

Course Articulation Matrix

Course Name: Programming For Problem Solving

Course Code: CSPS0079

Course Outcomes (COs) Code & Statement	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSPS0079.1 : Define and describe various terms and concepts of C programming language (Remembering)	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-
CSPS0079.2 : Compare and interpret information based on their understanding of the concepts of C language syntax, data types, control statements, functions, pointers, arrays, structures, files, graphics and hardware programming using C. (Understanding)	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-
CSPS0079.3 : Solve problems using standard algorithms and translate pseudo-codes into C programs and implement them.	-	-	2	-	-	-	-	-	-	-	-	-	3	-	-

(Applying)															
CSPS0079.4 : Analyze their skills for choosing the right data structure, function, data types and develop logic to solve various instances of problems. (Analyze)	-	-	2	-	-	-	-	-	-	-	-	1	3	-	-
CSPS0079.5 : Combine the various concepts and ideas learnt in C to plan, propose and develop a product. (Creating)	-	-	2	-	-	-	-	-	-	-	-	1	3	-	-
CSPS0079.6 : Evaluate various algorithms used for searching, sorting etc., in terms of correctness and computation cost. (Evaluate)	-	-	2	-	-	-	-	-	-	-	-	1	3	-	-

Course Name: Mathematics I - Calculus And Linear Algebra

Course Code: MACL0012

Course Outcomes (COs) Code & Statement	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
MACL0012.1 :	2	-	-	-	-	-	-	-	-	-	1	-	-	-	-

Classify various types of mean value theorems, and their properties, (understanding)															
MACL0012.2 : Develop different methods to definite integrals to determine surface areas and volumes of revolutions. (Applying)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MACL0012.3 : Find the concepts of convergence of sequence and series of real numbers. (Remembering)	2	-	-	-	-	-	-	-	-	-	-	1	-	-	1
MACL0012.4 : Determine vector spaces, linear transformations and their properties (Evaluating)	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
MACL0012.5 : Examine and recognize the use of eigen values and eigen vectors of matrices applicable to various complex engineering problems. (Analysing)	2	-	-	-	-	-	-	-	-	-	-	1	-	-	1

Course Name: Basic Electrical Engineering

Course Code: EEBE0038

Course Outcomes (COs) Code & Statement	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
EEBE0038.1 : Define basic terminologies related to electrical circuits and machines. (Remembering)	-	-	-	-	-	-	-	-	-	-	1	1	-	-	1
EEBE0038.2 : Explain the working principle, construction, applications of dc machines and ac machines. (Understanding)	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
EEBE0038.3 : Explain basics of converters, domestic wiring and Electrical Installations. (Understanding)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EEBE0038.4 : Implement network theorems to simplify and solve a complex circuit. (Applying)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EEBE0038.5 : Interrogate basic DC as well as AC circuits. (Analyzing)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1

Course Name: Mathematics II- Multiple Integrals, Numerical Methods and Differential Equations

developing any applications. (Applying)															
CSOP0080.4 : Examine user requirements for software functionality to decide whether basic Java concepts can meet user requirements. (Analyzing)	-	2	-	-	1	-	-	-	-	-	-	-	-	2	-
CSOP0080.5 : Choose an engineering approach to solving problems, starting from the various ways of giving an input through a program, choosing an optimal method of problem solving and getting the desired output. (Evaluating)	-	2	-	-	1	-	-	-	-	-	-	2	3	2	-
CSOP0080.6 : Develop solutions for real life problems by choosing between different basic Java concepts like polymorphism, inheritance, method overloading and method overriding. (Creating)	-	2	-	-	1	-	-	-	-	-	-	2	3	2	-

Course Name: Data Structures

Course Code: CSDS0082

Course Outcomes (COs) Code & Statement	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSDS0082.1 : Explain the concept of different data types, primitive, derived and their representation and application through coding. (Understanding)	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CSDS0082.2 : Apply the concept of ADT and linear and nonlinear data types and their representation. (Applying)	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CSDS0082.3 : Apply these data types in various applications like arithmetic expression evaluation and conversion. (Applying)	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CSDS0082.4 : Explain the concept of Graphs and Trees and their real time application. (Understanding)	-	2	-	-	-	-	-	-	-	-	-	2	-	2	-
CSDS0082.5 : Develop various searching and sorting techniques. (Creating)	-	2	-	-	-	-	-	-	-	-	-	2	-	2	-
CSDS0082.6 :	-	2	-	-	-	-	-	-	-	-	-	2	-	2	-

Choose and implement efficient data structures and apply them to solve problems. (Evaluating)																	
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Course Name: Computer Organization and Architecture

Course Code: CSOA0083

Course Outcomes (COs) Code & Statement	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSOA0083.1 : Recall the architecture and organization of major components of modern computer systems. (Remembering)	2	-	-	-	-	-	-	-	-	-	1	2	-	-	-
CSOA0083.2 : Explain the functioning and interconnection of major components of computer systems and different design issues associated with the design of any architecture. (Understanding)	2	-	-	-	-	-	-	-	-	-	-	2	-	-	-
CSOA0083.3 : Apply logic in designing simple control unit, instruction sets, instruction format,	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-

buses and register set etc. (Applying)																
CSOA0083.4 : Compare and Analyse different styles, strategies and formats adopted for designing the instruction set, register set, memory organization and I/O transfer.(Analysing)	-	2	-	-	-	-	-	-	-	-	-	2	-	-	-	
CSOA0083.5 : Assess various architectures and their design considerations. (Evaluating)	-	2	-	-	-	-	-	-	-	-	-	2	-	-	-	
CSOA0083.6 : Construct and organize a new architecture by considering various design issues in order to make it more efficient with less overhead. (Creating)	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-	

Course Name: Database Management Systems

Course Code: CSRD0084

Course Outcomes (COs) Code & Statement	Program Outcomes (POs)												Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CSRD0084.1 : Define the fundamental concepts necessary for designing, using	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-	

database project. (Evaluating)																
CSRD0084.7 : Design ER-diagrams and corresponding schema diagrams for handling database projects. (Creating)	-	2	-	-	2	-	-	-	-	-	-	-	1	3	-	

Course Name: Data Communications

Course Code: CSDC0124

Course Outcomes (COs) Code & Statement	Program Outcomes (POs)												Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CSDC0124.1 : Recall the fundamentals of data communication and various techniques of communications. Students will also be able to recall the layered structure of computer network. (REMEMBERING)	-	-	-	2	2	-	-	-	-	-	-	1	2	-	3	1
CSDC0124.2 : Explain about different network topology and the type of protocol required for different communication technique. (UNDERSTANDING)	-	-	-	2	2	-	-	-	-	-	-	-	2	-	3	1

CSDC0124.3 : Develop different network topology using various networking devices. (APPLYING)	-	-	-	2	2	-	-	-	-	-	-	2			
CSDC0124.4 : Compare different networking devices. Students will also be able to analyse different network behaviour depending on performance parameters. (ANALYSING)	-	-	-	2	2	-	-	-	-	-	-	2	-	3	1
CSDC0124.5 : Evaluation of network performance based on implementation policy, protocol, topology etc. (Evaluating)	-	-	-	2	2	-	-	-	-	-	-	2	-	3	1
CSDC0124.6 : Construct networks required for organization, depending on availability of hardwares and softwares (CREATING)	-	-	-	1	1	-	-	-	-	-	-	2	-	3	1

Course Name: Formal language and automata theory

Course Code: CSFA0122

Course Outcomes (COs) Code &	Program Outcomes (POs)	Program Specific Outcomes (PSOs)
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Statement															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO1	PO12	PSO1	PSO2	PSO3
CSFA0122.1 : Define basic terminology like Deterministic and Non deterministic automata, Pushdown Automata, Parse Tree, Regular Languages, Turing Machines etc. (Remembering)	3										1	2		2	
CSFA0122.2 : Explain the concepts, core terms and tools used in automata theory.(Understanding)	3											2		2	
CSFA0122.3 : Choose the techniques, components and tools of a typical automated machine and apply it in designing new machines. (Applying)	3											2		2	
CSFA0122.4 : Identify which input pattern would be accepted by a Turing Machine, Pushdown Automata, Finite Automata etc. (Applying)	2											2		2	
CSFA0122.5 : Compare and contrast various types of machines in	3											2		2	

Automata theory and relate it to everyday appliances like washing machines, fans, etc. (Analyzing)																
CSFA0122.6 : Evaluate the correctness, computation cost and complexity for an automation. (Evaluating)	3											2		2		
CSFA0122.7 : Design new automata and Turing machines for given problems by using most appropriate algorithmic strategy considering the problem domain. (Creating)	3											2		2		

Course Name: Compiler Design

Course Code: CSCD0128

Course Outcomes (COs) Code & Statement	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSCD0128.1 : Recall the application of compiler in program execution (Remembering)	1	2	-	-	-	-	-	-	-	-	1	2	3	-	-
CSCD0128.2 :	1	2	-	-	-	-	-	-	-	-	-	2	3	-	-

Demonstrate the various types of parser and their merits and demerits. It also explains about error handling technique in compiler construction. (UNDERSTANDING)															
CSCD0128.3 : Applying different parsing technique to input string. (APPLYING)	1	2	-	-	-	-	-	-	-	-	-	2	3	-	-
CSCD0128.4 : Compare and analysis different techniques of parsing. (ANALYSING)	1	2	-	-	-	-	-	-	-	-	-	2	3	-	-
CSCD0128.5 : Decide which parsing technique will be most suitable for any input given to them. Students will also be able to know how to convert the given grammar to its respective non-left recursive grammar if it requires for certain type of parsing technique. (EVALUATING).	1	2	-	-	-	-	-	-	-	-	-	2	3	-	-
CSCD0128.6 : Construct intermediate code generation, code	1	2	-	-	-	-	-	-	-	-	-	2	3	-	-

optimization, run time environment etc. during compilation.(CREATING)																		
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Course Name: Computer Networks

Course Code: CSNT0129

Course Outcomes (COs) Code & Statement	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSNT0129.1 : Define topology implementing different routing protocols that best suits a real time demand application, network and transport layer. (Remembering)	-	2	-	2	-	-	-	-	-	-	1	2	-	3	1
CSNT0129.2 : Explain the different network topologies, network, transport and application design issues and the importance of QoS in a network. (Understanding)	-	2	-	2	-	-	-	-	-	-	-	2	-	3	1
CSNT0129.3 : Solve different problems related to sub-netting, configuring working routing protocols in some model network	-	3	-	2	-	-	-	-	-	-	-	2	-	3	1

topology and implement presentation layer security. (Applying)															
CSNT0129.4 : Distinguish TCP from OSI and Analyze different layer protocols, sub-netting application layer security. (Analyzing)	-	1	-	1	-	-	-	-	-	-	-	2	-	3	1
CSNT0129.5 : Judge which protocol operate in which layer and why. (Evaluating)	-	3	-	3	-	-	-	-	-	-	-	2	-	3	1
CSNT0129.6 : Formulate the pros, cons and implementation of different IEEE based protocols. (Creating)	-	1	-	2	-	-	-	-	-	-	-	2	-	3	1

Course Name: Speech and Natural Language Processing

Course Code: CSSN6102

Course Outcomes (COs) Code & Statement	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSSN6102.1 : List the functions provided by NLTK for natural language processing.	-	2	-	2	1	-	-	-	-	-	-	2	2	-	2

(Knowledge)															
CSSN6102.2 : Explain of the various NLTK functions and corpora available for natural language processing. (Understanding)	-	2	-	2	1	-	-	-	-	-	-	2	2	-	2
CSSN6102.3 : Implement NLTK programs for part of speech tagging, syntax analysis, semantic analysis etc. (Applying)	-	2	-	2	1	-	-	-	-	-	-	2	2	-	2
CSSN6102.4 : Analyze the structure and meaning of given text. (Analyzing)	-	2	-	2	1	-	-	-	-	-	-	2	2	-	2
CSSN6102.5 : Evaluate the performance of classifiers used for text classification. (Evaluating)	-	2	-	2	1	-	-	-	-	-	-	2	2	-	2
CSSN6102.6 : Combine different NLTK functions to build applications for natural language processing and understanding. (Creating)	-	2	-	2	1	-	-	-	-	-	-	2	2	-	2

Course Name: Information Retrieval

Course Code: CSIR0155

Course Outcomes	Program Outcomes (POs)	Program Specific

(COs) Code & Statement													Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSIR0155.1 : Define Information Retrieval Systems and its objectives (Remembering)	2	2	-	-	2	-	-	-	-	-	1	2	3	1	2
CSIR0155.2 : Interpret models like vector-space, probabilistic, statistical, and other language models to identify how they can be applied to the document retrieval problem. (Understanding)	2	2	-	-	2	-	-	-	-	-	-	2	3	1	2
CSIR0155.3 : Anticipate clustering algorithms like hierarchical agglomerative clustering and k-means algorithm. (Analyze)	2	2	-	-	2	-	-	-	-	-	-	2	3	1	2
CSIR0155.4 : Identify the basic concepts related to Tolerant Retrieval, evaluation of IR systems and Latent Semantic Indexing. (Understanding)	2	2	-	-	2	-	-	-	-	-	-	2	3	1	2
CSIR0155.5 : Identify the concepts behind Query	2	2	-	-	2	-	-	-	-	-	-	2	3	1	2

Expansion and Probabilistic Information Retrieval. (Understanding)																
CSIR0155.6 : Discover XML Indexing Search and basic operations of image processing that support IR (Understanding)	2	2	-	-	2	-	-	-	-	-	-	2	3	1	2	

Course Name: Neural Networks and Deep Learning

Course Code: CSNN0158

Course Outcomes (COs) Code & Statement	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSNN0158.1 : Summarize the role of Deep learning in Machine Learning Applications.(Understanding)	-	2	-	3	2	-	-	-	-	-	1	2	2	1	2
CSNN0158.2 : To design and implement Deep Learning Applications. (Creating)	-	2	-	3	2	-	-	-	-	-	-	2	2	1	2
CSNN0158.3 : Critically Analyse Different Deep Learning Models in Image Related Projects. (Analysing)	-	2	-	3	2	-	-	-	-	-	-	2	2	1	2

CSNN0158.4 : To design and implement Convolutional Neural Networks. (Applying)	-	2	-	3	2	-	-	-	-	-	-	2	2	1	2
CSNN0158.5 : Apply Deep Learning in NLP and Image Processing.(Applying)	-	2	-	3	2	-	-	-	-	-	-	2	2	1	2

Course Name: Blockchain Fundamentals

Course Code: CSBF0159

Course Outcomes (COs) Code & Statement	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSBF0159.1 : The student will be able to identify the history, technology, and applications of Blockchain (Remembering)	-	2	-	3	3	-	-	-	-	-	-	2	3	1	-
CSBF0159.2 : The student will be able to explain Blockchain applications (Understanding)	-	2	-	3	3	-	-	-	-	-	-	2	3	1	-
CSBF0159.3 : The student will be able to demonstrate Blockchain concepts clearly and persuasively (Applying)	-	2	-	3	3	-	-	-	-	-	-	2	3	1	-

	Architecture Lab															
	Relational Database Management Systems		M			M						M	L	H		
	Relational Database Management Systems Lab		M			M						M	L	H		
	Discrete Mathematics	H										M		M		
	Analysis and Design of Algorithms		H		M							M	H	M		
	Introduction to Organizational Behavior								M							M
	Analysis and Design of Algorithms Lab	M	H		M							M	H	M		
	Environmental Sciences						L	H								L
Semester V	Data communications				M	M						M		H	L	
	Formal Language and Automata Theory	H										M		M		
	Operating Systems		M									M	H			
	Operating Systems Lab		M									M	M			
	Data communications IAB				M	H						M		M		
	Information System Design	L									M	M		L		

	Software Engineering & Designing Concepts	L				L					H	M		M	
	Economics for Engineers														L
	Mini Project-I					M			H	M	H	M	M	M	H
	Constitution of India/Essence of Indian Traditional Knowledge						M		M			M			L
Semester VI	Compiler Design	L	M									M	H		
	Computer Networks		M		M							M		H	L
	Computer Networks Lab		M		M	H						M		M	L
	Microprocessor	M												M	
	Production and Operations Management														L
	Compiler Design Lab		M									M	M		
	Microprocessor Lab	M	M											M	
Semester VII	Mini Project-II		H			M		L	M	M	H	M	M	M	H
	Computer Graphics and Multimedia					M								M	
	Computer Graphics and Multimedia Lab													M	
	Artificial Intelligence			L	H	M						M	M	H	

	Artificial Intelligence Lab			L	H	M							M	M	M	
	Image Processing and Pattern Recognition				M	M							M	M	M	
	E-Commerce and Data Security					M	H						M		L	M
	Data Ware housing and mining				M	M							M		M	M
	Biology							M								M
	Personal and Mobile Communicat ions					L							M		M	
	Android Application Developmen t Fundamenta ls		M				M						M		H	
	Major project - phase I		H	L	H	M				H	M	M	M	M	M	M
Semester VIII	Advance Concepts of Operating Systems	M	H		M								M	H		
	Emerging Trends in Computing - Cloud Computing					M							M		M	
	Advanced Computer Architecture and Parallel Processing	H				M							M	H		
	Distributed Computing				H								M		M	
	Realtime And Embeded Systems												M	M		

Network Security and Cryptography				M								M		M	
Computer Vision		M	L	M	M							M	M		
Speech Processing		M		M	M							M	M		
Pattern Recognition		M		M	M							M	M		
Natural Language Processing		M		M	L							M	M		