine, their working principle, application and conversion of fluid energy to mechanical energy in Turbo machine with utilization factor and	



	degree of reaction.
<b>C05</b>	Understand the working principle of hydraulic turbines and steam turbine

<b>Year / SEM : 3<sup>rd</sup> year / 5<sup>th</sup> sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: FINITE ELEMENT ANALYSIS- 21ME53</b>	
<b>C01</b>	To learn the basic principles of finite element analysis procedure
<b>C02</b>	To understand heat transfer problems with application of FEM.
<b>C03</b>	Solve 1 D, 2 D and dynamic problems using Finite Element Analysis approach.
<b>C04</b>	To learn and apply finite element solutions to structural, thermal, dynamic problem to develop the knowledge and skills needed to effectively evaluate finite element analyses.

<b>Year / SEM : 3<sup>rd</sup> year / 5<sup>th</sup> sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: MODERN MOBILITY &amp; AUTOMOTIVE MECHANICS - 21ME54</b>	
<b>C01</b>	To understand the different chassis design & main components of automobile
<b>C02</b>	To understand the working of transmission and control system employed in automobiles
<b>C03</b>	To understand the automotive pollution and alternative automotive technologies under trail
<b>C04</b>	To understand the upcoming electric vehicle technology

<b>Year / SEM : 3<sup>rd</sup> year / 5<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: DESIGN LAB- 21MEL55</b>		
<b>C01</b>	To understand the concepts of natural frequency, logarithmic decrement, damping and damping ratio.	
<b>C02</b>	To understand the techniques of balancing of rotating masses and influence of gyroscopic couple.	
<b>C03</b>	To verify the concept of the critical speed of a rotating shaft.	
<b>C04</b>	To illustrate the concept of stress concentration using Photo elasticity.	
<b>C05</b>	To appreciate the equilibrium speed, sensitiveness, power and effort of a Governor.	
<b>C06</b>	To illustrate the principles of pressure development in an oil film of a hydrodynamic journal bearing.	
<b>C07</b>	To visualize different mechanisms and cam motions	

<b>Year / SEM : 3<sup>rd</sup> year / 5<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: BASICS OF MATLAB - 21ME581</b>		
<b>C01</b>	To know about fundamentals of MATLAB tool.	
<b>C02</b>	To provide an overview to program curve fitting & solve Linear and Nonlinear Equations.	
<b>C03</b>	To understand the concept and importance of Fourier transforms.	
<b>C04</b>	To gain knowledge about MATLAB Simulink & solve Electrical engineering problems.	

<b>Year / SEM : 3<sup>rd</sup> year / 5<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: DIGITAL MARKETING – 21ME582</b>		
<b>C01</b>	To provide with the knowledge about business advantages of the digital marketing and its importance for marketing success;	
<b>C02</b>	To develop a digital marketing plan;	
<b>C03</b>	To make SWOT analysis;	
<b>C04</b>	To define a target group;	
<b>C05</b>	To get introduced to various digital channels, their advantages and ways of integration;	
<b>C06</b>	To integrate different digital media and create marketing content;	
<b>C07</b>	To optimize a Website and SEO optimization;	
<b>C08</b>	To create Google AdWords campaigns; social media planning;	
<b>C09</b>	To get basic knowledge of Google Analytics for measuring effects of digital marketing and getting insight of future trends that will affect the future development of the digital marketing.	

<b>Year / SEM : 3<sup>rd</sup> year / 5<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: VFX: VISUAL EFFECTS– 21ME583</b>		
<b>C01</b>	To learn the Basics of compositing using layer based compositing software.	
<b>C02</b>	To understand the tools and techniques of compositing.	

<b>CO3</b>	To practice the categories in composing process.
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<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: PRODUCTION AND OPERATIONS MANAGEMENT- 21ME61</b>	
<b>CO1</b>	Use of decision making tools such as break even analysis, linear programming, statistical analysis, simulation, etc. demands a strong knowledge of mathematics, science and engineering fundamentals.
<b>CO2</b>	Forecasting models are basically mathematical equations. Formulating these models and solving them requires skill and a strong knowledge of mathematics, science, engineering & management fundamentals.
<b>CO3</b>	Facility location and Capacity planning can be made by the use various mathematical models. Use of these models and solving them subsequently for arriving at a decision demands skill and knowledge on mathematics, science, engineering & management fundamentals.
<b>CO4</b>	Preparation of aggregate plans and master schedule in an organization requires a strong background of mathematics, science, engineering & management fundamentals.

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: HEAT TRANSFER (IPCC)- 21ME62</b>	
<b>CO1</b>	Principles of heat transfer
<b>CO2</b>	Steady and transient heat transfer, obtain the differential equation of heat conduction in various coordinate system.
<b>CO3</b>	Physical mechanism of convection and visualize the development of velocity and thermal boundary layers during flow over a surface.

<b>C04</b>	Radiation heat transfer mechanism
<b>C05</b>	The mechanisms of boiling and condensation and understand performance parameters of heat exchangers.

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: MACHINE DESIGN- 21ME63</b>		
<b>C01</b>	To explain the principles involved in design of machine elements, subjected to different kinds of forces, from the considerations of strength, rigidity. □	
<b>C02</b>	To understand and interpret different failure modes and application of appropriate criteria for design of machine elements.	
<b>C03</b>	Develop the capability to design elements like shafts, couplings and springs, welded joints, screwed joints.	
<b>C04</b>	To learn transmission elements like gears, belts, pulleys, bearings from the manufacturers' catalogue.	
<b>C05</b>	To produce assembly and working drawings of various mechanical systems involving machine elements like clutches and brakes.	

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: SUPPLY CHAIN MANAGEMENT &amp; INTRODUCTION TO SAP- 21ME641</b>		
<b>C01</b>	To acquaint with key drivers of supply chain performance and their inter-relationships with strategy.	
<b>C02</b>	To impart analytical and problem-solving skills necessary to develop solutions for a variety of supply chain management & design problems.	
<b>C03</b>	To study the complexity of inter-firm and intra-firm coordination in implementing programs such as e-collaboration, quick response, jointly managed inventories and strategic alliances.	

<b>CO4</b>	To understand the usage of SAP material management system
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<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: MECHATRONICS SYSTEM DESIGN- 21ME642</b>		
<b>CO1</b>	Gain knowledge of basics of Mechatronics system design and sensors.	
<b>CO2</b>	Understanding various techniques of Mechatronics system design for solving engineering problems.	
<b>CO3</b>	Understanding Dynamic responses of systems and Fault detection techniques	
<b>CO4</b>	Determination of optimization solutions, effective decision making, Convert the data in real time interfacing.	
<b>CO5</b>	Understand real time mechatronic system design through case study	

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: AUTONOMOUS VEHICLES- 21ME643</b>		
<b>CO1</b>	Introduce the fundamental aspects of Autonomous Vehicles	
<b>CO2</b>	Gain Knowledge about the Sensing Technology and Algorithms applied in Autonomous vehicles.	
<b>CO3</b>	Understand the Connectivity Aspects and the issues involved in driverless cars.	

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>	<b>Year of Study : 2022-23</b>
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<b>Course Name&amp; Code: INTERNET OF THINGS (IOT)- 21ME644</b>	
<b>CO1</b>	To introduce the fundamental concepts of IoT and physical computing
<b>CO2</b>	To expose the student to a variety of embedded boards and IoT Platforms
<b>CO3</b>	To create a basic understanding of the communication protocols in IoT communications.
<b>CO4</b>	To familiarize the student with application program interfaces for IoT.
<b>CO5</b>	To enable students to create simple IoT applications.

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: PROJECT MANAGEMENT- 21ME651</b>	
<b>CO1</b>	To understand how to break down a complex project into manageable segments and use of effective project management tools and techniques to arrive at solution and ensure that the project meets its deliverables and is completed within budget and on schedule.
<b>CO2</b>	To impart knowledge on various components, phases, and attributes of a project
<b>CO3</b>	To prepare students to plan, develop, lead, manage, and successfully implement and deliver projects within their chosen practice area.

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: RENEWABLE ENERGY POWER PLANTS (OPEN ELECTIVE)- 21ME652</b>	
<b>CO1</b>	To introduce the concepts and principles of solar energy, its radiation, collection, storage and application. .

<b>CO2</b>	To understand application aspects of Wind, Biomass, Geothermal, hydroelectric and Ocean energy.
<b>CO3</b>	To examine energy sources and systems, including fossil fuels and nuclear energy, and then focus on other forms of alternate energy sources.

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: MECHATRONICS- 21ME653</b>		
<b>CO1</b>	To acquire a strong foundation in science and focus in mechanical, electronics, control, software, and computer engineering, and a solid command of the newest technologies.	
<b>CO2</b>	To understand the evolution and development of Mechatronics as a discipline.	
<b>CO3</b>	To substantiate the need for interdisciplinary study in technology education	
<b>CO4</b>	To understand the applications of microprocessors in various systems and to know the functions of each element.	
<b>CO5</b>	To demonstrate the integration philosophy in view of Mechatronics technology	
<b>CO6</b>	To be able to work efficiently in multidisciplinary teams.	

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: MODERN MOBILITY- 21ME654</b>		
<b>CO1</b>	To understand the different chassis design & main components of automobile	
<b>CO2</b>	To understand the working of transmission and control system employed in automobiles	
<b>CO3</b>	To understand the automotive pollution and alternative automotive technologies under trail	



<b>CO4</b>	To understand the upcoming electric vehicle technology
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<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: CNC PROGRAMMING AND 3-D PRINTING LAB- 21MEL66</b>	
<b>CO1</b>	To expose the students to the techniques of CNC programming and cutting tool path generation through CNC simulation software by using G-Codes and M-codes.
<b>CO2</b>	To educate the students on the usage of CAM packages.
<b>CO3</b>	To expose the students on the usage of 3D Printing Technology
<b>CO4</b>	To make the students understand the importance of automation in industries through exposure to FMS, Robotics, and Hydraulics and Pneumatics.

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>	<b>Year of Study : 2024-25</b>
<b>Course Name&amp; code: AUTOMATION AND ROBOTICS (PCC)- 21ME71</b>	
<b>CO1</b>	To identify potential areas for automation and justify need for automation.
<b>CO2</b>	To select suitable major control components required to automate a process or an activity
<b>CO3</b>	To study the various parts of robots and fields of robotics.
<b>CO4</b>	To study the various kinematics and inverse kinematics of robots.
<b>CO5</b>	To study the control of robots for some specific applications.

Year / SEM : 4 <sup>th</sup> year / 7 <sup>th</sup> sem		Year of Study : 2024-25
<b>Course Name&amp; Code: ADDITIVE MANUFACTURING– 21ME731</b>		
<b>CO1</b>	To know the principle methods, areas of usage, possibilities and limitations of the Additive Manufacturing technologies.	
<b>CO2</b>	To be familiar with the characteristics of the different materials those are used in Additive Manufacturing.	
<b>CO3</b>	To know the principles of polymerization and powder metallurgy process, extrusion-based system printing processes, sheet lamination processes, beam deposition processes, direct write technologies Direct Digital Manufacturing.	
<b>CO4</b>	To get exposed to process selection, software issues and post processing.	

Year / SEM : 4 <sup>th</sup> year / 7 <sup>th</sup> sem		Year of Study : 2024-25
<b>Course Name&amp; Code: CONTROL ENGINEERING– 21ME72</b>		
<b>CO1</b>	To develop comprehensive knowledge and understanding of modern control theory, industrial automation, and systems analysis.	
<b>CO2</b>	To model mechanical, hydraulic, pneumatic and electrical systems.	
<b>CO3</b>	To represent system elements by blocks and its reduction techniques.	
<b>CO4</b>	To understand transient and steady state response analysis of a system.	
<b>CO5</b>	To carry out frequency response analysis using polar plot, Bode plot.	
<b>CO6</b>	To analyse a system using root locus plots.	

<b>C07</b>	To study different system compensators and characteristics of linear systems.
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<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>	<b>Year of Study : 2024-25</b>
<b>Course Name&amp; Code: TOTAL QUALITY MANAGEMENT- 21ME732</b>	
<b>C01</b>	Understand various approaches to TQM
<b>C02</b>	Understand the characteristics of quality leader and his role.
<b>C03</b>	Develop feedback and suggestion systems for quality management.
<b>C04</b>	Enhance the knowledge in Tools and Techniques of quality management

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>	<b>Year of Study : 2024-25</b>
<b>Course Name&amp; Code: REFRIGERATION AND AIR-CONDITIONING – 21ME733</b>	
<b>C01</b>	Study the basic definition, ASHRAE Nomenclature for refrigerating systems.
<b>C02</b>	Understand the working principles and applications of different types of refrigeration systems.
<b>C03</b>	Study the working of air conditioning systems and their applications.
<b>C04</b>	Identify the performance parameters and their relations of an air conditioning system.

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>		<b>Year of Study : 2024-25</b>
<b>Course Name&amp; Code: MEMS AND MICROSYSTEM TECHNOLOGY- 21ME734</b>		
<b>CO1</b>	To provide knowledge of semiconductors and solid mechanics to fabricate MEMS devices.	
<b>CO2</b>	To educate on the rudiments of Microfabrication techniques.	
<b>CO3</b>	To introduce various sensors and actuators.	
<b>CO4</b>	To introduce different materials used for MEMS	
<b>CO5</b>	To educate on the applications of MEMS to disciplines beyond Electrical and Mechanical engineering.	

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>		<b>Year of Study : 2024-25</b>
<b>Course Name&amp; Code: DESIGN FOR MANUFACTURING &amp; ASSEMBLY- 21ME735</b>		
<b>CO1</b>	To educate students on factors to be considered in designing parts and components with focus on manufacturability.	
<b>CO2</b>	To expose the students to dimensional tolerances, geometric tolerances and true position tolerance techniques in manufacture.	
<b>CO3</b>	To impart the knowledge on design considerations for designing components produced using various machining operations like turning, drilling, milling, grinding etc.	

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>	<b>Year of Study : 2024-25</b>
<b>Course Name&amp; Code: ADVANCED VIBRATIONS AND CONDITION MONITORING– 21ME741</b>	
<b>C01</b>	To introduce to vibration systems
<b>C02</b>	Understand the vibration analysis
<b>C03</b>	To understand vibration control & condition monitoring
<b>C04</b>	To get exposed to vibration measurements and basics of acoustics

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>	<b>Year of Study : 2024-25</b>
<b>Course Name&amp; Code: Theory and Design of IC Engines–21ME742</b>	
<b>C01</b>	To present a problem oriented in depth knowledge of Internal Combustion Engine.
<b>C02</b>	To address the underlying concepts, methods, and application of Internal Combustion Engine.
<b>C03</b>	To understand the operation of internal combustion engines.
<b>C04</b>	To perform theoretical calculations to obtain thermodynamic efficiencies and then assess operating losses.
<b>C05</b>	To calculate engine operating parameters.
<b>C06</b>	To understand the implications of a trade-off between performance, efficiency, emissions.

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>		<b>Year of Study : 2024-25</b>
<b>Course Name&amp; Code: ADVANCED TURBOMACHINES – 21ME743</b>		
<b>CO1</b>	Study the various thermodynamic processes involved in turbomachines, the application of 1st and 2nd law of Thermodynamics to evaluate the energy transfer and efficiencies,	
<b>CO2</b>	Understand of the concept and application of law of conservation of energy for the flow of steam and gas through nozzle and diffuser.	
<b>CO3</b>	Understand the concept of two-dimensional cascading for the evaluation of cascade performance in compressor and turbines.	
<b>CO4</b>	Learn on how to apply the concepts of thermodynamics to analyse its performance and characteristics in the axial flow turbines	
<b>CO5</b>	Understand the concepts of thermodynamics to analyse its performance and characteristics in the axial flow compressors and fans.	
<b>CO6</b>	Study the radial equilibrium and understand the various vortex flow concepts for designing the blades.	
<b>CO7</b>	Understand the different process of control and maintenance aspects of turbomachines.	

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>		<b>Year of Study : 2024-25</b>
<b>Course Name&amp; Code: PRODUCT DESIGN &amp; ERGONOMICS – 21ME744</b>		
<b>CO1</b>	Understanding the user-centred design process including form and colour theory.	
<b>CO2</b>	Understanding product metamorphosis, and ergonomics..	
<b>CO3</b>	Implement the principles of ergonomics and how to apply the principles to industrial design.	
<b>CO4</b>	Understand the importance and techniques of human biological data collection and experiments.	
<b>CO5</b>	Obtain a knowledge and ability towards Accident Investigation and Safety Management.	

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>		<b>Year of Study : 2024-25</b>
<b>Course Name&amp; Code: NON-TRADITIONAL MACHINING–21ME751</b>		
<b>CO1</b>	To learn various concepts related to modern machining processes & their applications.	
<b>CO2</b>	To appreciate the differences between conventional and non-conventional machining processes.	
<b>CO3</b>	To acquire a functional understanding of non-traditional manufacturing equipment.	
<b>CO4</b>	To know about various process parameters and their influence on performance and their applications.	
<b>CO5</b>	To impart knowledge on various types of energy involved in non-traditional machining processes.	

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>		<b>Year of Study : 2024-25</b>
<b>Course Name&amp; Code: HYDRAULICS AND PNEUMATICS–21ME752</b>		
<b>CO1</b>	Gain knowledge of basics of hydraulic and pneumatic systems.	
<b>CO2</b>	Understanding the working principles of hydraulics and pneumatics components.	
<b>CO3</b>	Engineering application of hydraulic and pneumatic systems.	

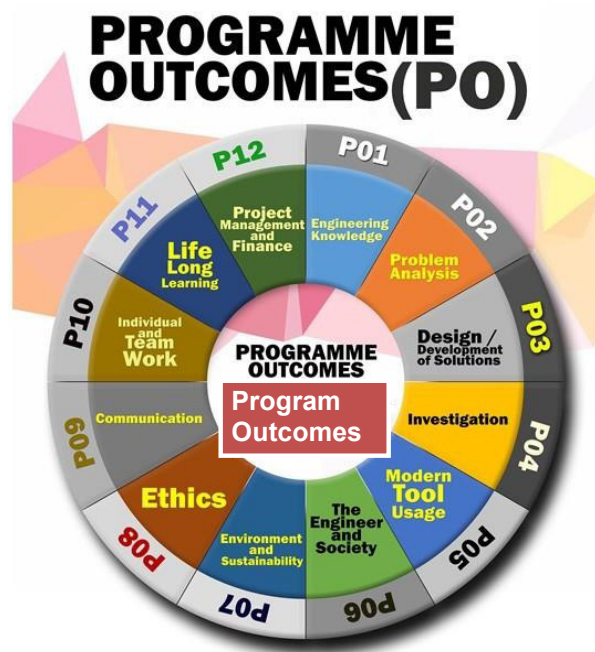
<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>		<b>Year of Study : 2024-25</b>
<b>Course Name&amp; Code: OPERATIONS RESEARCH– 21ME753</b>		
<b>CO1</b>	To enable the students to understand the scientific methods of providing various departments of an organization with a quantitative basis of decision making.	
<b>CO2</b>	To enable the students to understand the importance of various tools and techniques in finding optimal solutions to problems involving limited resources in the form of Men, Materials and machinery.	

# PROGRAMME OUTCOME, PROGRAMME SPECIFIC OUTCOMES AND COURSE OUTCOMES OF ALL DEPARTMENTS - 2022-23(CRITERIA - 2)

Department of Robotics & Automation Engineering

## 2.6.1 Program outcomes, program specific outcomes and course outcomes

ProgramOutcomes:





**PO1 - Engineering Knowledge:**

**PO2 - Problem Analysis:**

**PO3 - Design/Development of solutions:**

**PO4 - Conduct Investigations of Complex problems:**

**PO5 - Modern Tool Usage.**

**PO6 - The Engineer and Society:**

**PO7 - Environment and Sustainability:**

**PO8 - Ethics:**

**PO9 - Individual and Team Work:**

**PO10 -Communication:**

**PO11 -Project Management and Finance**

**PO12 -Life-Long Learning:**

**PROGRAM SPECIFIC OUTCOMES(PSOs):**

**Engineering Graduates will be able to:**

<b>PSO-1</b>	Students acquire knowledge in basic science, technical and managerial skills that develop self-confidence for lifelong learning.
<b>PSO2</b>	Students acquire theoretical knowledge of advance engineering tools in Design, Thermal and Manufacturing Science that they are capable of applying it for solving real time problems.

**Course Outcomes:**

<b>Year / SEM :</b> <b>2<sup>nd</sup>year / 3<sup>rd</sup>sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; code: Fundamentals of Robotics and Applications-21RA31</b>	
<b>CO1</b>	Understand and discuss the fundamental elementary concepts of Robotics.
<b>CO2</b>	Provide insight into different types of robots.

<b>CO3</b>	Explain intelligent module for robotic motion control
<b>CO4</b>	Educate on various path planning techniques.
<b>CO5</b>	Illustrate the working of innovative robotic devices

<b>Year / SEM : 2<sup>nd</sup>year / 3<sup>rd</sup>sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Fabrication Methods of Robotic Components-21RA32</b>	
<b>CO1</b>	Introduce students to different methods of fabrication used in the manufacturing of robotic components.
<b>CO2</b>	Develop an understanding of the materials used in robotic component fabrication and their properties. Familiarize students with traditional manufacturing processes commonly employed in the robotics industry.
<b>CO3</b>	Provide an overview of additive manufacturing techniques and their applications in robotics.
<b>CO4</b>	Introduce students to CNC programming and machining for precise fabrication of robotic components.

<b>Year / SEM : 2<sup>nd</sup>year / 3<sup>rd</sup>sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code : Analog and Digital Electronic Circuits-21RA33</b>	
<b>CO1</b>	To understand the basics and applications of diodes and transistors
<b>CO2</b>	To understand the basics and applications of OPAMPS
<b>CO3</b>	To Illustrate simplification of Algebraic equations using Karnaugh Maps and Quine-McClusky Techniques.

<b>C04</b>	To Design Decoders, Encoders, Digital Multiplexer, Adders, Subtractors and Binary Comparators.
<b>C05</b>	To Describe Latches and Flip-flops, Registers and Counters.

<b>Year / SEM : 2<sup>nd</sup>year / 3<sup>rd</sup>sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Mechanics of Solids and Fluids-21RA34</b>		
<b>C01</b>	Gain knowledge of linear elastic properties and stress strain relations	
<b>C02</b>	Derive and solve problems on Principal stresses developed in structures	
<b>C03</b>	Compute the stress strain for bars, beams, shafts, and column and to apply the concept of dynamic similarity and to apply it to experimental modeling.	
<b>C04</b>	Gain knowledge of basic properties of fluids, fluid statics.	
<b>C05</b>	To apply conservation of mass, momentum and energy equation and to determine the discharge of fluid flow.	

<b>Year / SEM : 2<sup>nd</sup>year / 3<sup>rd</sup>sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Introduction to Modelling and Design for Manufacturing - BMEL35</b>		
<b>C01</b>	Develop a comprehensive understanding of mechanical assemblies and design for manufacturing principles.	
<b>C02</b>	Learn and apply best practices to create design that are robust, adaptable and cost effective	
<b>C03</b>	Master the art of maintaining control over designs throughout the entire lifecycle, from initial sketch to final production	

<b>C04</b>	Gain hands on experience in practical exercises and projects to reinforce theoretical concepts
<b>C05</b>	Acquire effective communication skills for multidisciplinary team work in design and production processes

<b>Year / SEM : 2<sup>nd</sup>year / 3<sup>rd</sup>sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Basic Communication Systems-21RA36</b>		
<b>C01</b>	To prepare students with fundamental knowledge in the field of Communication systems.	
<b>C02</b>	Use of different modulation and demodulation techniques used in the communication.	
<b>C03</b>	Analyze transmitter and receiver circuits.	
<b>C04</b>	Compare design issues, advantages, disadvantages and limitations of communication systems.	

<b>Year / SEM : 2<sup>nd</sup>year / 3<sup>rd</sup>sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Robot Vision-21RA306B</b>		
<b>C01</b>	To learn fundamental image processing and algorithms in vision systems	
<b>C02</b>	To learn vision based image Classification, object recognition and object detection	
<b>C03</b>	To be familiar about the applications regarding vision	

<b>Year / SEM : 2<sup>nd</sup>year / 3<sup>rd</sup>sem</b>		<b>Year of Study :2022-23</b>
<b>Course Name&amp; Code: Linear Integrated Circuits – 21RA306C</b>		

<b>CO1</b>	Understand the basic concepts of OP-AMP circuits
<b>CO2</b>	Analyze the applications of operational amplifiers
<b>CO3</b>	Understand special function ICs and wave form Generators using operational amplifiers circuits
<b>CO4</b>	Compared sign issues, advantages, disadvantages and limitations of communication systems.

<b>Year / SEM : 2<sup>nd</sup>year / 3<sup>rd</sup>sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Data Structures and Applications -21RA306D</b>		
<b>CO1</b>	Explain fundamentals of data structures and their applications essential for programming/problem solving	
<b>CO2</b>	Illustrate linear representation of data structures: Stack, Queues, Lists, Trees and Graphs.	
<b>CO3</b>	Demonstrate sorting and searching algorithms.	
<b>CO4</b>	Find suitable data structure during application development/Problem Solving	

<b>Year / SEM : 2<sup>nd</sup>year / 3<sup>rd</sup>sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Introduction to Python - 21RA358A</b>		
<b>CO1</b>	Demonstrate the use of Anaconda or PyCharm IDE to create Python Applications	
<b>CO2</b>	Develop Python programming language to develop programs for solving real-world problems.	
<b>CO3</b>	Utilize Object-Oriented Programming concepts in Python.	
<b>CO4</b>	Analyse the working of various documents like PDF, Word file	

<b>Year / SEM : 2<sup>nd</sup>year / 3<sup>rd</sup>sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Applications of MAT LAB – 21RA358B</b>		
<b>CO1</b>	To provide the requisite and relevant background necessary to understand the other important engineering mathematics courses offered for Engineers and Scientists.	
<b>CO2</b>	To introduce important topics of applied mathematics, namely Single and Multivariable Calculus and Vector Calculus etc.	
<b>CO3</b>	To impart the knowledge of Laplace transform, an important transform technique for Engineers this requires knowledge of integration.	

<b>Year / SEM : 2<sup>nd</sup>year / 3<sup>rd</sup>sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Fundamentals of Virtual Reality and App Development – 21RA35</b>		
<b>CO1</b>	Describe how VR systems work and list the applications of VR	
<b>CO2</b>	Understand the design and implementation of the hardware that enables VR systems to be built	
<b>CO3</b>	Understand the system of human vision and its implication on perception and rendering.	
<b>CO4</b>	Explain the concepts of motion and tracking in VR systems.	
<b>CO5</b>	Describe the importance of interaction and audio in VR systems	

<b>Year / SEM : 2<sup>nd</sup>year / 3<sup>rd</sup>sem sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Introduction to C++ – 21RA38</b>		
<b>CO1</b>	Understanding about object oriented programming and Gain knowledge about the capability to store information together in an object.	
<b>CO2</b>	Understand the capability of a class to rely upon another class and functions	
<b>CO3</b>	Understand about constructors which are special type of functions.	

<b>CO4</b>	Create and process data in files using file I/O functions
<b>CO5</b>	Use the generic programming features of C++ including Exception handling

<b>Year / SEM : 2<sup>nd</sup> year / 4th sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Measurement Systems - 21RA41</b>	
<b>CO1</b>	To understand the concept of metrology and standards of measurement.
<b>CO2</b>	To equip with knowledge of limits, fits, tolerances and gauging
<b>CO3</b>	To understand the knowledge of measurement systems and methods with emphasis on different Transducers, intermediate modifying and terminating devices.
<b>CO4</b>	To understand the concept of control system.

<b>Year / SEM : 2<sup>nd</sup> year / 4th sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Micro controllers- 21RA42</b>	
<b>CO1</b>	Understand the difference between a Microprocessor and a Microcontroller and embedded microcontrollers.
<b>CO2</b>	Familiarize the basic architecture of 8051 microcontroller
<b>CO3</b>	Program 8051 microprocessor using Assembly Level Language and C.
<b>CO4</b>	Understand the interrupt system of 8051 and the use of interrupts.
<b>CO5</b>	Understand the operation and use of inbuilt Timers/Counters and Serial port of 8051.

<b>CO6</b>	Interface 8051 to external memory and I/O devices using its I/O ports.
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<b>Year / SEM : 2<sup>nd</sup> year / 4th sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Robot Kinematics, Dynamics and Control- 21RA43</b>	
<b>CO1</b>	To identify and enumerate different link-based mechanisms with basic understanding of motion
<b>CO2</b>	To interpret and analyse various velocity and acceleration diagrams for various mechanisms
<b>CO3</b>	To understand and illustrate various power transmission mechanisms using suitable method
<b>CO4</b>	To design and evaluate the performance of different cams and followers

<b>Year / SEM : 2<sup>nd</sup> year / 4th sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Robot Programming &amp; Simulation Lab- 21RAL44</b>	
<b>CO1</b>	To introduce different types of robotics and demonstrate them to identify different parts and components.
<b>CO2</b>	To write programming for simple operations

<b>Year / SEM : 2<sup>nd</sup> year / 4th sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Fuzzy Logic for Robotics-21RA45</b>	
<b>CO1</b>	To learn the concept of fuzziness involved in various systems.
<b>CO2</b>	To provide adequate knowledge about fuzzy set theory



<b>CO3</b>	To teach Modelling of non-linear systems using fuzzy models
<b>CO4</b>	To make students to understand to the concepts of feed forward neural networks.
<b>CO5</b>	To provide adequate knowledge about feedback networks

<b>Year / SEM : 2<sup>nd</sup> year / 4<sup>th</sup> sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Unmanned Aerial Vehicles (UAV)- 21RA46</b>	
<b>CO1</b>	Acquire the knowledge of basic concepts needed in modelling and analysing an unmanned system.
<b>CO2</b>	To expose students to the development of UAV
<b>CO3</b>	To expose students to the type of payloads used in UAV
<b>CO4</b>	To study path planning.
<b>CO5</b>	To understand the avionics hardware used in the UAV.

<b>Year / SEM : 2<sup>nd</sup> year / 4<sup>th</sup> sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Sensors and Actuators-21RA4</b>	
<b>CO1</b>	To summarize and analyze the different types of sensors, signal conditioning circuits, and actuators.
<b>CO2</b>	To introduce students the criteria for selecting a sensor for a particular measurement.
<b>CO3</b>	To elucidate students the types of actuators: electrical, pneumatic, and hydraulic and enlighten their operation.

<b>CO4</b>	To familiarize students with the basic techniques of designing the required signal conditioning for a particular sensor
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<b>Year / SEM : 2<sup>nd</sup> year / 4<sup>th</sup> sem</b>	<b>Year of Study :2022-23</b>
<b>Course Name&amp; Code: Smart Materials- 21RA405D</b>	
<b>CO1</b>	To acquire a comprehensive understanding of smart materials.
<b>CO2</b>	To gain knowledge about smart sensors and their functionalities.
<b>CO3</b>	To develop an understanding of smart actuators and their applications.
<b>CO4</b>	To explore the concept of smart composites and their unique properties.
<b>CO5</b>	To acquire knowledge about smart structures and materials and their practical applications.

<b>Year / SEM : 2<sup>nd</sup> year / 4<sup>th</sup> sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Introduction to AI&amp;ML- 21RA</b>	
<b>CO1</b>	To impart artificial intelligence principles, techniques, and history.
<b>CO2</b>	To assess the applicability, strengths, and weaknesses of the basic knowledge representation, problem- solving, and learning methods in solving engineering problems.
<b>CO3</b>	To develop intelligent systems by assembling solutions to concrete computational problems

<b>Year / SEM : 2<sup>nd</sup> year / 4<sup>th</sup> sem</b>	<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Embedded C Basics- 21RA</b>	
<b>CO1</b>	Understand the basic programming of Microprocessor and micro controller.
<b>CO2</b>	To develop the microcontroller-based programs for various applications.

<b>Year / SEM : 2<sup>nd</sup> year / 4<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Control and Data Acquisition System –21RA</b>		
<b>CO1</b>	Understand the importance of IoT for consumers and SCADA for entrepreneurs	
<b>CO2</b>	Understand and apply the concept of SCADA for heavy machineries and its intelligent management system is going to be completely taken over by the technology of SCADA	
<b>CO3</b>	Apply the knowledge of SCADA system for its technologies possess and to give the education of the best practices followed for securing important data in small and large scale industries..	

<b>Year / SEM : 2<sup>nd</sup> year / 4<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Introduction to Raspberry Pi Controllers – 21RA</b>		
<b>CO1</b>	To understand the working and usage of Raspberry Pi controllers in different fields.	

<b>Year / SEM : 3<sup>rd</sup> year / 5<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: DESIGN OF AUTOMATION SYSTEM– 21RA51</b>		
<b>CO1</b>	To know about the basic concepts in industrial automation	
<b>CO2</b>	To design automated systems.	
<b>CO3</b>	To know about transfer lines and automated assembly	
<b>CO4</b>	Be exposed to pneumatic, electric, hydraulic and electronic systems in automation of mechanical operations.	
<b>CO5</b>	To know about the advancement in hydraulics and pneumatics	

Year / SEM : 3 <sup>rd</sup> year / 5 <sup>th</sup> sem		Year of Study : 2022-23
<b>Course Name&amp; Code: Hydraulics and Pneumatics – 21RA52</b>		
<b>C01</b>	To provide an insight into the capabilities of hydraulic and pneumatic fluid power	
<b>C02</b>	To understand concepts and relationships surrounding force, pressure, energy and power in fluid power systems.	
<b>C03</b>	To examine concepts centering on sources of hydraulic power, rotary and linear actuators, distribution systems, hydraulic flow in pipes, and control components in fluid power systems	
<b>C04</b>	Exposure to build and interpret hydraulic and pneumatic circuits related to industrial applications.	
<b>C05</b>	To familiarize with logic controls and trouble shooting	

Year / SEM : 3 <sup>rd</sup> year / 5 <sup>th</sup> sem		Year of Study : 2022-23
<b>Course Name&amp; Code: AUTONOMOUS ROBOTS– 21RA53</b>		
<b>C01</b>	To learn principles of working of autonomous robots.	
<b>C02</b>	To learn the holistic design of autonomous robots - from the mechatronic design to sensors and intelligence	
<b>C03</b>	To demonstrate the sensing, perception, and cognition of autonomous robots	
<b>C04</b>	To understand anatomy of autonomous robots	
<b>C05</b>	To understand operation of Humanoid robot	
<b>C06</b>	To understand principles of operation of telecheric robots	

Year / SEM : 3 <sup>rd</sup> year / 5 <sup>th</sup> sem		Year of Study : 2022-23
<b>Course Name&amp; Code : ROBOT OPERATING SYSTEM– 21RA54</b>		

<b>CO1</b>	Discuss the fundamental concepts of Operating Systems..
<b>CO2</b>	Explain the mechanisms of Operating Systems to handle processes, threads and their communication.
<b>CO3</b>	Analyze the file structure and the protection and secuRItY mechanism.
<b>CO4</b>	Explain the Memory management technique to improve the CPU utilization and its response speed.

<b>Year / SEM : 3<sup>rd</sup> year / 5<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code :VIRTUAL INSTRUMENTATION AND AUTOMATION LAB- 21RAL55</b>		
<b>CO1</b>	Understanding VirtualInstrument concepts and data acquisition operation	
<b>CO2</b>	Creating VirtualInstruments for practicalworks	

<b>Year / SEM : 3<sup>rd</sup> year / 5<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: MEDICAL ROBOTICS- 21RA581</b>		
<b>CO1</b>	Provide knowledge on the application of robotics in the field of health care	
<b>CO2</b>	Overview of the sensor requirements for localization and tracking in medical applications	
<b>CO3</b>	Understand the design aspects of medical robots	

<b>Year / SEM : 3<sup>rd</sup> year / 5<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Deep Learning for Computer Vision – 21RA582</b>		
<b>CO1</b>	Introduce major deep learning algorithms, the problem settings, and their applications to solve real world problems.	
<b>CO2</b>	Become familiar with neural networks	
<b>CO3</b>	This topics course aims to present the mathematical, statistical and computational challenges of building stable representations for high-dimensional data	
<b>CO4</b>	Discussing recent models from supervised learning	
<b>CO5</b>	Discussing recent models from unsupervised learning	

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: MOBILEROBOTICS –21RA583</b>		
<b>CO1</b>	Provide knowledge on the application of mobile robotics .	

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Quality Control Process and Maintenance Management– 21RA61</b>		
<b>CO1</b>	To facilitate the understanding of Quality Management principles and process.	
<b>CO2</b>	To impart knowledge in maintenance.	
<b>CO3</b>	To know about the fundamentals of maintenance and to implement it.	

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: PLC AND SCADA- 21RA62</b>		
<b>C01</b>	To know the importance and benefits of automation and to understand how to automate an industrial process using PLC.	
<b>C02</b>	To understand the instructions of PLC	
<b>C03</b>	To program PLC using the Ladder diagrams	
<b>C04</b>	Be aware of applications of timers, counters and effective use of program flow control instructions to manage PLC operations.	
<b>C05</b>	Appreciate the need for DCS/ SCADA in Process Control Instrumentation	
<b>C06</b>	To Understand the working of HMI Automation	

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp;Code: Industry 4.0 and IOT- 21RA63</b>		
<b>C01</b>	Introduce the concept of Industry 4.0.	
<b>C02</b>	Understand the basics of Internet of things and protocols.	
<b>C03</b>	Introduction to some of the application areas where Internet of Things can be applied	
<b>C04</b>	To learn about the working of Internet of Things.	
<b>C05</b>	To understand the concepts of Web of Things.	

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp;Code:NEURALNETWORK &amp; FUZZY LOGIC SYSTEMS– 21RA641</b>		
<b>CO1</b>	To expose the students to the concepts of feed forward neural networks.	
<b>CO2</b>	To provide adequate knowledge about feedback networks.	
<b>CO3</b>	To teach about the concept of fuzziness involved in various systems.	
<b>CO4</b>	To provide adequate knowledge about fuzzy set theory	

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp;Code: MICROROBOTICS– 21RA642</b>		
<b>CO1</b>	Provide brief introduction to micromachining and the principles of microsystems	
<b>CO2</b>	Understand the various flexures, actuators and sensor systems.	
<b>CO3</b>	Discuss the methods of implementation of micro robots.	

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Fluid PowerAutomation– 21RA643</b>		
<b>CO1</b>	To make the students to learn the basic concepts of hydraulics and pneumatics and their controlling elements in the area of manufacturing process	
<b>CO2</b>	To train the students in designing the hydraulic and pneumatic circuits using various design procedures.	



<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Automation in Manufacturing- 21RA644</b>		
<b>CO1</b>	Describe the basic concepts of automation in manufacturing systems.	
<b>CO2</b>	Acquire the fundamental concepts of automated flow lines and their □ analysis.	
<b>CO3</b>	Classify automated material handling, automated storage and retrieval systems.	
<b>CO4</b>	Illustrate adaptive control systems and automated inspection methods.	

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: Fundamentals of Robotics-21RA651</b>		
<b>CO1</b>	To introduce the functional elements of Robotics	
<b>CO2</b>	To impart knowledge on the direct and inverse kinematics	
<b>CO3</b>	To introduce the manipulator differential motion and control	
<b>CO4</b>	To educate on various path planning techniques	
<b>CO5</b>	To introduce the dynamics and control of manipulators	

<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study :2022-23</b>
<b>Course Name&amp; Code: Introduction to PLC- 21RA652</b>		
<b>CO1</b>	The fundamentals of Automation	
<b>CO2</b>	The concept of PLC and its Programming using LadderDiagram..	

<b>CO3</b>	The basics of HMI and Installations in PLC.
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<b>Year / SEM : 3<sup>rd</sup> year / 6<sup>th</sup> sem</b>		<b>Year of Study : 2022-23</b>
<b>Course Name&amp; Code: FINITE ELEMENT ANALYSIS LAB- 21RAL66</b>		
<b>CO1</b>	To learn the basic principles of finite element analysis procedure.	
<b>CO2</b>	To understand heat transfer problems with application of FEM	
<b>CO3</b>	Solve 1 D, 2 D and dynamic problems using Finite Element Analysis approach	
<b>CO4</b>	To learn and apply finite element solutions to structural, thermal, dynamic problem to develop the knowledge and skills needed to effectively evaluate finite element analyses.	

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>		<b>Year of Study : 2023-24</b>
<b>Course Name&amp; Code: INDUSTRIAL ROBOTICS: Field and ServiceRobotics- 21RA71</b>		
<b>CO1</b>	To know types of industrial robots.	
<b>CO2</b>	To Enlighten the students in the use robots for inspection.	
<b>CO3</b>	To Enlighten the students in different applications of robots.	
	To develop the student's skills in understanding the selection of robots for different applications.	
<b>CO5</b>	To understand the advanced material handling methods.	

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>	<b>Year of Study :2023-24</b>
<b>Course Name&amp; Code: Industrial DataNetworks–21RA72</b>	
<b>CO1</b>	To educate on the basic concepts of data networks
<b>CO2</b>	To introduce the basics of internetworking and serial communications
<b>CO3</b>	To provide details on HART and Field buses
<b>CO4</b>	To educate on MODBUS, PROFIBUS and other communication protocol
<b>CO5</b>	To introduce industrial Ethernet and wireless communication

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>	<b>Year of Study : 2023-24</b>
<b>Course Name&amp; Code: TotalQuality Management– 21RA731</b>	
<b>CO1</b>	Understand various approaches to TQM
<b>CO2</b>	Understand the characteristics of quality leader and his role
<b>CO3</b>	Develop feedback and suggestion systems for quality management.
<b>CO4</b>	Enhance the knowledge in Tools and Techniques of quality management

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>	<b>Year of Study : 2023-24</b>
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<b>Course Name&amp; Code:Smart Manufacturing -21RA732</b>	
<b>CO1</b>	To present a problem oriented in depth knowledge of Smart Manufacturing.
<b>CO2</b>	To address the underlying concepts and methods behind Smart Manufacturing.

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>	<b>Year of Study : 2023-24</b>
<b>Course Name&amp; Code: Motors Drives and Power Electronics- 21RA741</b>	
<b>CO1</b>	To give an overview of applications power electronics, different types of power semiconductor devices, their switching characteristics.
<b>CO2</b>	To explain power diode characteristics, types, their operation and the effects of power diodes on RL circuits
<b>CO3</b>	To explain the techniques for design and analysis of singlephase diode rectifier circuits
<b>CO4</b>	To explain different power transistors, their steady state and switching characteristics and imitations.

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>	<b>Year of Study : 2023-24</b>
<b>Course Name&amp; code: Digital Image Processing- 21RA742</b>	
<b>CO1</b>	Understand the fundamentals of digital image processing
<b>CO2</b>	Understand the image transform used in digital image processing
<b>CO3</b>	Understand the image enhancement techniques used in digital image processing
<b>CO4</b>	Understand the image restoration techniques and methods used in digital image processing
<b>CO5</b>	Understand the Morphological Operations and Segmentation used in digital image processing

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>	<b>Year of Study : 2023-24</b>
<b>Course Name: INTRODUCTION TO MOBILE ROBOTICS– 21RA751</b>	
<b>CO1</b>	Provide knowledge on the application of mobile robotics

<b>Year / SEM : 4<sup>th</sup> year / 7<sup>th</sup> sem</b>	<b>Year of Study : 2023-24</b>
<b>Course Name&amp; Code:INTRODUCTION to Automation– 21RA752</b>	
<b>CO1</b>	To impart knowledge of CIM and Automation and different concepts of automation
<b>CO2</b>	To understand how to automate an industrial process using PLC.
<b>CO3</b>	To understand the instructions of PLC
<b>CO4</b>	To program PLC using the Ladder diagrams
<b>CO5</b>	To make the students to learn the basic concepts of hydraulics and pneumatics and their controlling elements in the area of manufacturing process