		Department of Computer Science & Engineering
		Cousrse Outcomes
nd Year-3 rd Se	mester	
bject Code	Subject !	Name
/A 1308		Mathematics
	CO1	Apply concepts of Group theory to the model real-world problems.
	CO2	Analyze the use of graphs in Engineering applications.
	соз	Extend the concepts of Predicate Calculus in computer science like design of computing machines, artificial intelligence,
		definition of data structures for programming languages etc
	CO4	Evaluate problems related to mathematical logic and pigeonhole principle.
	COS	Solve problems using Permutation and Combination, Recursion and generating functions.
S 1302	Data Str	
.5 2502	CO1	Describe the working of data structures like array, stack, queue, linked list, tree and graph
	CO2	Explain common applications for array, stack, queue, linked list, tree and graph
	CO3	Solve a given problem using appropriate data structures and algorithm
	CO4	Discuss about the working of the principal algorithms for sorting, searching, and hashing
	COS	Correlate the performance of a program with respect to the choice of data structure & algorithm
CS 1304		ircuits and Logic Design
1501	CO1	Relate and implement Boolean algebra in Digital Logic Circuits
	CO2	Design combinational logic circuits
	CO3	Design sequential logic circuits
	CO4	Interpret various logic families
	COS	Explain the working of multivibrator circuits
CS 1306		er Organization and Architecture
C5 1500	CO1	Demonstrate competence in mapping relation between computer programming and computer organization and architecture.
	1001	
	CO2	Identify computer model requirements.
	CO3	Analyze and evaluate the competence of a model.
	CO4	Identify the evolution of Computer systems and the complexities in data processing.
	COS	Propose various microprocessor design alternatives to learn the concepts of parallel processing, pipelining and interprocesso
		system performance
CS 1307	Intelled	tual Property Rights and Software Ethics
05 2507	CO1	Identify regulations, legislation and standards for Intellectual Property Rights
	CO2	Describe the impact of Intellectual Property Rights on engineering and industrial practices vis a vis social, environmental and
		economic contexts.
	соз	Apply principles of Intellectual Property Rights to sustainable design and development.
	CO4	Analyse ethical lapses and recognize ethical dilemmas.
	COS	Distinguish professional issues which arise in the intellectual property law context
CS 1308	Object	Oriented Concepts & Programming using C++
	CO1	Describe the principles of Object Oriented Programming and C++ features that support OOP Paradigm.
	CO2	Compare and differentiate between OOP and structured or procedural programming.
	CO3	Explain programming constructs and features of C++ programming language.
	CO4	Employ C++ constructs to write Object Oriented Programs to solve problems.
	COS	Adapt to bottom up approach of problem solving using classes and objects.
CS 1361		tructures Lab
	CO1	Write program related to application of data structures using programming constructs of a language like C programming
	- 11 11	language
	CO2	Identify the suitable input and output for a specified problem statement
	CO3	Conclude the working of various algorithms in terms of time and space complexity
	CO4	Examine the errors enounterd in the program using appropriate tools and fix them
	COS	Write well-indented and well-documented code
CS 1363		l Circuits and Logic Design Lab
23 1303	CO1	Design and analyze basic combinational circuits.
*	CO2	Relate logic circuits to solve digital electronics problems.
	CO3	Express flip-flops as memory elements and design digital electronics circuit with a memory.
31	CO4	Design small sequential circuits and implement them in software and hardware.
374.8	CO5	Design programmable counters and implement them in software and hardware.
CC 12CF		t Oriented Concepts & Programming using C++ Lab
CS 1365		Tell the syntax and semantics of the C++ programming language.
	CO1	Tell the syntax and semantics of the cr. programming language.
	000	
	CO2	Apply the concepts and principles of Object Oriented programming while writing programs using C++. Extend the concepts of encapsulation, polymorphism, inheritance using class, objects, function/operator overloading, function

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	CO4	Write programs with Inheritance, virtual functions that supports code reusability, dynamic binding and run time polymorphism
s#	CO5	Adapt to bottom up approach of problem solving using classes and objects.
P1391	Constitu	tion of India
	CO1	Describe the importance of the Constitution of India.
	CO2	Identification and use of different types of political system in India.
	CO3	Explain the parliamentary form of government in India.
	CO4	Investigation of urban and local government systems and development of ideas for the betterment of government.
	CO5	Development of the concept of democracy, fundamental rights, and laws
P 1392	Indian T	raditional Knowledge
7	CO1	Identification of core features and importance of Vedic knowledge.
	CO2	Discuss modern science, Indian knowledge, and yogic practices.
	CO3	Develop philosophical understanding of Indian traditional and Indian linguistic systems.
	CO4	Illustrate the impact of yogic practices.
- 1	COS	Measure the impact of Indian traditional knowledge.
V 44b		Weasure the impact of mulan traditional knowledge.
nd Year-4th		LAT the Late Complete and Equation Application
/A1408		cal Methods, Complex and Fourier Analysis
	CO1	Create ability to handle complex integrations appearing in different engineering areas.
	CO2	Apply the concepts of interpolation to find best Curve fitting for given data and also evaluate Integration and differentiation
		numerically.
	CO3	Solve differential equations numerically.
	CO4	Evaluate solution of algebraic and Transcendental equations and system of linear equations using iterative methods
	CO5	Associate between the concepts of Fourier analysis and applications in the field of Signal processing, Image processing etc.
CS 1403	Datahas	se Management Systems
.3 1403		Describe fundamental elements of a relational database management system
	CO1	
	CO2	Design entity-relationship diagrams to represent simple database application scenarios
	CO3	Explain the basic concepts of relational data model, Entity-relationship model, Relational database design, relational algebra and database language SQL
	CO4	Apply and relate the concept of transaction, concurrency control and recovery in database
	CO5	Analyze various Normalization techniques and improve the database design by normalization
CS 1405	Design	and Analysis of Algorithms
	CO1	Define asymptotic notations and solve problems related to it
	CO2	Calculate time and space complexities for recursive/non-recursive algorithm based on following algorithm design techniques
	552	divide and conquer, greedy, dynamic programming and branch and bound.
	602	
	CO3	Select appropriate algorithm design technique to solve a given problem.
	CO4	Explain the working of existing algorithm / algorithm design techniques
	CO5	Discuss and describe the classes P, NP, and NP-Complete
CS 1406		ed Computer Organization & Architecture
	CO1	Review Computer System Architecture.
	CO2	Evaluate complexities in data representation and processing.
	CO3	Apply concepts of parallel processing and multiprocessor architectures in reviewing processors.
	CO4	Solve problems related to multiprocessing, distributed processing and non von Neumann architectures.
	CO5	Illustrate the concept of data flow computers, Reduction computer architecture and systolic architecture
C.S 1437	Open E	Elective-I # Enterprose Resource Planning
	CO1	Identify the important business functions provided by typical business software such as enterprise resource planning and
		customer relationship management.
	CO2	Illustrate basic concepts of ERP systems for manufacturing or service companies
	CO3	Analyze the technical aspect of telecommunication systems, internet and their roles in business environment.
	CO4	Reframe open-ended problem descriptions to feasible solutions
2	CO5	Illustrate the use of various tools used in ERP for industry
	Prograi	mme Elective-I #
CS1435	Python	Programmming
	CO1	Define the basic structure of python programming.
	CO2	Differentiate imperative, functional and procedural programming features in Python
	соз	Practice features for designing and implementing python program.
	CO4	Compose applications using various libraries and concepts of Python.
	COS	Select methods to build and package Python modules for reusability
CS 1462		
C3 1402	and the second second second	ase Management Systems Lab
s."	CO1	Select appropriate SQL/MongoDB commands and functions for a given query on the database.
	CO2	Infer constraints and relationships between tables from conceptual/logical level schema and convert them into relationship
	1 4 5	integrity constraints at the physical level schema.
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and a	CO4	Compute amount of information in terms of entropy and apply in source coding and channel coding
	CO5	Compose methods for analyzing the performance of error control codes
1561	Operatin	ng Systems Lab
	CO1	Illustrate the concept of process and thread creation for executing user's task.
	CO2	Apply the theory for implementing various process scheduling algorithms.
	соз	Produce a optimal solution for data inconsistency problem by synchronizing processes and threads.
	CO4	Examine the various memory management strategies for efficient resource utilization and implement it.
	CO5	Analyse and debug various technical issues related to operating systems services and use different types of Modern OS
C 1 F C C	C-6	
S 1566	CO1	e Engineering and Object-Oriented Analysis Lab Demonstrate competence in using engineering fundamentals to visualize solutions using knowledge of software engineering.
	No.	skills.
	CO2	Extend an ability to formulate a solution plan and methodology for an engineering problem using software engineering.
	соз	Apply an ability to formulate and interpret a model for project management
	CO4	Identify modern engineering tools, techniques, and resources to solve software related problems.
	CO5	Develop a quality software products by possessing the leadership skills as an individual or contributing to the team development and demonstrating effective and modern working strategies by applying both communication and negotiation
S1567	Scripting	management skill. g Language Lab
31307.		
- (5) (811-)6	CO1	Design simple websites using HTML, CSS and Javascript Create front and web applications using Applications
	CO2	Create front-end web applications using Angular JS
	CO3	Build server-side applications using Node JS and Express JS
	CO4	Connect front-end web applications with Mongo DB database
	CO5	Create a program for solving different problems and evaluate its performance and effectiveness.
S 1581		al Training/Industrial Visit I
will late	CO1	Describe fundamental principles of science and engineering.
	CO2	Discover comprehensive learning platform where they can enhance their employ ability skills
	CO3	Express their knowledge in one particular technology.
45	CO4	Develop self-confidence in finding their own proficiency
,	CO5	Illustrate competence in listening, speaking, and presentation.
rd Year-6th Se	emester	
S 1604	Formal	Languages and Automata Theory
	CO1	Explain different concepts in automata theory and formal languages.
	CO2	Produce various grammars and their acceptors.
	CO3	Analyze the various language acceptors.
	CO4	Acquire a fundamental understanding of computational models related to decidability and recursive enumerability.
	CO5	Illustrate various proofs using mathematical principles.
S 1606	Comput	ter Networks-II
.5 1000	CO1	Understand and discover the engineering fundamentals involved in Computer Net york and other related frame work
	CO2	Identify the complex engineering problem relating computer network relating to host Identification data delivery and routing
	соз	Ability to formulate a solution plan and methodology for an engineering problem concerning Computer Networking like Subnetwork, super network, and DNS etc
	CO4	Ability to formulate and interpret a model based on the Computer Networks and its related framework.
	CO5	Understand and explain basic responsibilities/concept of protocols in protocol present stack ,DNS, DHCP ,security, etc.
CS 1663	Compu	ter Networks Lab
e n estiri	CO1	Identify and understand various functions used in socket programs
	CO2	Develop and test of socket program for client server interaction for various purpose.
71 KW 1911	CO3	Implementing and Validate Sub network with static and various dynamic routing 21 stocols.
	CO4	Analyze the packet structure of various protocols used for communication
and the same	COS	Understand the fundamentals of SDN
201000	Paralle	l Programming Lab
CS1666	001	Classify the different parallel programming constructs.
CS1666	CO1	
CS1666	CO2	Simulate various parallel programming constructs in any high level language.
CS1666	CO2 CO3	Select appropriate constructs to be used in different algorithms.
CS1666	CO2	Select appropriate constructs to be used in different algorithms. Justify the output of a program in solving different problems and evaluate its point in lance and effectiveness.
CS1666	CO2 CO3	Select appropriate constructs to be used in different algorithms.

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	CO3	Write Oracle PL/SQL Programs for data processing.
	CO4	Design nested queries for efficient data processing on the database.
	CO5	Test an SQL interface of a multi-user relational DBMS package to create, secure, populate, maintain, and query a database.
1464	Advanced	l Programming Lab
	CO1	Discuss the concept of objects and class.
	CO2	Evaluate requirements for given problem and decide the functionalities of programs accordingly.
	CO3	Illustrate a diverse set of problem solutions using techniques of Interface, Packages, File Handling, Multi-threading, etc
	CO4	Apply the concept java network program to establish connection between client and server.
	CO5	Design modern website to fulfill users requirement
1465	Algorithm	n Lab
	CO1	Calculate time and space complexities for algorithms using mathematical models
	CO2	Calculate time and space complexities for algorithms by performing an empirical measurement
	CO3	Select appropriate algorithm design technique to solve a given problem
	CO4	Write a computer program to implement any algorithm using a programming language
	CO5	Choose the most optimal algorithm by comparing time and space complexities
Year-5th Se	mester	
1502	Probabil	ty, Statistics and Stochastic Processes
	CO1	Explain concept of probability, random variables.
	CO2	Differentiate the ideas between discrete and continuous random variables.
	соз	Discuss fundamentals of probability and statistical theories.
	CO4	Apply the knowledge of probability and statistics to analyze different real-world situations.
	CO5	Develop the models of many time dependent processes such as signals in communications, time series analysis.
5 1502	Operatir	ng Systems
1302	CO1	Describe the different operating system architectures and structures.
	CO2	Select the appropriate scheduling algorithms or techniques for efficient utilization of computer resource like CPU, Memory,
		etc.
		li
	соз	Interpret theory of data inconsistency problem and provide a procedure for synchronization problem.
	CO3 CO4	Manage various technical issues related to operating systems' services using principles of computer science and engineering.
147 - 1 140 - 1 11 X		Interpret theory of data inconsistency problem and provide a procedure for synchronization problem. Manage various technical issues related to operating systems' services using principles of computer science and engineering. Compose methods for analyzing the performance of various identified algorithms or techniques in operating systems
201509	CO4	Manage various technical issues related to operating systems' services using principles of computer science and engineering. Compose methods for analyzing the performance of various identified algorithms or techniques in operating systems
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S 1509	CO4 CO5 Comput CO1 CO2 CO3 CO4 CO5 Softwal CO1 CO2 CO3 CO4 CO5 Prograi BIOINF CO1	Manage various technical issues related to operating systems' services using principles of computer science and engineering. Compose methods for analyzing the performance of various identified algorithms or techniques in operating systems er Networks – I Understand and identify the engineering fundamentals concerning Data Communication and Computer Network. Identify the complex engineering problem involved in Data communication and its architecture for a successful network base communication. Ability to Practice and formulate a solution for an engineering problem concerning any layers in Data Communication model Demonstrate an ability to formulate and interpret a model based on the fundamentals of Computer Networks Compare and understand the IOS reference model and TCP-IP reference medel for data communication re Engineering Demonstrate competence in using engineering fundamentals to visualize solutions using knowledge of software engineering skills. Extend an ability to formulate a solution plan and methodology for an engineering problem using software engineering. Apply an ability to formulate and interpret a model for project management Explain an ability to define complex problem , find and analyze requirements Apply new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of t society in all aspects and evolving into their continuous professional development. mme Elective-II# DORMATICS(CS1540/CS1632) Describe basic principles and concepts of biology, computer science and mathematics
S 1509	CO4 CO5 Comput CO1 CO2 CO3 CO4 CO5 Softwal CO1 CO2 CO3 CO4 CO5 Prograi BIOINF CO1 CO2	Manage various technical issues related to operating systems' services using principles of computer science and engineering. Compose methods for analyzing the performance of various identified algorithms or techniques in operating systems er Networks – I Understand and identify the engineering fundamentals concerning Data Communication and Computer Network. Identify the complex engineering problem involved in Data communication and its architecture for a successful network base communication. Ability to Practice and formulate a solution for an engineering problem concerning any layers in Data Communication model Demonstrate an ability to formulate and interpret a model based on the fundamentals of Computer Networks Compare and understand the IOS reference model and TCP-IP reference model for data communication re Engineering Demonstrate competence in using engineering fundamentals to visualize solutions using knowledge of software engineering skills. Extend an ability to formulate a solution plan and methodology for an engineering problem using software engineering. Apply an ability to formulate and interpret a model for project management Explain an ability to define complex problem , find and analyze requirements Apply new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of t society in all aspects and evolving into their continuous professional development. mme Elective-II# ORNMATICS(CS1540/CS1632) Describe basic principles and concepts of biology, computer science and mathematics Choose suitable computational models to solve the problem for a given biological sequence analysis
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S 1509	CO4 CO5 Comput CO1 CO2 CO3 CO4 CO5 Softwar CO1 CO2 CO3 CO4 CO5 Prograr BIOINF CO1 CO2 CO3 CO4 CO5 CO4 CO5 CO5	Manage various technical issues related to operating systems' services using principles of computer science and engineering. Compose methods for analyzing the performance of various identified algorithms or techniques in operating systems er Networks – I Understand and identify the engineering fundamentals concerning Data Communication and Computer Network. Identify the complex engineering problem involved in Data communication and its architecture for a successful network base communication. Ability to Practice and formulate a solution for an engineering problem concerning any layers in Data Communication model Demonstrate an ability to formulate and interpret a model based on the fundamentals of Computer Networks Compare and understand the IOS reference model and TCP-IP reference model for data communication re Engineering Demonstrate competence in using engineering fundamentals to visualize solutions using knowledge of software engineering skills. Extend an ability to formulate a solution plan and methodology for an engineering problem using software engineering. Apply an ability to formulate and interpret a model for project management Explain an ability to define complex problem, find and analyze requirements Apply new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of t society in all aspects and evolving into their continuous professional development. mme Elective-II# Describe basic principles and concepts of biology, computer science and mathematics Choose suitable computational models to solve the problem for a given biological sequence analysis Compare various approaches of data analysis by evaluating their advantages and disadvantages Analyze various bioinformatics tools for handling biological data and to solve problems by applying acquired knowledge, fact techniques and rules in a different way. Develop computer programs for bioinformatics data analysis.
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CO1 dentify the important business function prouded by typical business software such as enterprise resource planning at customer relationship managemen. CO2 illustrate basic concepts of ERP systems for manufacturing or service companies CO3 Analyze the exchical assect or telecommunications, immered and their roles in business environment. CO4 Reframe open-ended problem descriptions to feasible solutions. Blustrate the use of various toxis used in ERP for industry CO5 Illustrate the use of various toxis used in ERP for industry CO6 Illustrate the use of various toxis used in ERP for industry CO7 Illustrate the use of various toxis used in ERP for industry CO8 Illustrate the use of various toxis used in ERP for industry CO8 Illustrate the use of various toxis used in ERP for industry CO9 Illustrate the use of various toxis used in ERP for industry CO9 Illustrate the use of various toxis used in ERP for industry CO9 Illustrate the user of the industry CO9 Illustrate the user of the industry CO9 Section blood diagrams for indirecting the MPW with perspheral devices. Illustrate the execution of instructions by the MP user indirecting the ERP with emphasized advices as per the problem statement for creating an app of the problem statement for creating an appearance of the problem of the problem statement of problem statement for creating and problem statement of problem statement of p		CO1	Identify the important business functions provided by typical business of	
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			Assess various HCI (human-computer interaction) and the psychology behind user decision position	
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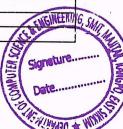
	CO2	Develop a computational model to meet the desired requirements identified within ethical and realistic constraints.
	соз	Select appropriate modern programming languages and technologies known, to develop a sustainable and a robust solution.
	CO4	Analyse the results achieved to understand the performance of the system for optimal result achievement.
	COS	Summarize the important attributes and performance analysis of the proposed system.
th Year-7th Sen		
S 1703	Compile	r Design
31703	CO1	Define the competence in designing compilers .
	CO2	Describe the functioning in various problem domains.
	CO3	Discover complex engineering problem and able to solve it using the concept of compiler design.
	CO4	Analyze and select optimal design scheme using compiler design principles
	COS	Develop and experiment using knowledge of compilers for compiling different programs.
44740		
A1710	-	al Engineering Management
	CO1	Understand different concepts regarding Organization and Productivity in industries.
	CO2	Evaluate control charts for variable as well as attribute data for different types of manufacturing processes and service activities.
	CO3	Identify the techniques, skills and modern management tools necessary for engineering practice.
	CO4	Apply knowledge of science, mathematics and engineering.
	CO5	Analyze the concept of Inventory management and reliability.
CS 1733		raphy & Network Security
	CO1	Define mathematical modelling of a Security services to address modern security issues and challenges.
	CO2	Demonstrate and an ability to formulate a solution plan and methodology for security in information systems using Cryptography
	соз	Analyze diverse set of alternative design solutions to meet the basic requirements and goals of a security system.
	CO4	Recognize technical issues for existing security principles and network applications consistent with their level of knowledge and understanding.
	COS	Develop solutions for existing security principles and network applications.
S 1762		er Design Lab
.3 1702	CO1	Simulate the functioning of various phases of compilers in various problem domains.
	CO2	Devise solutions to solve complex engineering problem.
	CO3	Identify an optimal design among all available design alternatives for further manipulation using compiler design principles to execute the code faster.
	CO4	Apply tools using knowledge of compilers for compiling different programs.
-17-17	CO5	Evaluate the effectiveness of different compilation tools.
CS 1763	Intellige	ent System Lab
	CO1	Classify procedures for Machine Learning algorithms.
	CO2	Simulate various procedures of Machine learning in any high level language.
	CO3	Select appropriate datasets to be used in different algorithms.
	CO4	Justify the application of an algorithm in solving real world problems and evaluate its performance and effectiveness.
	CO5	Apply Machine learning algorithms in solving various rela life problems.
CS 1781	Industri	ial Training/ Course Work II
	CO1	Discover comprehensive learning platform where they can enhance their employ ability skills
	CO2	Identify real lifesituations in industrial organizations and their related environments and accelerating thelearning process
	CO3	Express their knowledge in one particular technology.
	CO4	Develop skills and techniques directly applicable to their career
	CO5	Analyse competence in listening, speaking, and presentation.
4th Year-8th Se		Analyse competence in instenting, speaking, and presentation.
CS 1875	Major F	
	CO1	Analyze, design and implement a computational system to meet desired needs within realistic constraints.
	CO2	Apply modern programming languages and technologies to develop a sustainable and robust software / hardware application or perform qualitative analysis on computational systems using appropriate tools.
	соз	Propose set of alternative design solutions to problems for which standard algorithmic solutions do not exist.
*	CO4	Express ethics, values and respects legal as well as social issues for the computing profession or computational application.
	CO5	Justify the technical design incorporated in the computational system with the help of in-depth analysis, presentation as well a

CS1437/1422 Enterprise Resource Planning



	CO5	Identify introduction to microbiology.			
CS 1540/CS 1632	Bioinfor	matics			
	CO1	Describe basic principles and concepts of biology, computer science and mathematics			
	CO2	Choose suitable computational models to solve the graph law for			
	CO3	Choose suitable computational models to solve the problem for a given biological sequence analysis problem			
	CO4	Compare various approaches of data analysis by evaluating their advantages and disadvantages Analyze various higher matter tools for headline billion to the control of th			
		Analyze various bioinformatics tools for handling biological data and to solve problems by applying acquired knowledge, facts techniques and rules in a different way.			
	CO5	Develop computer programs for bioinformatics data analysis.			
S 1541/CS 1633	Digital I	mage Processing			
	CO1	Describe the fundamental concepts of a digital image processing system.			
	CO2	Analyze images in the spatial domain using mathematical transformation function.			
	CO3	Write the procedure for implemeting various image enhancement techniques .			
	CO4	Interpret image segmentation and representation techniques.			
400	CO5	Select the morphological operation for extracting different features from an image			
S 1542/CS 1635	Embedd	ed Systems			
	CO1	Identify the internal architecture and interfacing of different peripheral devices with Microcontrollers			
	CO2	Understand hardware and software design requirements of embedded systems			
	CO3	Analyze the role of embedded systems in industry			
	CO4	Evaluate the requirements of programming Embedded Systems I had been seen as a second			
		Evaluate the requirements of programming Embedded Systems, related software architectures and tool chain for Embedded Systems			
	CO5				
S 1543		Design real time embedded systems using the concepts of RTOS.			
1	CO1				
	CO2	Explain the sources of power dissipation in MOS devices			
		Classify the special techniques to mitigate the power consumption in VLSI circuits			
	CO3	Summarize the power optimization and trade-off techniques in digital circuits			
	CO4	Compare the power estimation at logic and circuit level			
	CO5	Formulate the software design for low power in various level			
S 1544		ion Retrieval			
	CO1	Define information retrieval models.			
	CO2	Develop Web Search Engine			
	CO3	Analyze the different tools, techniques and algorithms with an experiment.			
	CO4	Experiment with Hadoop and Map Reduce.			
	CO5	Select appropriate tools and techniques.			
S 1546/CS 1404	Compute	er Graphics			
	CO1	Describe the competence in application of mathematical modelling to computer graphics			
, in the same	CO2	Explain an ability to interpret a solution plan and methodology for an engineering problem using computer graphics			
	соз	Discuss an ability to conduct investigations of technical issues related to computer vision with their level of knowledge and			
		understanding			
	CO4	Illustrate an ability to advance an engineering design to defined end state			
	CO5	compare different algorithms used to solve a computer vision problem			
S 1752		d Algorithms			
	CO1	Describe the divide-and-conquer paradigm with an approach to design an algorithm.			
	CO2	Define the dynamic-programming paradigm to explain an algorithmic design.			
	CO3	Identify the greedy paradigm with an approach to design an algorithm.			
	CO4	Analyze randomized algorithms for a given set of problems.			
	CO5				
S 1750/CS 1644	CO5 Explain competitive analysis of various algorithms for a given set of problems. 4 Artificial Intelligence				
3 1739/03 1044					
	CO1	Identify areas in engineering and real life where Artificial Intelligence (AI) can find its application			
	CO2	Discuss the role of mathematical and statistical models in Al			
	CO3	Demonstrate an ability to formulate problems using AI			
	CO4	Analyse techniques and resources to solve AI problems			
	CO5	Test techniques and resources to solve AI problems			
S 1545		Neural Networks			
	CO1	Display sufficient understanding of mathematical and engineering fundamentals in the perspective of Artificial neural network theory.			
		Identify Artificial Neural network suitable for a complex problem.			
×:	ICO2	, rear at network satisfies of a complex problem,			
× = 4	CO2 CO3	Awake the importance of tolerance of imprecision and uncertainty for design of robust and low-cost intelligent machines.			
	CO3	Awake the importance of tolerance of imprecision and uncertainty for design of rebust and low-cost intelligent machines. Investigate a problem to identify technical issues and solve the problems using various Artificial neural network. Design real-life application using various neural network algorithm.			

CS 1634 Data Warehousing and Data Mining



-	:02	Identify classification and Genetics in biology
	:03	Understand cell structure and functions, inheritance & evolution
10	04	Illustrate Macromolecular analysis and Metabolism
	:05	Identify introduction to microbiology.
		Programme Elective II and III
1531 I	nformatio	n Transmission and Coding Theory
	01	Describe the principles and applications of information theory.
1	CO2	Differentiate the various types of coding schemes available in coding theory
1	соз	Compare various error control encoding and decoding techniques
	CO4	Compute amount of information in terms of entropy and apply in source coding and channel coding
	CO5	Compose methods for analyzing the performance of error control codes
1532	Advanced	Java Programming
	CO1	Write program codes displaying competence in basic object-oriented programming using Java
1	CO2	Compare and able to develop scalable network applications using Java
1 - 2	CO3	Illustrate and practice component-based software.
	CO4	Explain and able to conduct investigations of technical issues consistent with their level of knowledge on distributed
		applications.
	CO5	Design and implement the understanding pertaining to database applications
1533	System Pr	ogramming the second state of the second state
	CO1	Describe the evolution of Programming and understand how an Operating and other system softwares have evolved since its
	CO2	Examine various system programs and it's usage for proper functioning of Computer System.
	соз	Analyze the theory and design the procedure for implementing assembler and macro-processor system programs.
	CO4	Compare various program loading schemes and discuss issues pertaining to design of some loading schemes.
	CO5	Understand the basic concepts of Compiler Program and issues related to its design.
S 1534/CS 1507		
5 1534/CS 1507	CO1	Identify effectively algebraic techniques to analyze basic discrete structures and algorithms.
	CO2	Apply the concepts of sets, integers, reals and functions of such quantities to solve simple problems
	CO3	Understand and relate the graphs and related discrete structures to practical examples
	CO4	Understand the notion of mathematical and algorithmic thinking and apply them for problem solving
	COS	Infer logical reasoning to solve a problem
S 1535/CS 1636		
2 1222/C2 1020	CO1	Distinguish competence in graphical modelling of problems
	CO2	Compute a solution process using graph theoretical concepts and analyze results for multiple problems
	CO3	Illustrate and interpret a graph model.
	CO4	Develop diverse set of alternative design solutions for multiple problems
	COS	Analyze and interpret the results using contemporary tools.
C 1526/CC 1620		Simulation and Modeling
.2 1220/C2 1020	CO1	Explain the understanding of mathematical modeling through use in computer system modelling and simulations
	1001	Explain the understanding of mathematical modeling and a second of the s
	CO2	Describe the system behavior in investigating discrete event simulation, modeling and system dynamics
	CO3	Develop simulation models
	CO4	Test validity of model through analysis of output data
		Simulate the models for the purpose of optimum control by using different software.
00.4527	CO5	ed Web Technologies
CS 1537		Define the basic terms of HTML, CSS and JavaScript
	CO1	Identify appropriate web based technologies for developing dynamic webpages
	CO2	Choose an appropriate database language and technologies for conecting front end to backend
	CO3	Distinguish major frameworks for development of web services and cloud applications
	CO4	Test appropriate content management system for developing scalable websites
00 4500 /00 400	CO5	
CS 1538/CS 160		Oriented Analysis and Design Using UML
	CO1	Identify object oriented design techniques suitable for a complex problem Demonstrate an ability to formulate a solution plan and methodology for an engineering problem using object oriented analy
	CO2	
		and design using UML.
	CO3	Determination of the formula and interpretation of a model for project management.
	CO4	Investigate a problem to identify technical issues and solve the problems using variousobject oriented design tools and
N		techniques.
00.4706	CO5	Design real-life application using modern UML tools, techniques and resources .
CS 1539	Biology	
	CO1	Describe how biological observations lead to major discoveries
14 1 191 1	CO2	Identify classification and Genetics in biology
	CO3	Understand cell structure and functions, inheritance & evolution
1/	CO4	Illustrate Macromolecular analysis and Metabolism
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	137	[3] Date

	CO5	Decide the individual specialization from the recent trends in computer science of their interest.
S 1653	Neural Ne	tworks and Deep Learning
	CO1	Discuss the computational complexity of most neural network problems requires us regularly to deal with approximate techniques
	CO2	Evaluate the basic problem solving methods based on Al-based search, knowledge representation, reasoning, planning, and machine learning algorithms.
	соз	Develop a set of alternative design solutions to problems for which standard algorithmic solutions do not exist.
	CO4	Classify the different technical issues related to Deep Architectures consistent with their level of knowledge and understanding
S 1654/CS 1623	CO5	Construct neural network models and make these models work on practical problems in deep Learning
3 1034/03 1023	CO1	Enumerate methods used in preprocessing, image analysis and information extraction from different types of imageries.
	CO2	Select and apply appropriate data manipulation and visualization methods for a number of earth science applications.
	CO3	Explain the use of geographical applications in remote sensing
	CO4	Focus photographic techniques, photogrammetric, multispectral, hyper spectral, thermal imaging, and RADAR/ LIDAR images.
20.4555 (00.450.4	CO5	Differentiate between contemporary data manipulation and visualization tools in remote sensing
.S 1655/CS 1624		ous Mobile Robotics and Computational Intelligence
	CO1	Identify application of Robots
	CO2	Describe the evolution, kind of robots and basics of design of a Robotics System
	CO3	Choose correct choices of Locomotion, Kinematics, Perception techniques
	CO4	Apply Intelligent Algorithms for decision making in Motion Planning and path optimization
20.4.00.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.	CO5	Develop simple robot control systems integrating perception, planning, and action
CS 1656/CS 1625,		nical Information System
	CO1	Define appropriate data manipulation and visualization method for a number of Earth Science applications in GIS
NOTE IN CO.	CO2	Operate PC-based visualization software effectively.
	CO3	Illustrate earth science data and present the result in an organized and concise fashion.
ty if	CO4	Connect the hand-held GPS units for demarking geographical location/ latitude /longitude/etc.
	CO5	Compare different contemporary methods used in earth science data interpretation
CS 1657	Soft Skills	s and Interpersonal Communication
	CO1	Define and describe personality types, communication styles, low/high context cultures and other terms and concepts important for interpersonal and communication skills
haraca, tana	CO2	Apply principles of negotiations to persuade and negotiate with idealistic and practical moral values
	CO3	Analyze, explain and solve conflicts using principles of conflict resolution
V + 5	CO4	Describe and explain principles of behavioral psychology
	CO5	Manage time, stress, criticism, and team by formulating strategies appropriate for the situation and type of people.
CS 1658	Human R	Resource Development and Organizational Behavior
	CO1	Determine the concept of organizational behavior principles and their influence in workplace.
	CO2	Analyze the complexities associated with management of individual human behaviour as well as group behavior in the organization.
	CO3	
		of people in the organization.
	CO4	Express and defend opinions through the use of management case studies.
CS 1741	CO4 CO5	of people in the organization. Express and defend opinions through the use of management case studies. Infer critical thinking and apply in research, writing and presentation skills.
CS 1741	CO4 CO5	of people in the organization. Express and defend opinions through the use of management case studies. Infer critical thinking and apply in research, writing and presentation skills. Learning
CS 1741	CO4 CO5 Machine	of people in the organization. Express and defend opinions through the use of management case studies. Infer critical thinking and apply in research, writing and presentation skills. Learning Display sufficient understanding of mathematical and engineering fundamentals in the perspective of machine learning theory.
CS 1741	CO4 CO5 Machine	of people in the organization. Express and defend opinions through the use of management case studies. Infer critical thinking and apply in research, writing and presentation skills.
CS 1741	CO4 CO5 Machine CO1	of people in the organization. Express and defend opinions through the use of management case studies. Infer critical thinking and apply in research, writing and presentation skills. Learning Display sufficient understanding of mathematical and engineering fundamentals in the perspective of machine learning theory identify problems that can be solved using machine learning techniques.
CS 1741	CO4 CO5 Machine CO1 CO2 CO3	of people in the organization. Express and defend opinions through the use of management case studies. Infer critical thinking and apply in research, writing and presentation skills. Learning Display sufficient understanding of mathematical and engineering fundamentals in the perspective of machine learning theory identify problems that can be solved using machine learning techniques. Appreciate the importance of tolerance of imprecision and uncertainty for design of robust and low-cost intelligent machines. Investigate a problem to identify technical issues and solve the problems using various machine learning techniques.
	CO4 CO5 Machine CO1 CO2 CO3 CO4	of people in the organization. Express and defend opinions through the use of management case studies. Infer critical thinking and apply in research, writing and presentation skills. Learning Display sufficient understanding of mathematical and engineering fundamentals in the perspective of machine learning theory identify problems that can be solved using machine learning techniques. Appreciate the importance of tolerance of imprecision and uncertainty for design of robust and low-cost intelligent machines. Investigate a problem to identify technical issues and solve the problems using various machine learning techniques. Design real-life applications using machine learning techniques.
CS 1741 CS 1659	CO4 CO5 Machine CO1 CO2 CO3 CO4 CO5 Ethical H	of people in the organization. Express and defend opinions through the use of management case studies. Infer critical thinking and apply in research, writing and presentation skills. Learning Display sufficient understanding of mathematical and engineering fundamentals in the perspective of machine learning theory identify problems that can be solved using machine learning techniques. Appreciate the importance of tolerance of imprecision and uncertainty for design of robust and low-cost intelligent machines investigate a problem to identify technical issues and solve the problems using various machine learning techniques. Design real-life applications using machine learning techniques.
	CO4 CO5 Machine CO1 CO2 CO3 CO4 CO5 Ethical H	of people in the organization. Express and defend opinions through the use of management case studies. Infer critical thinking and apply in research, writing and presentation skills. Learning Display sufficient understanding of mathematical and engineering fundamentals in the perspective of machine learning theory identify problems that can be solved using machine learning techniques. Appreciate the importance of tolerance of imprecision and uncertainty for design of robust and low-cost intelligent machines investigate a problem to identify technical issues and solve the problems using various machine learning techniques. Design real-life applications using machine learning techniques. Examine competence in applying acquired expertise in computer networks
	CO4 CO5 Machine CO1 CO2 CO3 CO4 CO5 Ethical H CO1 CO2	of people in the organization. Express and defend opinions through the use of management case studies. Infer critical thinking and apply in research, writing and presentation skills. Learning Display sufficient understanding of mathematical and engineering fundamentals in the perspective of machine learning theory. Identify problems that can be solved using machine learning techniques. Appreciate the importance of tolerance of imprecision and uncertainty for design of robust and low-cost intelligent machines. Investigate a problem to identify technical issues and solve the problems using various machine learning techniques. Design real-life applications using machine learning techniques. Iacking Examine competence in applying acquired expertise in computer networks Determine an ability to interpret and evaluate behaviour of malwares and their countermeasures
CS 1741	CO4 CO5 Machine CO1 CO2 CO3 CO4 CO5 Ethical F CO1 CO2 CO3	of people in the organization. Express and defend opinions through the use of management case studies. Infer critical thinking and apply in research, writing and presentation skills. Learning Display sufficient understanding of mathematical and engineering fundamentals in the perspective of machine learning theory identify problems that can be solved using machine learning techniques. Appreciate the importance of tolerance of imprecision and uncertainty for design of robust and low-cost intelligent machines. Investigate a problem to identify technical issues and solve the problems using various machine learning techniques. Design real-life applications using machine learning techniques. lacking Examine competence in applying acquired expertise in computer networks Determine an ability to interpret and evaluate behaviour of malwares and their countermeasures Evaluate the approaches used by hackers and work on its countermeasures to reach a valid conclusion
	CO4 CO5 Machine CO1 CO2 CO3 CO4 CO5 Ethical H CO1 CO2	of people in the organization. Express and defend opinions through the use of management case studies. Infer critical thinking and apply in research, writing and presentation skills. Learning Display sufficient understanding of mathematical and engineering fundamentals in the perspective of machine learning theory identify problems that can be solved using machine learning techniques. Appreciate the importance of tolerance of imprecision and uncertainty for design of robust and low-cost intelligent machines. Investigate a problem to identify technical issues and solve the problems using various machine learning techniques. Design real-life applications using machine learning techniques. Examine competence in applying acquired expertise in computer networks Determine an ability to interpret and evaluate behaviour of malwares and their countermeasures

WHAT THE DEPART

	CO1	Distinguish the concepts of data warehousing and data mining			
	CO2	Illustrate the dimensional modelling technique for designing a data warehouse and data warehouse architectures and OLAP			
	соз	Explain the knowledge discovery process.			
	CO4	Deduction of data mining tasks and study their well-known techniques			
	CO5	Apply various data mining techniques in varied problem scenarios.			
1637	Software	Quality Management			
, 103,	CO1	To the requirements of ISO 9000 Certification and other process evaluation models			
	CO2	Discuss the role of software quality measures, quality assurance and quality control in improving the software development			
	COZ	THE STATE OF THE S			
	603	Prepare a software quality plan for a software project - to include sections on change management, configuration management			
	CO3	defect elimination, validation, verification and measurement.			
		Apply the techniques learned to improve the quality of their own software development			
	CO4				
	CO5	Employ the latest software quality tools			
S 1639	Real Tim	e Systems			
	CO1	Discuss the concepts of Real-Time systems and interpret its model.			
	CO2	Recognize the characteristics of a real-time system			
	CO3	Develop and document on an architectural design of a real-time system			
	CO4	Express an ability to select appropriate algorithms for task scheduling and resource management in Real Time System.			
	COS	Illustrate Real-time Operating Systems and Fault Tolerant applications of Real-Time Systems			
S 1641		etwork Analysis			
.5 1071	CO1	Explain and extend the competence in structural properties of Social Networks fundamentals			
	CO2	Illustrate the ability to formulate and interpret several Social Network models			
		Represent the mathematical representation and analyse Social Network results.			
	CO3	Compare and analyze Social Network Data to reach a valid conclusion.			
	CO4				
	CO5	Define competence in Social Network Analysis fundamentals.			
CS 1643	VLSI Des				
	CO1	Identify the various IC fabrication methods			
	CO2	Discuss the Layout of simple MOS circuit using Lambda based design rules			
	CO3	Apply the Lambda based design rules for subsystem design			
	CO4	Design an application using Verilog HDL			
	COS	Evaluate a digital system using Hardware Description Language.			
CS 1645/CS 160	5 Unix Int	ernals and Shell Programming			
	CO1	Describe the function of the basic UNIX commands			
	CO2	Identify various useful UNIX commands on a standard UNIX based Operating System			
	CO3	Write shell programming on UNIX based Operating System			
		Select suitable system calls for file handling			
	CO4	Choose appropriate algorithms for process control and synchronization			
	CO5				
CS 1646		and Natural Language Processing			
	CO1	Define the concepts used for describing and analyzing language			
	CO2	Explain semantics related to the language			
	CO3	Construct language models for understanding pragmatics of the language			
	CO4	Illustrate modeling concepts using programming languages like Python			
	CO5	Evaluate basic language modeling techniques using some standard dataset			
CS 1648	Signals	and Networks			
	CO1	Compute mathematical description and representation of continuous and discrete time signals and networks			
	CO2	Illustrate input output relationship for linear shift invariant system and understand the convolution operator for continuous			
44	1002	and discrete time system			
	CO3	Measure the signals in frequency domain using Fourier series and Fourier transforms			
	CO3	Predict the limitations of Fourier transform and need for Laplace transform			
	CO4				
	CO5	Develop the ability to analyze the system in S- domain and Z- domain			
CS 1650	Agile Methodology				
*	CO1	Explain the philosophy, and historical context of agile methods			
5	CO2	Enumerate the common agile practices and principles based on the contemporary scientific discourse			
5 /4 (c)	CO3	Analyze the strengths and weaknesses of an agile approach within a particular development context			
S 1 5	CO4	Modify selected agile practices and principles based on own experience from project			
* 3	CO5	Employ the latest tools in agile methodology			
CS 1651		Trends in Computer Science			
	CO1	Discuss various recent technologies used in computer science associated with research and application.			
	CO2	Select optimal design scheme suitable for data analytics techniques and tools for extraction of knowledge			
and the same of th	des.	Identify modern engineering tools, techniques and resources to solve various Computer Vision, Big Data, Block chain Problem			
1.00	CO3				
	The Control of the Co	etc			
	CO4	Classify machine learning algorithms for sovling Artificial Intelligence problems or other related problems.			

Date.

CO2 Determine CO3 Interpret a CO4 Develop in CO5 Demonstrictorage so S 1545 Artificial Neural Network CO1 Display surtheory. CO2 Identify Artificial Neural Network CO3 Awake the cost of the cost o	
CO3 Interpret a CO4 Develop n CO5 Demonstr storage so CO1 Display sur theory. CO2 Identify Ar CO3 Awake the CO4 Investigate CO5 Design rea CO5 Design rea CO6 Describe of CO6 Describe of CO7 CO8 CO8 Develop a CO9 Discuss va CO9 Develop a CO9 Develop a CO9 Describe of CO	mpetence in using engineering fundamentals to visualize solutions using knowledge of software engineering skills.
CO3 Interpret a CO4 Develop n CO5 Demonstr storage so 1545 Artificial Neural Netw CO1 Display sur theory. CO2 Identify Ar CO3 Awake the CO4 Investigate CO5 Design rea CO1 Describe of CO2 Discuss va CO3 Develop a CO4 Classify th CO5 Apply Dec CO4 Classify th CO5 Describe of CO4 Classify th CO5 Apply Dec CO6 Apply Dec CO7 Describe of CO8 Apply Dec CO9 Discuss va CO9 Discuss va CO9 Discuss va CO9 Describe of	e a solution plan and methodology for an engineering problem using software engineering.
CO5 Demonstrictorage so Artificial Neural Network CO1 Display surtheory. CO2 Identify Aid CO3 Awake the CO4 Investigate CO5 Design read CO5 Design read CO5 Describe of CO2 Discuss various CO3 Develop at CO4 Classify the CO5 Apply Deed CO4 Classify the CO5 Apply Deed CO4 CO5 Distinguis CO1 Describe of CO2 Describe of CO4 Analyse of CO5 Distinguis CO4 Analyse of CO5 Distinguis CO4 Apply special CO5 Distinguis CO2 Compute CO3 Apprecial CO4 Apply special CO4 Develop CO5 Analyze at CO4 Develop CO5 Analyze at CO4 Develop CO5 Analyze at CO4 Develop CO5 Distinguis CO4 Develop CO5 Analyze at CO4 Develop CO5 Distinguis CO4 Develop CO5 Analyze at CO4 Develop CO5 Test app Programme Elective VII & VIII CO2 Compute CO3 CO4 Distinguis CO5 Test app Programme Elective VII & VIII CO1 Develop CO2 COMpute CO3 To creat CO4 It is easy	a model for project management as well as define complex problem , also find and analyse requirements
Artificial Neural Network. CO1 Display surtheory. CO2 Identify Arthory. CO3 Awake the CO3 Awake the CO4 Investigate CO5 Design read CO5 Design read CO6 Describe of CO6 Describe of CO6 Describe of CO7 CO7 Describe of CO8 Describe of CO8 Describe of CO8 Describe of CO9	modern engineering tools, techniques and resources to solve software related problems. rate an ability to identify/create modern engineering tools, techniques and resources to solve cloud architecture and
CO1 Display surtheory. CO2 Identify Air CO3 Awake the CO3 Awake the CO4 Investigate CO5 Design reactions and CO4 CO5 Design reactions are CO4 Discuss various and CO3 Develop at CO4 Classify the CO5 Apply Dec CO4 Classify the CO5 Apply Dec CO4 Classify the CO5 Distinguis CO4 Analyse e CO5 Distinguis CO4 Analyse e CO5 Distinguis CO4 Analyse e CO5 Distinguis CO4 Apply special CO4 Apply special CO4 Apply special CO4 Distinguis CO5 Analyze of CO5 Distinguis CO5 To acquire CO4 Develop CO5 Analyze of CO4 Develop CO5 Analyze of CO4 Develop CO5 Analyze of CO4 Distinguis CO4 Develop CO5 Analyze of CO4 Distinguis CO5 Test applications of CO4 Develop CO5 CO4 Distinguis CO5 Test applications of CO4 Develop CO5 CO4 Distinguis CO5 Test applications of CO4 Develop CO5 CO4 Distinguis CO5 Test applications of CO4 Develop CO5 CO4 Distinguis CO5 Test applications of CO4 Develop CO5 CO4 Distinguis CO5 Test applications of CO4 Develop CO5 CO4 Distinguis CO5 Test applications of CO4 Develop CO5 CO4 Develop CO5 CO5 CO6	
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CO3 Awake the CO4 Investigate CO5 Design react CO5 Design react CO5 Design react CO1 Describe of CO2 Discuss vate CO3 Develop at CO4 Classify the CO5 Apply December CO4 Classify the CO5 Apply December CO1 Identify react CO2 Describe at economic CO3 Apply print CO4 Analyse et CO5 Distinguis CO4 Analyse et CO5 Distinguis CO1 Differentit CO2 Analyze, at CO3 Appreciate CO4 Apply special CO4 Apply special CO4 Distinguis CO5 To acquir CO4 Develop CO5 Analyze at CO4 Develop CO5 Analyze at CO4 Develop CO5 Analyze at CO4 Describe at CO4 Develop CO5 Analyze at CO4 Describe at CO4 Develop CO5 Analyze at CO4 Describe at CO4 De	rtificial Neural network suitable for a complex problem.
CO5 Design reads of the property of the proper	e importance of tolerance of imprecision and uncertainty for design of robust and low-cost intelligent machines.
CO1 Describe of CO2 Discuss va CO3 Develop at CO4 Classify the CO5 Apply Dec CO5 Apply Dec CO1 Identify re CO2 Describe at CO3 Apply print CO4 Analyse at CO5 Distinguis CO5 Distinguis CO1 Differentic CO2 Analyze, at CO3 Appreciat CO4 Apply special CO4 Apply special CO5 To acquir CO4 Apply special CO5 Distinguis CO2 Compute CO3 Illustrate CO4 Develop CO5 Analyze at CO4 Develop CO5 Analyze at CO4 Develop CO5 Analyze at CO4 Distinguis CO2 CO5 Analyze at CO4 Distinguis CO3 Choose at CO4 Distinguis CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compute CO3 Choose at CO4 Develop CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare application CO3 To create CO4 It is easy	te a problem to identify technical issues and solve the problems using various Artificial neural network.
CO1 Describe of CO2 Discuss va CO3 Develop at CO4 Classify the CO5 Apply Dec CO5 Apply Dec CO1 Identify re CO2 Describe at CO3 Apply print CO4 Analyse at CO5 Distinguis CO5 Distinguis CO1 Differentic CO2 Analyze, at CO3 Appreciat CO4 Apply special CO4 Apply special CO5 To acquir CO4 Apply special CO5 Distinguis CO2 Compute CO3 Illustrate CO4 Develop CO5 Analyze at CO4 Develop CO5 Analyze at CO4 Develop CO5 Analyze at CO4 Distinguis CO2 CO5 Analyze at CO4 Distinguis CO3 Choose at CO4 Distinguis CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compute CO3 Choose at CO4 Develop CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare application CO3 To create CO4 It is easy	al-life application using various neural network algorithm.
CO1 Describe of CO2 Discuss va CO3 Develop at CO4 Classify the CO5 Apply Dec CO5 Apply Dec CO1 Identify re CO2 Describe at CO3 Apply print CO4 Analyse et CO5 Distinguis CO1 Differentic CO2 Analyze, at CO3 Appreciat CO4 Apply special CO4 Apply special CO5 To acquir CO4 Apply special CO5 To acquir CO4 Apply special CO5 To acquir CO4 Describe at CO4 Develop CO5 Analyze at CO4 Distinguis CO2 Compute CO3 Illustrate CO4 Develop CO5 Analyze at CO4 Distinguis CO5 Test appropriate CO4 Develop CO5 Analyze at CO4 Distinguis CO5 Test appropriate CO4 Develop CO5 Analyze at CO4 Distinguis CO5 Test appropriate CO4 Develop CO5 Analyze at CO4 Distinguis CO5 Test appropriate CO4 Develop CO5 Analyze at CO4 Distinguis CO5 Test appropriate CO4 Develop CO5 CO5 CO6	
CO3 Develop a CO4 Classify the CO5 Apply Dee S 1720 / CS1626 Intellectual Property CO1 Identify re CO2 Describe to economic CO3 Apply print CO4 Analyse e CO5 Distinguis CO1 Differenti CO2 Analyze, o CO3 Appreciat CO4 Apply special CO5 To acquir CO4 Apply special CO5 To acquir CO6 To acquir CO7 Distinguis CO7 CO8 Illustrate CO8 Illustrate CO9 CO9 Illustrate CO9 CO9 Indentify a CO9 CO9 Identify a CO9 CO9 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To creat CO3 To creat CO4 It is easy	deep learning techniques and computing environment that are suitable for the applications under consideration.
CO3 Develop a CO4 Classify the CO5 Apply Dee S 1720 / CS1626 Intellectual Property CO1 Identify re CO2 Describe to economic CO3 Apply print CO4 Analyse e CO5 Distinguis CO1 Differenti CO2 Analyze, o CO3 Appreciat CO4 Apply special CO5 To acquir CO4 Apply special CO5 To acquir CO6 To acquir CO7 Distinguis CO7 CO8 Illustrate CO8 Illustrate CO9 CO9 Indentify a CO9 CO9 Identify a CO9 CO9 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To creat CO3 To creat CO4 It is easy	arious solution plans and methodologies for an engineering problem using Deep Learning.
CO4 Classify the CO5 Apply Dee CO1 Identify re economic CO2 Describe reconomic CO3 Apply print CO4 Analyse e CO5 Distinguis CO1 Differentic CO2 Analyze, a CO3 Appreciat CO4 Apply special CO5 To acquir CO4 Apply special CO5 To acquir CO1 Distinguis CO2 Compute CO3 Illustrate CO4 Develop CO5 Analyze a CO4 Describe the CO1 Define the CO2 Identify a CO3 Choose a CO4 Distinguis CO5 Test app Programme Elective VII & VIII CO1 Develop CO5 CO1 Develop CO5 Test app CO2 Compare applicatic CO3 To creat CO4 It is easy	a set of alternative design solutions to problems for which standard algorithmic solutions do not exist.
S 1720 /CS1626 Intellectual Property CO1 Identify re CO2 Describe to economic CO3 Apply print CO4 Analyse et CO5 Distinguis CO1 Differenti CO2 Analyze of CO3 Appreciat CO4 Apply special CO4 Apply special CO5 To acquir CO6 To acquir CO7 Distinguis CO8 CO9 Illustrate CO9 CO9 Illustrate CO9 Develop CO9 Analyze of CO9 CO9 CO9 CO9 Analyze of CO9 Develop CO9 Analyze of CO9 Desire the CO9 CO9 Distinguis CO9 CO9 Destringuis CO9 CO9 Destringuis CO9 CO9 Destringuis CO9	he different technical issues related to Deep Architectures consistent with their level of knowledge and understanding
CO1 Identify re CO2 Describe to economic CO3 Apply print CO4 Analyse e CO5 Distinguis S 1660/CS 1702 Soft Computing CO1 Differenti CO2 Analyze, o CO3 Appreciat CO4 Apply special CO5 To acquir CO5 To acquir CO6 CO7 Distinguis CO7 CO8 Illustrate CO8 Develop CO9 Analyze o CO9 CO8 Illustrate CO9 Develop CO9 Analyze o CO9 Define the CO9 Identify o CO9 CO9 Distinguis CO9 CO9 Define the CO9 CO9 Destinguis CO9	ep Learning techniques to solve real-life problems which directly or indirectly benefits to the society
CO2 Describe economic CO3 Apply prir CO4 Analyse e CO5 Distinguis S 1660/CS 1702 Soft Computing CO1 Differenti CO2 Analyze, o CO3 Appreciat CO4 Apply special CO5 To acquir CO5 To acquir CO1 Distinguis CO2 Compute CO3 Illustrate CO4 Develop CO5 Analyze o CO5 Analyze o CO6 CO9 CO7 Define th CO9 Identify o CO9	regulations, legislation and standards for Intellectual Property Rights
CO3 Apply print CO4 Analyse et CO5 Distinguis S 1660/CS 1702 Soft Computing CO1 Differenti CO2 Analyze, c CO3 Appreciat CO4 Apply special CO5 To acquir CO5 To acquir CO1 Distinguis CO2 Compute CO3 Illustrate CO4 Develop CO5 Analyze c CO6 Analyze c CO7 Define th CO9 Identify c CO9 CO9 CO9 To acquir CO9 CO9 CO9 CO9 CO9 Analyze c CO9 Define th CO9 Identify c CO9 CO9 CO9 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To creat CO4 It is easy	the impact of Intellectual Property Rights on engineering and industrial practices vis a vis social, environmental and
CO4 Analyse e CO5 Distinguis S 1660/CS 1702 Soft Computing CO1 Differenti CO2 Analyze, o CO3 Appreciat CO4 Apply special CO5 To acquir CO5 To acquir CO1 Distinguis CO2 Compute CO3 Illustrate CO4 Develop CO5 Analyze o CO5 Analyze o CO6 Define th CO7 Define th CO8 CO9	nciples of Intellectual Property Rights to sustainable design and development.
CO5 Distinguis S 1660/CS 1702 Soft Computing CO1 Differenti CO2 Analyze, of CO3 Appreciat CO4 Apply special CO5 To acquir CO5 To acquir CO1 Distinguis CO2 Compute CO3 Illustrate CO4 Develop CO5 Analyze of CO5 Analyze of CO6 Define the CO7 Identify of CO8 Choose of CO9 Develop CO9 Test app Programme Elective VII & VIII CO1 Develop CO2 Compute CO3 Choose of CO4 Distinguit CO5 Test app CO5 Test app CO6 CO7 Develop CO7 CO8 Compute CO8 CO9 CO8 CO9	ethical lapses and recognize ethical dilemmas.
Soft Computing CO1 Differenti CO2 Analyze, o CO3 Appreciat CO4 Apply spectors CO5 To acquir CO1 Distinguir CO2 Compute CO3 Illustrate CO4 Develop CO5 Analyze o CO5 Analyze o CO5 Analyze o CO6 Define th CO7 CO6 CO6 CO6 CO7 Define th CO8 CO7 Destinguir CO9 CO6 Analyze o CO9 CO6 CO6 Analyze o CO9 CO6 CO6 Analyze o CO9 CO6	sh professional issues which arise in the intellectual property law context
CO1 Differenti CO2 Analyze, of CO3 Appreciate CO4 Apply special CO4 Apply special CO5 To acquir CO5 To acquir CO5 To acquir CO1 Distinguir CO2 Computer CO3 Illustrater CO4 Develop CO5 Analyze of CO5 Analyze of CO1 Define the CO2 Identify of CO3 Choose of CO4 Distinguir CO5 Test app Programme Elective VII & VIII CO5 Test app CO2 Compared application CO3 To creater CO3 To creater CO4 It is easy	
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CO3 Appreciate CO4 Apply special CO5 To acquire CO5 To acquire CO1 Distinguis CO2 Compute CO3 Illustrate CO4 Develop CO5 Analyze at CO1 Define the CO2 Identify at CO3 Choose at CO4 Distinguis CO3 Choose at CO4 Distinguis CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO2 Compare application CO3 To create CO4 It is easy	evaluate and build fuzzy models.
CO5 To acquir CS 1535/CS 1636 Graph Theory CO1 Distingui: CO2 Compute CO3 Illustrate CO4 Develop CO5 Analyze a CS 1537 Advanced Web Tech CO1 Define th CO2 Identify a CO3 Choose a CO4 Distingui CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To creat CO4 It is easy	te the importance of tolerance of imprecision and uncertainty for design of robust and low-cost intelligent systems.
CS 1535/CS 1636 Graph Theory CO1 Distinguis CO2 Compute CO3 Illustrate CO4 Develop CO5 Analyze a CO1 Define th CO2 Identify a CO3 Choose a CO4 Distingui CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To creat CO4 It is easy	ecified techniques in design and implementation of soft computing models for solving real life problems.
CO1 Distinguis CO2 Compute CO3 Illustrate CO4 Develop CO5 Analyze a CO1 Define th CO2 Identify a CO3 Choose a CO4 Distingui CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To creat CO4 It is easy	re the knowledge of the fuzzy Neural network and Genetic Language.
CO2 Compute CO3 Illustrate CO4 Develop CO5 Analyze a CS 1537 Advanced Web Tech CO1 Define th CO2 Identify a CO3 Choose a CO4 Distingui CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To creat CO4 It is easy	
CO3 Illustrate CO4 Develop CO5 Analyze a CS 1537 Advanced Web Tech CO1 Define th CO2 Identify a CO3 Choose a CO4 Distingui CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To creat CO4 It is easy	ish competence in graphical modelling of problems.
CO4 Develop CO5 Analyze a CS 1537 Advanced Web Tech CO1 Define th CO2 Identify a CO3 Choose a CO4 Distingui CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To creat CO4 It is easy	e a solution process using graph theoretical concepts and analyze results for multiple problems.
CO5 Analyze a CS 1537 Advanced Web Tech CO1 Define th CO2 Identify a CO3 Choose a CO4 Distingui CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To creat CO4 It is easy	e and interpret a graph model.
Advanced Web Tech CO1 Define th CO2 Identify a CO3 Choose a CO4 Distingui CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To creat CO4 It is easy	diverse set of alternative design solutions for multiple problems.
CO1 Define the CO2 Identify at CO3 Choose at CO4 Distinguity at CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare application application CO3 To create CO4 It is easy	and interpret the results using contemporary tools.
CO2 Identify at CO3 Choose at CO4 Distingui CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To create CO4 It is easy	hnologies
CO3 Choose a CO4 Distingui CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To create CO4 It is easy	he basic terms of HTML, CSS and JavaScript
CO4 Distingui CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To creat CO4 It is easy	appropriate web based technologies for developing dynamic webpages
CO5 Test app Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To create CO4 It is easy	an appropriate database language and technologies for conecting front end to backend
Programme Elective VII & VIII CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To create CO4 It is easy	ish major frameworks for development of web services and cloud applications
CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To create CO4 It is easy	propriate content management system for developing scalable websites
CS 1730 Augmented Reality CO1 Develop CO2 Compare applicati CO3 To create CO4 It is easy	The section of a second country of the secon
CO1 Develop CO2 Compare applicati CO3 To create CO4 It is easy	
cO3 To create CO4 It is easy	interactive augmented reality applications for both PC based mobile devices using a variety of novel input devices.
CO3 To create CO4 It is easy	e and describe a knowledge of the research literature in Augmented Reality for both compositing and interactive ions.
CO4 It is easy	te environment using AR/VR technology which can help us in our life.
	y to use this kind of technology to illustrate applications with AR toolkit and mobile AR.
and the state of t	e the knowledge of the research literature in Augmented Reality for both compositing and interactive applications.
CS 1731 Ad-Hoc Wireless Ne	etworks cy6WE
Control of the contro	tand the involved engineering fundamentals of Ad-Hoc wireless.

Signature.....

v i	CO2	Ability to identify the complex engineering problem relating to Infrastructure based wireless network and Ad-Hoc wireless Network.
	соз	Ability to formulate a solution plan and methodology by applying appropriate theory, practices and tools to the development of Ad-Hoc network for related application domain.
ă ·	CO4	Demonstrate an ability to select optimal design scheme suitable for Ad- Hoc Network considering its inherent characteristics.
CS 1732	CO5	Understand the various routing protocols especially designed for Ad-Hoc network
.3 1732	CO1	Explain competence in using engineering fundamentals to visualize solutions using knowledge of software engineering skills.
	CO2	Determine a solution plan and methodology for an engineering problem using software engineering.
	соз	Interpret a model for project management as well as define complex problem , also find and analyse requirements
	CO4	Develop modern engineering tools, techniques and resources to solve software related problems.
	COS	Demonstrate an ability to identify/create modern engineering tools, techniques and resources to solve cloud architecture and storage solution.
S 1733	Cryptogr	raphy and Network Security
.5 1/55		Define mathematical modelling of a Security services to address modern security issues and challenges.
	CO2	Demonstrate and an ability to formulate a solution plan and methodology for security in information systems using
	соз	Cryptography Analyze diverse set of alternative design solutions to meet the basic requirements and goals of a security system.
	CO4	Recognize technical issues for existing security principles and network applications consistent with their level of knowledge and
	CO5	understanding. Develop solutions for existing security principles and network applications.
CS 1734		ted Database System
.3 1/34	CO1	Describe the various range of data models, database architectures and features supported by different database management systems.
	602	
	CO2	Compare the procedural and non-procedural languages and use them where appropriate to process data. Evaluate various types of client-side interfaces to databases using selected modern tools appropriate for the task.
	CO4	Discuss issues underpinning distributed database administration, security and performance.
	CO5	Define and manipulate distributed database data using Structured Query Language (SQL)
CS 1739		s Sensor Networks
35 17 55	CO1	Understanding the engineering fundamentals of wireless communication applied in sensor network.
	CO2	Ability to identify and relate the complex engineering problem relating to sensor network architectures and functions.
	соз	Formulate a solution plan and methodology by Applying appropriate theory, practices and tools to the development of wireless sensor network with respect to its applications area.
	CO4	Ability to differentiate and select optimal design scheme suitable for wireless sensor network
	COS	Discuss and compare the design principles and implementation of a variety of key sensor networking protocols and algorithms
C. 1741	Machine	e Learning
	CO1	Display sufficient understanding of mathematical and engineering fundamentals in the perspective of machine learning theory
	CO2	Identify problems that can be solved using machine learning techniques.
	соз	Appreciate the importance of tolerance of imprecision and uncertainty for design of robust and low-cost intelligent machines.
	CO4	Investigate a problem to identify technical issues and solve the problems using various machine learning techniques.
	CO5	Design real-life applications using machine learning techniques.
CS 1742	Data An	
	CO1	Apply data analytics techniques and tools to produce knowledge from a given dataset.
	CO2	Analyze and apply statistical and probabilistic approach for the development of a model using large dataset.
	CO3	Create and evaluate the model using suitable machine learning algorithms.
	CO4	Formulate statistical hypothesis testing and inference for the model development.
	CO5	Explain the dataset using different data representation tools.
C: 1744	Mobile	Computing
	CO1	Examine fundamentals of wireless communications.
	CO2	Analyse security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.
	CO3	Develop basic skills for cellular networks design.
and the same	CO4	
1 3 W 140	-	Apply knowledge of TCP/IP extensions for mobile and wireless networking.
A Comment	CO5	Measure the awareness of the life-long learning, business ethics, professional ethics and current marketing scenarios.
gywaran	12/0	

NATARISM * MILE

1745		ormance Computing			
	CO1	Define the fundamental concepts and techniques in parallel computation structuring and design			
	CO2	Describe several parallelization methodologies and paradigms			
	CO3	Choose various mathematical paradigms describing parallel computing systems			
	CO4	Explain the architectures of high-performance computing systems			
	CO5	Select appropriate application/platform for algorithm implementation			
S 1746	Human C	omputer Interaction			
	CO1	Describe and apply core theories, models, and methodologies from the field of HCI			
V	CO2	Analyze one after another the main features of interactive systems, and explain how to gauge the usability of digital			
	11	environments, tools, and interfaces			
	соз	Identify the various tools and techniques for interface analysis, design, and evaluation.			
	CO4	Identify the impact of usable interfaces in the acceptance and performance utilization of information systems.			
	CO5	Apply theories and concepts associated with effective work design to real-world application			
S 1747	Computational Number Theory				
	CO1	Explain the different concepts in divisibility and modular arithmetic.			
	CO2	Develop various algorithms for polynomials			
45	CO3	Acquire a fundamental understanding of computational models related to elliptic curves and Integer factoring algorithms.			
1. 1.	CO4	Analyze the various methods to compute discrete logarithms.			
	CO5	Analyze the various methods to compute integer factoring algorithms.			
CS 1748		d Operating Systems			
	CO1	Explain and manipulate the different concepts in advanced operating systems.			
	CO2	Analyze the working of various subsystems connected to the network.			
	соз	Select appropriate approaches for building a range of distributed systems, including some that employ middleware.			
	CO4	Apply standard design principles in the construction of these systems.			
1	CO5	Select appropriate approaches for building a range of distributed systems			
CS 1749	Fault To	erant Computing			
	CO1	Manipulate different concepts in fault tolerant computing.			
	CO2	Correlate the basic knowledge of fault tolerant computing with real time situations.			
	CO3	Decide on the applicability of such tools during safety critical cases.			
	CO4	Select an appropriate tool for testability, controllability and observability.			
	CO5	Select an appropriate algorithm for resilience and self- checking.			
CS 1750	Multi-as	gent Intelligent Systems			
	CO1	Illustrate the different agent architectures and inter agent communication with different examples			
	CO2	Represent distributed rational decision making in various applications.			
	CO3	Construct different agent modelling techniques.			
	CO4	Summarize the different multi-agent learning techniques.			
	CO5	Summarize the different ways of agent communications			
CS 1751	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	and Distributed Algorithms			
CS 1/51	CO1	Discuss about in-depth discourse on how to think about algorithms in a parallelized manner.			
	CO2	Select algorithms suitable for conventional, single-processor computers are not appropriate for parallel architectures.			
	CO3	Compare inherent parallel algorithms with their counterparts.			
	CO4	Justify the choice of parallel algorithms to accomplish a task.			
	COS	Illustrate the process of synchronization.			
CS 1752		ed Algorithms			
03 1/32	CO1	Describe the divide-and-conquer paradigm with an approach to design an algorithm.			
	CO2	Define the dynamic-programming paradigm to explain an algorithmic design.			
(40)		Identify the greedy paradigm with an approach to design an algorithm.			
_	CO3	Analyze randomized algorithms for a given set of problems.			
4 5	CO4	Explain competitive analysis of various algorithms for a given set of problems.			
	CO5				
CS 1753		tational Geometry Describe the divide-and-conquer paradigm and the scenario when it should be employed.			
9-8	CO1				
- 1/5	CO2	Construct algorithms related to computational geometry.			
r _ ,	CO3	Analyze various algorithms based on certain underlying parameters.			
	CO4	Evaluate various computational geometry problems			
·	CO5	Apply computational geometry in solving real world problems			
MA 1754	Queui	ng Theory and Modeling			
	CO1	Apply probability techniques, models to analyse the basics of queuing theory.			
	CO2	Identify the areas and hence apply the mathematical techniques necessary.			
	соз	Apply knowledge of continuous time stochastic processes for deeper understanding.			
Water of	CO4	Learn to design resources such as buffer and link capacities to meet specified required quality of service of a queueing system.			

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	CO5	The students will develop ability to identify, evaluate, formulate and solve engineering problems related to resource allocation of queueing system.
1755	Quantun	n Computing
1. 1.	CO1	Describe the fundamentals of quantum information processing. (BL II).
	CO2	Illustrate the fundamentals of quantum computation, quantum cryptography, and quantum information theory.
	CO3	Device the quantum circuit model consisting of qubits, unitary operators, measurement, entanglement
	CO4	Represent various implementations of Quantum computers.
	CO5	Represent various applications of Quantum computers in real life.
S 1756	R Progra	mming
	CO1	Choose various mathematical techniques for the data analysis.
	CO2	Describe the process, solution and analyse the results.
	CO3	Develop/create different models and experiment with it.
	CO4	Apply appropriate tools, techniques, algorithms etc.
	CO5	Examine the case study of the different available models.
S 1757	Internet	of Things
	CO1	Show competence in engineering fundamentals through solutions to real world problems Using Networking Technologies
	CO2	Identify solutions to complex engineering problems pertaining to real world.
	CO3	Formulate a solution plan and methodology for an engineering problem using IoT.
	CO4	Plan investigation of technical issues and requirements pertaining to IoT applications.
	COS	Select and apply discipline specific tools, techniques and resources for IoT applications for various domains.
CS 1640 /CS1758		rer Vision
.5 1640 /C51756	CO1	Display sufficient understanding of mathematical and engineering fundamentals in the perspective of computer vision.
	CO2	Identify problems that can be solved using computer vision techniques.
	CO3	Appreciate the importance of tolerance of imprecision and uncertainty for design of robust and low-cost intelligent machines
	CO4	Investigate a problem to identify technical issues and solve the problems using various computer vision techniques.
		Design week life annihigations using computer vision techniques
	CO5	Design real-life applications using computer vision techniques.
CS 1760		hain Coding
	CO1	Describe crypto currencies and blockchain fundamentals Explain individual building blocks and understand the working mechanism of any blockchain technology.
	CO2	Discover the modern engineering tools, techniques and resources in the field of blockchain technology.
	CO3	Differentiate between different version of Blockchain technology
	CO4	Illustrate use of blockchain technology in a broader context like health, banking sector and identify security concerns in
	CO5	
		blockchain technology
CS 1752		ced Algorithms
	CO1	Describe the divide-and-conquer paradigm with an approach to design an algorithm.
	CO2	Define the dynamic-programming paradigm to explain an algorithmic design.
	соз	Identify the greedy paradigm with an approach to design an algorithm.
	CO4	Analyze randomized algorithms for a given set of problems.
	CO5	Explain competitive analysis of various algorithms for a given set of problems.
CS 1759/CS 164		ial Intelligence
	CO1	Identify areas in engineering and real life where Artificial Intelligence (AI) can find its application
1	CO2	Discuss the role of mathematical and statistical models in Al
	CO3	Demonstrate an ability to formulate problems using Al
	CO4	Analyse techniques and resources to solve AI problems.
	CO5	Test techniques and resources to solve AI problems.
CS 1655/CS 162	24 Auton	omous Mobile Robotics and Computational Intelligence
	CO1	Identify application of Robots
	CO2	Describe the evolution, kind of robots and basics of design of a Robotics System
	CO3	Choose correct choices of Locomotion, Kinematics, Perception techniques
	CO4	Apply Intelligent Algorithms for decision making in Motion Planning and path optimization
	CO5	Develop simple robot control systems integrating perception, planning, and action
CS 1641	Social	Network Analysis
	CO1	Explain and extend the competence in structural properties of Social Networks fundamentals
	CO2	Illustrate the ability to formulate and interpret several Social Network models
		Represent the mathematical representation and analyse Social Network results.
	CO3	
	CO3	Compare and analyze Social Network Data to reach a valid conclusion.
C° 1650	CO4 CO5	Compare and analyze Social Network Data to reach a valid conclusion.
C° 1650	CO4 CO5 Agile	Compare and analyze Social Network Data to reach a valid conclusion. Define competence in Social Network Analysis fundamentals.

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. г.	202	Analyze the strengths and weaknesses of an agile approach within a particular development context
700	CO3	Modify selected agile practices and principles based on own experience from project
	CO5	Employ the latest tools in agile methodology
	Ethical Ha	The state of the s
	CO1	Demonstrate competence in applying acquired expertise in computer networks
	CO2	Determine an ability to interpret and evaluate behaviour of malwares and their countermeasures
	CO3	Evaluate the approaches used by hackers and work on its countermeasures to reach a valid conclusion
	CO4	Demonstrate an ability to identify the limitation of tools used to break an insecure web application
	COS	Decide the problem in the decision-making process between possible options using tools
1743	Cyber Sec	
1/43	CO1	Discover the concepts of Cyber security and its social, technical and political techniques.
	CO2	Illustrate on the various Intrusion detection and prevention techniques.
	CO3	Analyze various algorithms based on Cryptography and Network security.
	CO4	Asses various methods of handling investigations in the field of cyber forensics
	COS	Asses the legal and social issues in the development and management of cyber security.
1754		ternet Architecture
1/54	CO1	Describe the basic concepts of networking.
		Construct algorithms related to different backbone networks and Software Defined Networking (SDN)
	CO2	
	CO3	Analyze various algorithms based on data centre networks and data centre virtualization
	CO4	Evaluate various problems based on overlay networks
1621	CO5	Evaluate various problems based on virtualization.
1631	Deep Lea	Describe deep learning techniques and computing environment that are suitable for the applications under consideration.
1 1	CO2	Discuss various solution plans and methodologies for an engineering problem using Deep Learning.
	CO3	Develop a set of alternative design solutions to problems for which standard algorithmic solutions do not exist.
** Mary	CO4	Classify the different technical issues related to Deep Architectures consistent with their level of knowledge and understanding
pen Elective-II	CO5	Apply Deep Learning techniques to solve real-life problems which directly or indirectly benefits to the society.
5 1728 /CS1701	Dietelber	ad Systems
1/28/C51/01		Observe the complexities of distributed system development.
	CO1	Develop a strategy to overcome important issues including time, inter-process communication, and state management in
	CO2	distributed computing.
	соз	Construct systems in a constrained distributed environment by integrating several modules and validate the detailed design.
	CO4 CO5	Illustrate the ability to apply the knowledge in analysing and designing distributed systems. Summarize the middleware technologies that support distributed applications such as RPC, RMI and object-based middleware
S 1721 /CS1407	Principle	of Programming Languages
.3 1721 / 031407	CO1	Examine the major programming paradigms, and the principles and techniques involved in design and implementation of
	1001	modern programming languages.
	CO2	Classify notations to describe syntax and semantics of programming languages.
	CO3	Analyse the behaviour of simple programs in imperative languages using concepts such as binding, scope, control structures,
	COS	subprograms and parameter passing mechanisms.
	604	Classification of the concepts of ADT and object oriented programming for large scale software development.
	CO4	Evaluate the concepts of concurrency control and exception handling in programming language
C 4722	CO5	
S 1723	Big Data	Demonstrate competence in statistics and mathematical modelling to solve big data problems.
	CO1	
	CO2	Apply research-based knowledge and research methods including design of experiments, analysis and interpretation of data. and synthesis of the information to provide valid conclusions.
	соз	Solve problems associated with batch learning and online learning, and the big data characteristics such as high dimensionality
		dynamically growing data and in particular scalability issues.
	CO4	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations for solving big data problems.
	CO5	Demonstrate an ability to recognize ethical dilemmas between Transparency, Identity and Power.
CS 1724/CS 1724	-	ation Technique
.5 1/24/05 1/31	The second second	Demonstrate the knowledge and understanding of the basic ideas underlying optimization techniques.
	CO1	Apply the mathematical approach to optimization problems relevant to engineering
	CO2	Apply the mathematical approach to optimization problems relevant to engineering Analyze the robustness of continuous linear optimization problems solutions using sensitivity analysis.
	CO3	
34	CO4	Ability to understand and interpret the results and information provided by a particular method.
CS 1725	CO5	Compare the robustness of continuous linear optimization problems solutions using various techniques Music System
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	CO1	Identify, in an oral fashion, the main melodic, rhythmic and formal characteristics of Indian classical music.			
	CO2	Identify and use the principal instruments of Indian classical music			
	соз	To identify the names of some major composers and performers of Indian classical music.			
	CO4	Represent various applications of music in industry and household.			
	CO5	To identify the pioneers of Indian classical music.			
S 1726	History of Science				
5	CO1	Define science and the scientific method.			
	CO2	Describe the possible future of science			
	CO3	Explain the difficulties involved in predicting the future of science			
	CO4	Explain some of the effects of technology on modern society			
	CO5	Compare modern and past examples of science.			
CS 1727	Introduction to Art and Aesthetics				
	CO1	Focus on the range of questions based on philosophy and science.			
	CO2	Apply the history of aesthetics, and the contemporary state of the subject in various problem domains			
	соз	facilitate the application of philosophical thought on aesthetics to students' own engagements with art and the aesthetic.			
	CO4	Develop philosophical skills.			
	CO5	Practice the appropriate usage of scholarly reviews and primary sources			
CS 1729	Engineering Research Methodology				
	CO1	Apply appropriate procedure/algorithm, dataset and test cases and choose appropriate hardware/software tools to conduct the experiment.			
	CO2	Identify gaps in knowledge and a strategy to complete this gap enhancing knowledge.			
	CO3	Select discipline-specific tools, techniques and resources based on strengths and limitations of tools and techniques.			
	CO4	Create/develop comprehend technical literature and document project work to produce well formulated written document for supporting logical progression of ideas.			
	COS	Analyze the experimental data and ethical issues.			
C5 1720 /CS1626	6 Intellectual Property Rights				
03 17 20 7 00 20 20	CO1	Identify regulations, legislation and standards for Intellectual Property Rights			
	CO2	Describe the impact of Intellectual Property Rights on engineering and industrial practices vis a vis social, environmental and			
		economic contexts			
	CO3	Apply principles of Intellectual Property Rights to sustainable design and development.			
	CO4	Analyse ethical lapses and recognize ethical dilemmas.			
	COS	Distinguish professional issues which arise in the intellectual property law context			
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