D. N. R. COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

(Approved by AICTE, New Delhi & Affiliated to JNTUK, Kakinada)

BALUSUMUDI, BHIMAVARAM, W.G. Dist., A.P., PIN-534 202

Ph: 08816-221238, Email: dnrcet@gmail.com , Website: https://dnrcet.org

Accredited with A++Grade with 3.73/4CGPAbyNAACandAccredited by NBA(B. Tech- CSE, ECE & EEE)

Mr. B.V.RAM KUMAR
M.E., MCSI,MISTE, MIAENG
HoD, IT

Department of Information Technology
E-Mail: sreesatyam@dnrcet.org
Mobile: +91-9491922706, Phone: 08816-221237

CIRCULAR

Ref:*DNRCET/CSE/2026-27/BoS/C-2* **Date:** *10.01.2026*

It is to inform all BoS members of the CSE department to attend the BoS meeting to be conducted ***on 20thJan, 2026***at ***10:00 a.m.*** The following agenda is being discussed.

Agenda:

1. Introducing the members of Board of Studies.
2. Discussion on III year Semester I & II course structure for B. Tech (Information Technology) Program for the academic year 2026 – 27.
3. Discussion on preparation of course syllabus in accordance to JNTUK course structure and syllabus.
4. Discussion on Academic Regulations of UG Program.
5. Discussion and finalizing the model papers for the academic year 2026 – 27.
6. To discuss the Certificate Courses to be done by the students & staff.
7. To discuss the functional MoUs with the industries.
8. To discuss the feasibility of developing collaborations with other institutions.
9. To evolve a plan of action for consultancy activities.
10. Any other agenda with the permission of the chair.

Chairperson Board of Studies / Head of the Department

Head of the Dept.
Department of IT
D.N.R. College of Engg. & Tech.
BHIMAVARAM-534 202.

Copy to

1. The Members of BoS,
2. The Principal, DNRCET(A),
3. The Dean, Academics, DNRCET(A),
4. Office file.

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Department of Information Technology

Date: 10.01.2026

To
Dr. N. Ramakrishnaiah,
Professor,
CSE Department,
UCEK, JNTUK Kakinada,
Kakinada – 533003.

Dear Sir,

Sub: DNR College of Engineering & Technology – Department of Information Technology– Board of Studies Meeting – Reg.

We take the privilege in inviting you for the Board of Studies Meeting of Department of Information Technology, DNR College of Engineering & Technology as an Expert Nominated by Vice-Chancellor, JNTUK, Kakinada. It is proposed to discuss and finalize the course structure and syllabus for the 3rd year of DR24 B. Tech (IT) course curriculum.

In this regard, you are requested to attend the meeting scheduled to be held on **20.01.2026** at **10.00 AM** in online mode.

Kindly accept our invitation and make it convenient to attend the Board of Studies meeting.

Thanking You Sir

Yours Sincerely,

Chairperson Board of Studies /
Head of the Dept.
Head of the Department
Department of IT
D.N.R. College of Engg. & Tech.
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Department of Information Technology

Date: 10.01.2026

To

Dr. V. Chandrasekhar,
Professor & Dean,
Department of Computer Science & Engineering,
S. R. K. R. Engineering College (A),
BHIMAVARAM 534202.

Dear Sir,

Sub: DNR College of Engineering & Technology – Department of Information Technology – Board of Studies Meeting – Reg.

We take the privilege in inviting you for the Board of Studies Meeting of Department of Information Technology, DNR College of Engineering & Technology as an Expert Nominated by Vice-Chancellor, JNTUK, Kakinada. It is proposed to discuss and finalize the course structure and syllabi for the 3rd year of DR24 B. Tech (IT) course curriculum .

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Thanking You Sir

Yours Sincerely,

Chairperson Board of Studies / Head of the Department

Head of the Dept.
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Department of Information Technology

Date: 10.01.2026

To
Dr. V. Purushotham Raju,
Professor & Dean Academics,
Department of Computer Science & Engineering,
Shri Vishnu Engineering College for Women (A),
Bhimavaram, W.G. Dist., A.P.

Dear Sir,

Sub: DNR College of Engineering & Technology – – Department of Information Technology – Board of Studies Meeting – Reg.

We take the privilege in inviting you for the Board of Studies Meeting of – Department of Information Technology, DNR College of Engineering & Technology as an Expert Nominated by Vice-Chancellor, JNTUK, Kakinada. It is proposed to discuss and finalize the course structure and syllabi for the 3rd year of DR24 B. Tech (IT) course curriculum .

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Department of Information Technology

Date: 10.01.2026

To

Rajiv Chand Kakarla
CEO, Amaravathi Software Innovations
Rajahmundry,
East Godavari District, A.P.,

Dear Sir,

Sub: DNR College of Engineering & Technology – Department of Information Technology – Board of Studies Meeting – Reg.

We take the privilege in inviting you for the Board of Studies Meeting of Department of Information Technology, DNR College of Engineering & Technology as an Expert Nominated by Vice-Chancellor, JNTUK, Kakinada. It is proposed to discuss and finalize the course structure and syllabi for the 3rd year of DR24 B. Tech (IT) course curriculum .

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Thanking You Sir

Yours Sincerely,

Chairperson Board of Studies / Head of the Department

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B. V. Ram Kumar
M.E., MCSI, MISTE, MAIENG.
Professor & HoD, IT

Department of Information Technology
E-Mail: bvrk.bonam@gmail.com
Mobile: +91-9492232152, Phone: 08816-221237

List of members of Board of Studies

S No.	Category	Name	Position	Signature
1	Chairperson	Mr.B. V. Ram Kumar	Asst. Professor & HoD Department of IT DNRCET, Bhimavaram	
2	Expert Nominated by Vice-Chancellor	Dr. N. Rama krishnaiah	Professor, CSE Department, UCEK, JNTUK Kakinada, Kakinada – 533003.	
3	Subject Experts from outside Parent Universities	Dr. V. Chandrasekhar,	Professor & Dean, Department of CSE, S. R. K. R. Engineering College (A), BHIMAVARAM 534202.	
4		Dr. V. Purushotham Raju	Professor & Dean Academics, Department of Computer Science & Engineering, Shri Vishnu Engineering College for Women (A),Bhimavaram, W.G. Dist., A.P.	
5	Member (Industrial Expert)	Rajiv Chand Kakarla	CEO, Amaravathi Software Innovations, Rajahmundry, East Godavari District, A.P.,	
6	Members Secretary	Mr. M. Ravi Kiran	Assistant Professor, Department of IT, DNRCET, Bhimavaram.	
7	Faculty Members	Mr. J.V.S. Nageswar Rao	Assistant Professor, Department of IT, DNRCET, Bhimavaram.	
8	Member (College alumni)	Mrs. G. Jahnavi Deepika	Mrs. G. Jahnavi Deepika Assistant Professor, Department of Computer Science & Engineering, Mallareddy Engineering College for Women (A),Hyderabad.	

Head of the Dept.
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DEPARTMENT OF INFORMATION TECHNOLOGY

Ref: *DNRCET/IT/2026-27/BoS/MoM-1* **Date:** *21.01.2026*

Board of Studies (BoS) Minutes of Meeting

20th JAN, 2026 at 10:00 am.

Agenda:

1. Introducing the members of Board of Studies.
2. Discussion on III year Semester I & II course structure for B. Tech (Information Technology) Programs for the academic year 2026 – 27.
3. Discussion on preparation of course syllabus in accordance to JNTUK course structure and syllabus.
4. Discussion on Academic Regulations of both UG Program.
5. Discussion and finalizing the model papers for the academic year 2026 – 27.
6. Any other agenda with the permission of the chair.

The Board of Studies meeting held on 20th Jan, 2026 at 10:00 am through online & offline mode with the welcome speech by Mr. B. V. Ram Kumar, Professor & Head of the department / Chairperson of BoS.

The points mentioned in the agenda were discussed, and the details are listed below:

Agenda No. 1: The Board of Studies (BoS) for Department of Information Technology is constituted by the chairperson as per the guidelines of Academic Council. The Chairperson introduced all nominated Board of Studies members of department of Information Technology to each other.

Agenda No. 2, 3, 4: The BoS members discussed on the agenda 2, 3, 4 and made the following resolutions.

Resolution on Agenda 2, 3, 4:

The members of the Board of Studies (BoS) and the chairperson made the decision to follow the JNTUK, Kakinada R-23 regulations for B. Tech Program were put into place for second year students for the academic year 2026-27. This included adhering the academic regulations, syllabi, model papers, and the evaluation procedure for semester-end examinations (SEE) and continuous internal evaluation (CIE).

Agenda No.5: The BoS members discussed on the agenda 5 and made the following resolutions.

Resolution on Agenda 5:

As it is decided to adhere JNTUK, Kakinada R-23 model paper without any change in agenda 5. The chairperson of the BoS discussed and finalized with the model paper

with two sections. Section- A consists of 10 small questions, each carry 2 marks and it should be 2 from each unit. The Section-B consists of five question with internal choice which carry 10 marks each and it should be each from one unit of the syllabus. All the members accepted unanimously and list is finalized and enclosed in Annexure G.

Agenda No.6: The BoS members discussed on the agenda 6 and made the following resolutions.

Agenda No.6: As there is no other agenda for discussion; hence the chairperson advised to conclude the meeting with the permission of all the BoS members.

The entire meeting is recorded as video and stored in the department.

The meeting concluded at 1:00pm with a vote of thanks by Mr. B. V. Ram Kumar, Chairperson of BoS / Professor & Head of the department.

University Nominee

Chairperson Board of Studies / Head of the Department

Head of the Dept.
Department of IT
D.N.R. College of Engg. & Tech.
BHIMAVARAM-534 202.

Copy to:

1. Principal, DNRCET(A),
2. Dean, Academics, DNRCET(A),
3. Controller of Examinations, DNRCET(A),
4. Circulation among the faculty members, IT Department, DNRCET(A),
5. File.

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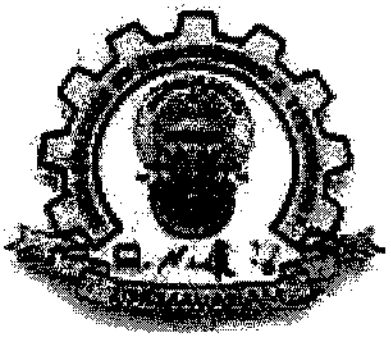
4		Dr. V. Purushotham Raju	Professor & Dean Academics, Department of Computer Science & Engineering, Shri Vishnu Engineering College for Women (A),Bhimavaram, W.G. Dist., A.P.	
5	Member (Industrial Expert)	Rajiv Chand Kakarla	CEO, Amaravathi Software Innovations, Rajahmundry, East Godavari District, A.P.,	
6	Members Secretary	Mr. M. Ravi Kiran	Assistant Professor, Department of IT, DNRCET, Bhimavaram.	
7	Faculty Members	Mr. J.V.S. Nageswar Rao	Assistant Professor, Department of IT, DNRCET, Bhimavaram.	
8	Member (College alumni)	Mrs. G. Jahnavi Deepika	Mrs. G. Jahnavi Deepika Assistant Professor, Department of Computer Science & Engineering, Mallareddy Engineering College for Women (A),Hyderabad.	

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE STRUCTURE & SYLLABUS B. Tech IT for PROGRAMME

(Applicableforbatchesadmittedfrom2026-2027)



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B.Tech. INFORMATION TECHNOLOGY (DR24 Regulation III Year I-SEM COURSE STRUCTURE &SYLLABUS)

B. Tech.–III Year I Semester

S. No.	Course Code	Title	Category	L/D	T	P	Credits
1	BT24IT3101	Advanced Java	PC	3	0	0	3
2	BT24CS3102	Computer Networks	PC	3	0	0	3
3	BT24IT3102	Automata Theory & Compiler Design	PC	3	0	0	3
4	BT24CS31P1A	1. Object Oriented Analysis and Design	PE-1	3	0	0	3
	BT24IT31P1A	2. Cyber Security					
	BT24IT31P1C	3. Artificial Intelligence					
	BT24CS31P1D	4. Microprocessors &Microcontrollers					
	BT24IT31P1B	5. Data Warehousing & Data Mining					
5		OR Entrepreneurship Development & Venture Creation	OE-1	3	0	0	3
6	BT24CS3105	Advanced JavaLab	PC	0	0	3	1.5
7	BT24CS3106	Computer Networks Lab	PC	0	0	3	1.5
8	BT24CS3107	FullStackDevelopment1	SEC	0	1	2	2
9	BT24CS3108	User Interface Designusing Flutter/ SWAYAM Plus - Android Application Development (withFlutter)	ES	0	0	2	1
10	BT24BCS3109	Evaluation of Community Service Internship		-	-	-	2
		Total		**15**	1	10	23
MC	MinorCourse(Studentmayselectfromthesamespecialized minors pool)			3	0	3	4.5
MC	MinorCoursethroughSWAYAM/NPTEL(minimum12week, 3 credit course)			3	0	0	3
HC	HonorsCourse(Studentmayselectfromthesamehonors pool)			3	0	0	3
HC	HonorsCourse(Studentmayselectfromthesamehonorspool)			3	0	0	3

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B.Tech. INFORMATION TECHNOLOGY (DR24 Regulation III Year II-SEM COURSE STRUCTURE &SYLLABUS)

B. Tech – III Year II Semester

S. No.	Course Code	Title	Category	L/D	T	P	Credits
1	BT24IT3202	Cloud Computing	PC	3	0	0	3
2	BT24IT3203	Cryptography &Network Security	PC	3	0	0	3
3	BT24IT3201	Machine Learning	PC	3	0	0	3
4	BT24CS32P2A	1. Software Testing Methodologies	PE-2	3	0	0	3
	BT24CS32P2B	2. Augmented Reality & Virtual Reality					
	BT24CS32P2C	3. DevOps					
	BT24CS32P2D	4. Generative AI					
	BT24EC32P2E	5. 12 week MOOC Swayam/NPTELcourse					
5	BT24CS32P3A	1. Software Project Management	PE-3	3	0	0	3
	BT24CS32P3B	2. Mobile Adhoc Networks					
	BT24CS32P3C	3. Natural Language Processing					
	BT24CS32P3D	4. DistributedOperating System					
	BT24CS32P3E	5.					
	BT24CS32P3F	6. 12weekMOOCSwayam/NPTEL course recommended b ythe BoS					
6		OpenElective–II	PC	3	0	0	3
7	BT24CS3204	Cloud Computing Lab	PC	0	0	3	1.5
8	BT24CS3205	Machine Learning Lab	SEC	0	0	3	1.5
9		Softskills//SWAYAMPlus -21st CenturyEmployability Skills	BS & H	0	1	2	2
10		TechnicalPaperWriting&IPR	BS & H	2	0	0	-
Total				**20**	**1**	**08**	**23**
11	MandatoryIndustry Internship/ MiniProject of08weeksdurationduringsummervacation						
MC	Minor Course(Studentmayselectfrom thesamespecializedminors pool)			3	0	3	4.5
MC	MinorCoursethroughSWAYAM/NPTEL(minimum12 week, 3 credit course)			3	0	0	3
HC	HonorsCourse(Studentmayselect from thesamehonors pool)			3	0	0	3
HC	HonorsCourse(Studentmayselectfromthesamehonorspool)			3	0	0	3

*UnderIndustryInternshipinterestedstudentscanpursueSWAYAMPlus coursesviz., Hands-on Masterclass on Data Analytics OR Artificial Intelligence for Real-World Application

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DEPARTMENT OF INFORMATION TECHNOLOGY

III Year – I Semester	Course Code: BT24IT3101	L	T	P	C
		3	0	0	3
ADVANCED JAVA					

CourseObjectives:

Thiscoursedevelopsprogrammingabilityofstudentstocreatedynamicwebapplicationsusingserver side technology with Java Database Connectivity. Students can learn networking and remote method invocation using Java API and different Java frameworks like Spring will increase ability of students in web application development.

CO1:.	Explain JDBC architecture, JDBC drivers, major classes/interfaces, and perform database operations including CRUD, transaction management, batch updates, and RowSet objects.
CO2	Analyze J2EE architecture, containers, server types, HTTP protocols, request processing, and structure of web applications.
CO3:	Apply Servlet API for building dynamic web applications, including Servlet lifecycle, configuration, session tracking, event handling, filters, and response manipulation.
CO4:.	Demonstrate JSP concepts including JSP architecture, lifecycle, scripting elements, directives, actions, implicit objects, Expression Language, JSTL, custom tags, session management, and exception handling.
CO5: .	Develop CRUD-based web applications using Java web frameworks, particularly Spring MVC, exploring dependency injection, bean lifecycle, Spring annotations, Spring AOP, and database transaction management.
CO6:	Integrate web application components, implement MVC architecture using Spring, and design robust enterprise-level web applications with data access and transaction management.

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	2							
CO2	3	3	2	2	1							
CO3	3	3	3	2	1							
CO4	3	3	2	2	1							
CO5	3	3	3	2	3							
CO6	3	3	3	2	3							3

UnitI:

JDBC Programming : JDBC Architecture, Types of JDBC Drivers, Introduction to major JDBC Classes and Interface, Creating simple JDBC Application, Types of Statement (Statement Interface, Prepared Statement, Callable Statement), Exploring Result Set Operations, Batch Updates in JDBC, Creating CRUD Application, Using Rowsets Objects, Managing Database Transaction.

UnitII:

J2EE and Web Development: J2EE Architecture Types, J2EE Containers, Types of Servers in J2EE Application, HTTP Protocols and API, Request Processing in Web Application, Web Application Structure, Web Containers and Web Architecture Models.

UnitIII:

Servlet API and Overview: Servlet Introduction, Servlet Life Cycle(SLC), Types of Servlet, Servlet Configuration with Deployment Descriptor, Working with Servlet Context and Servlet Config Object, Attributes in Servelt,, Response and Redirection using Request Dispacher and using send Redirect Method, Filter API, Manipulating Responses using Filter API, Session Tracking: using Cookies, HTTP Session, Hidden Form Fields and URL Rewriting, Types of Servlet Event: Context Level and Session Level.

UnitIV:

Java Server Pages(JSP): Introduction to JSP , Comparison with Servlet, JSP Architecture, JSP: Life Cycle, Scripting Elements, Directives, Action Tags, Implicit Objects, Expression Language(EL), JSP Standard Tag Libraries(JSTL), Custom Tag, Session Management, Exception Handling, CRUD Application

Unit V:

Java Web Frameworks: Spring MVC Spring: Introduction, Architecture, Spring MVC Module, Life Cycle of Bean Factory, Explore: Constructor Injection, Dependency Injection, Inner Beans, Aliases in Bean, Bean Scopes, Spring Annotations, Spring AOP Module, Spring DAO, Database Transaction Management, CRUD Operation using DAO and Spring API.

Text Books:

1. BlackBook"Javaserverprogramming"J2EE,1st ed.,DreamTechPublishers,2008.
2. CompleteReferenceJ2EE,JamesKeogh,McGrawHillpublication
3. ProfessionalJavaServerProgramming,SubrahmanyamAllamaraju,CedricBuest,Wiley Publication
4. SpringinAction,3rd edition,Craigwalls,ManningPublication

ReferenceBooks:

1. CoreJava,VolumeII:AdvancedFeatures,CayHorstmann,GaryCornellPearson Publication
2. JDBC™APITutorialandReference,ThirdEdition,MaydeneFisher,JonEllis,Jonathan Bruce, Addison Wesley
3. BeginningJSP,JSFandTomcat,GiulioZambon,Apress

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DEPARTMENT OF INFORMATION TECHNOLOGY

IIIYear-ISemester	Course Code: BT24CS3102	L	T	P	C
		2	1	0	3
COMPUTER NETWORKS					

CourseObjectives:

- Toprovideinsightaboutnetworks,topologies,andthekeyconcepts.
- Togaincomprehensiveknowledgeaboutthelayeredcommunicationarchitectures(OSIand TCP/IP) and its functionalities.
- To understand the principles, key protocols, design issues, and significance of each layers in ISO and TCP/IP.
- Toknowthebasicconceptsofnetworkservicesandvariousnetworkapplications.

CO1:.	Explain the fundamentals of computer networks, including network types (LAN, MAN, WAN), topologies, reference models (OSI, TCP/IP), and guided/unguided media.
CO2	Analyze data link layer concepts such as framing, flow control, error detection and correction, and implement elementary protocols including Stop-and-Wait, Sliding Window, HDLC, and PPP.
CO3:	Demonstrate Media Access Control techniques including random access (ALOHA, CSMA), controlled access, and channelization methods, and evaluate wired LAN technologies including Ethernet, Fast Ethernet, and Gigabit Ethernet.
CO4:.	Apply network layer concepts including packet switching, routing algorithms, congestion control, tunneling, internetworking, IPv4/IPv6 addressing, and fragmentation.
CO5: .	Analyze transport layer protocols including UDP and TCP, covering services, connection management, flow control, error control, and congestion control mechanisms.
CO6:	Evaluate application layer protocols and services including HTTP, email, TELNET, and DNS, and analyze web-based network security mechanisms.

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1								
CO2	3	3	2	2								
CO3	3	3	2	2	2							
CO4	3	3	3	2	2							
CO5	3	3	2	2	2							
CO6	3	3	2	2				1				3

UNIT I: Introduction: Network Types, LAN, MAN, WAN, Network Topologies Reference models- The OSI Reference Model- the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models, OSI Vs TCP/IP.
PhysicalLayer–IntroductiontoGuidedMedia-Twisted-paircable,CoaxialcableandFiberoptic cable and introduction about unguided media.

UNIT II: Data link layer: Design issues, **Framing**: fixed size framing, variable size framing, flow control, error control, error detection and correction codes, CRC, Checksum: idea, one's complement internet checksum, services provided to Network Layer, **Elementary Data Link Layer protocols**: simplex protocol, Simplex stop and wait, Simplex protocol for Noisy Channel.
Sliding window protocol: One bit, Go back N, Selective repeat-Stop and wait protocol, Data link layer in HDLC, Point to point protocol (PPP)

UNIT – III: Media Access Control: Random Access: ALOHA, Carrier sense multiple access (CSMA), CSMA with Collision Detection, CSMA with Collision Avoidance, **Controlled Access:** Reservation, Polling, Token Passing, **Channelization:** frequency division multiple Access(FDMA), time division multiple access(TDMA), code division multiple access(CDMA).
Wired LANs: Ethernet, Ethernet Protocol, Standard Ethernet, Fast Ethernet(100 Mbps), Gigabit Ethernet, 10 Gigabit Ethernet.

UNIT – IV: The Network Layer Design Issues – Store and Forward Packet Switching-Services Provided to the Transport layer- Implementation of Connectionless Service-Implementation of Connection Oriented Service- Comparison of Virtual Circuit and Datagram Networks,
Routing Algorithms-The Optimality principle-Shortest path, Flooding, Distance vector, Link state, Hierarchical, Congestion Control algorithms-General principles of congestion control, Congestion prevention polices, Approaches to Congestion Control-Traffic Aware Routing-Admission Control- Traffic Throttling-Load Shedding. Traffic Control Algorithm-Leaky bucket & Token bucket.
Internet Working: How networks differ- How networks can be connected- Tunnelling, internetwork routing-, Fragmentation, network layer in the internet – IP protocols-IP Version 4 protocol-IPV4 Header Format, IP addresses, Class full Addressing, CIDR, Subnets-IP Version 6-The main IPV6 header, Transition from IPV4 to IPV6, Comparison of IPV4 & IPV6.

UNIT –V: The Transport Layer: Transport layer protocols: Introduction-services- port number- User data gram protocol-User datagram-UDP services-UDP applications-Transmission control protocol: TCP services- TCP features- Segment- A TCP connection-windows in TCP- flow control- Error control, Congestion control in TCP.
Application Layer –- World Wide Web: HTTP,Electronic mail-Architecture- web basedmail-email security- TELENET-local versus remote Logging-Domain Name System.

Text Books:

1. ComputerNetworksm,AndrewSTanenbaum,FifthEdition.PearsonEducation/PHI
2. DataCommunicationsandNetworks,BehrouzA.Forouzan,FifthEdition TMH.

ReferencesBooks:

1. DataCommunicationsandNetworks-AchutSGodbole,AtulKahate
2. ComputerNetworks,MayankDave,CENGAGE

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DEPARTMENT OF INFORMATION TECHNOLOGY

IIIYear-ISemester	Course Code: BT24IT3102	L	T	P	C
		3	0	0	3
AUTOMATA THEORY & COMPILER DESIGN					

CourseObjectives:

- Introducethenotionofformallanguagesandgrammars
- DesignofGrammars,FAsandPDAs
- Tobecomefamiliarwiththeunderlyingtheoryandmethodsusedincompilerdesign
- ToIntroducetheparsingtechniques,codeoptimizationtechniquesandgenerate code

CO1:.	Explain the fundamentals of formal languages, regular expressions, finite automata (DFA, NFA, NFA-ϵ), and their equivalence and minimization techniques.
CO2	Analyze context-free grammars (CFGs), parse trees, ambiguity, and pushdown automata (PDAs), and demonstrate the equivalence between PDAs and CFGs.
CO3:	Apply lexical analysis concepts, including token specification, recognition, input buffering, and tools like Lex, and perform top-down parsing techniques such as recursive descent and LL(1) parsing.
CO4:.	Demonstrate bottom-up parsing techniques, including shift-reduce parsing, LR, SLR, LALR parsers, and syntax-directed translation schemes with evaluation orders.
CO5: .	Design intermediate code generation strategies, including three-address code, type checking, control flow representation, and simple code generation techniques.
CO6:	Implement code optimization techniques, basic blocks, flow analysis, and generate target code efficiently while handling control and data dependencies.

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1								
CO2	3	3	2	2								
CO3	3	3	3	2	1							
CO4	3	3	3	2	2							
CO5	3	3	3	2	2							
CO6	3	3	2	2	2							3

UNIT–I:RegularExpressions,LanguagesandFiniteAutomata

Formal Languages and the Chomsky Hierarchy, Regular Expressions and Regular Languages, Algebraic Laws for Regular Expressions, Applications of Regular Expressions, Abstract model of Finite Automaton, Transition Tables and Transition Graphs, Deterministic Finite Automata (DFA), Nondeterministic Finite Automata (NFA), Converting NFA to DFA, Finite Automata with ϵtransitions (NFA-ϵ), Converting NFA-ϵ to NFA/DFA, Minimization of Finite Automata, Equivalence of FA and Regular Expressions

UNIT-II:ContextFreeGrammarsandPushDownAutomata:

Context Free Grammars (CFG) and Context Free Languages (CFL), Design of CFGs, Leftmost and Rightmost Derivations, Parse Trees, Applications of CFGs, Ambiguity in Grammars and Languages, Push Down Automata (PDA), The Language of a PDA, Equivalence of PDAs and CFGs

UNIT-III:LexicalAnalysisandTop-DownParsing

Thestructureofacompiler,Roleoflexicalanalyzer,InputBuffering,Specificationoftokens, Recognition of tokens, The Lexical Analyser Generator –LEX IntroductiontoSyntaxAnalysis,Eliminatingambiguityandleftrecursionfroma CFG,Recursive Decent Parsing, LL(1) Grammars, Nonrecursive Predictive Parsing

UNIT-IV:Bottom-UpParsingandSyntaxDirectedTranslation

Shift-ReduceParsing,SimpleLRparsing,CanonicalLR(1)Parsing,LALRParsing,Parser Generators SyntaxDirectedDefinitions,EvaluationOrdersforSDDs,SyntaxDirectedTranslationSchemes

UNIT-V:IntermediateCodeGeneration,CodeGenerationandOptimization:

Threeaddresscode,TypesandDeclarations,TranslationofExpressions,TypeChecking,Control Flow,Issuesinthedesignofa CodeGenerator,TheTargetLanguage,A simpleCodeGeneratorBasicBlocksandFlow

Textbooks:

1. Introduction to Automata Theory, Languages and Computation, J.E.Hopcroft, R.Motwani and J.D.Ullman, 3rd Edition, Pearson, 2008.
2. Compilers Principles, Techniques and Tools, 2nd Edition, Alfred V.Aho, Monica S. Lam, Ravi Sethi,Jeffrey D. Ullman, Pearson

ReferenceBooks:

1. IntroductiontoLanguagesandTheTheoryofComputation,JohnC.Martin,McGrawHill.
2. TheoryofComputerScience-Automata,LanguagesandComputation,K.L.P.Mishraand N.Chandrasekaran, 3rd Edition, PHI, 2007
3. CompilerConstruction||,K.V.N.Sunitha,Pearson,2013
4. CompilerDesign,SandeepSaxena,RajkumarSinghRathore,S.Chandpublication

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DEPARTMENT OF INFORMATION TECHNOLOGY

IIIYear-ISemester	Course Code: BT24CS31P1A	L	T	P	C
		3	0	0	3
OBJECT ORIENTED ANALYSIS AND DESIGN					

Course Objectives:

Themainobjectiveisthestudentsto

- BecomefamiliarwithallphasesofOOAD.
- MasterthemainfeaturesoftheUML.
- Master the main concepts of Object Technologies and how to apply them at work and develop the ability to analyze and solve challenging problem in various domains.
- LearntheObjectdesignPrinciplesandunderstandhowtoapplythemtowards Implementation.

Course Outcomes:

Attheendofthecoursestudentswillbeableto

CO1:.	Explain the structure and complexity of software systems and analyze attributes of complex systems for effective design of organized software architectures.
CO2	Demonstrate UML fundamentals, modeling principles, object-oriented modeling, and the software development life cycle with practical case studies.
CO3:	Apply class and object diagram techniques, including advanced classes, relationships, interfaces, packages, and modeling roles in real-world systems.
CO4:.	Design basic behavioral models including use case diagrams, interaction diagrams, and activity diagrams for software systems.
CO5: .	Develop advanced behavioral and architectural models including events, signals, state machines, processes, component and deployment diagrams.
CO6:	Integrate structural, behavioral, and architectural modeling techniques to analyze and design complex systems in real-world applications.

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2								
CO2	3	3	2	2								
CO3	3	3	3	2								
CO4	3	3	3	2	1							
CO5	3	3	3	2	2							
CO6	3	3	3	3	2							3

UNITI:

Introduction: The Structure of Complex systems, The Inherent Complexity of Software, Attributes of Complex System, Organized and Disorganized Complexity, Bringing Order to Chaos, Designing Complex Systems. **Case Study:** System Architecture: Satellite-Based Navigation

UNITII:

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, and Software Development Life Cycle. **Basic Structural Modeling:** Classes, Relationships, common Mechanisms, and diagrams. **Case Study:** Control System: Traffic Management.

UNITIII:

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams. **Advanced Structural Modeling:** Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages. **Case Study:** AI: Cryptanalysis.

UNITIV:

Basic Behavioral Modeling-I: Interactions, Interaction diagrams Use cases, Use case Diagrams, Activity Diagrams. **Case Study:** Web Application: Vacation Tracking System

UNITV:

Advanced Behavioral Modeling: Events and signals, state machines, processes andThreads, time and space, state chart diagrams. **Architectural Modeling:** Component, Deployment, Component diagrams and Deployment diagrams. **Case Study:** Weather Forecasting

TextBooks:

1. Grady BOOCH, Robert A. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, Kellia Houston , "Object- Oriented Analysis and Design with Applications", 3rd edition, 2013, PEARSON.
2. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Education.

ReferenceBooks:

1. MeilirPage-Jones:FundamentalsofObjectOrientedDesigninUML,PearsonEducation.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY- Dreamtech IndiaPvt. Ltd.
3. AtulKahate:ObjectOriented Analysis&Design, TheMcGraw-Hill Companies.
4. Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.

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DEPARTMENT OF INFORMATION TECHNOLOGY

IIIYear-ISemester	Course Code: BT24IT31P1A	L	T	P	C
		3	0	0	3
CYBER SECURITY					

Course Objectives:

The aim of the course is to

- identifysecurityrisksandtakepreventive steps
- understandtheforensicsfundamentals
- understandtheevidencecapturingprocess
- understandthepreservationofdigital evidence

CO1:.	Explain the fundamentals of cybercrime, its origins, types of attacks, vulnerabilities of mobile and wireless devices, and the impact on information security.
CO2	Analyze and apply various cyber attack techniques, including phishing, malware, trojans, DoS/DDoS, SQL injection, buffer overflows, sniffers, and social engineering methods.
CO3:	Demonstrate cybercrime investigation techniques, including digital evidence collection, preservation, eDiscovery, email/IP tracking, recovering deleted evidence, and password cracking.
CO4:.	Evaluate computer forensics tools and techniques for analyzing systems, software, hardware, and multimedia evidence, including Windows, Linux, and mobile forensics.
CO5: .	Apply legal and ethical frameworks related to cybercrime, including the Indian IT Act, amendments, digital signatures, cyberlaw, and global perspectives.
CO6:	Integrate knowledge of cybercrime, forensic tools, and legal aspects to conduct real-world case studies and investigations in a structured manner.

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1								
CO2	3	3	2	2								
CO3	3	3	3	2	1							
CO4	3	3	3	2	2			2				
CO5	3	2	2	1				3	3			2
CO6	3	3	3	3	2			2	2			3

UNIT I: Introduction to Cybercrime: Introduction, Cybercrime: Definition and Origins of theWord, Cybercrime and Information Security, Cybercriminals,Classificationsof Cybercrime, Cyberstalking, Cybercafe and Cybercrimes, Botnets. Attack Vector, Proliferation of Mobile and Wireless Devices, Security Challenges Posed by Mobile Devices, Attacks on Mobile/Cell Phones, Network and Computer Attacks.

UNIT II: Tools and Methods : Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares,Virus and Worms, TrojanHorses and Backdoors, Steganography, Sniffers, Spoofing, Session Hijacking Buffer over flow, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Identity Theft (ID Theft), Foot Printing and Social Engineering, Port Scanning, Enumeration.

UNIT III: Cyber Crime Investigation: Introduction, Investigation Tools, eDiscovery, Digital Evidence Collection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP Tracking, E- Mail Recovery, Hands on Case Studies. Encryption and Decryption Methods, Search and Seizure of Computers, Recovering Deleted Evidences, Password Cracking.

UNIT IV: Computer Forensics and Investigations: Understanding Computer Forensics, Preparing for Computer Investigations. Current Computer Forensics Tools: Evaluating Computer Forensics Tools, Computer Forensics Software Tools, Computer Forensics Hardware Tools, Validating and Testing Forensics Software, Face, Iris and Fingerprint Recognition, Audio Video Analysis, Windows System Forensics, Linux System Forensics, Graphics and Network Forensics, E-mail Investigations, Cell Phone and Mobile Device Forensics.

UNIT V: Cyber Crime Legal Perspectives: Introduction, Cybercrime and the Legal Landscape around the World, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Amendments to the Indian IT Act, Cybercrime andPunishment, Cyberlaw, Technology and Students: Indian Scenario.

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Text Books:

1. SunitBelapureNinaGodbole"CyberSecurity:UnderstandingCyberCrimes,Computer Forensics and Legal Perspectives", WILEY, 2011.
2. NelsonPhillipsandEnfingerSteuart,"ComputerForensicsandInvestigations",Cengage Learning,NewDelhi, 2009.

ReferenceBooks:

1. MichaelT.Simpson,KentBackmanandJamesE.Corley,"HandsonEthicalHacking and Network Defence", Cengage, 2019.
2. ComputerForensics,ComputerCrimeInvestigationbyJohnR.Vacca,FirewallMedia,NewDelhi.
3. AlfredBasta,NadineBasta,MaryBrownandRavinderKumar "Cyber SecurityandCyber Laws" , Cengage,2018.

E-Resources:

1. CERT-InGuidelines-http://www.cert-in.org.in/
2. https://www.coursera.org/learn/introduction-cybersecurity-cyber-attacks[OnlineCourse]
3. https://computersecurity.stanford.edu/free-online-videos[FreeOnlineVideos]
4. Nickolai Zeldovich. 6.858 Computer Systems Security. Fall 2014. Massachusetts Instituteof Technology: MIT OpenCourseWare, https://ocw.mit.eduLicense: Creative CommonsBY-NC-SA.

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DEPARTMENT OF INFORMATION TECHNOLOGY

IIIYear-ISemester	Course Code: BT24IT31P1C	L	T	P	C
		0	0	3	1.5
ARTIFICIAL INTELLIGENCE					

Pre-requisite:

1. KnowledgeinComputerProgramming.
2. Acourseon"MathematicalFoundationsofComputerScience".
3. Backgroundinlinearalgebra,datastructuresandalgorithms,andprobability.

Course Objectives:

1. Thestudentshouldbemadetostudytheconceptsof Artificial Intelligence.
2. Thestudent shouldbemadetolearnthemethodsofsolvingproblemsusing Artificial Intelligence.
3. Thestudentshouldbemadetointroducetheconceptsof Expert Systems.
4. Tounderstandtheapplicationsof AI,namelygameplaying,theoremproving,andmachine learning.
5. Tolearndifferentknowledgerepresentationtechniques

CO1:.	Explain the foundations, history, and problem-solving approaches in Artificial Intelligence, including intelligent agents, rationality, and problem formulation.
CO2	Analyze and apply search strategies, including uninformed and heuristic search, hill climbing, A*, AO*, and game-playing algorithms with adversarial search and alpha-beta pruning.
CO3:	Demonstrate knowledge representation techniques including predicate logic, semantic networks, frames, inheritance, rules, and reasoning under uncertainty using probabilistic methods.
CO4:.	Apply logical inference techniques including first-order logic, propositional logic, forward/backward chaining, resolution, and machine learning approaches such as decision trees, explanation-based learning, and reinforcement learning.
CO5: .	Design and implement expert systems, understanding their architecture, knowledge acquisition, heuristics, and the use of expert system shells (e.g., MYCIN, DART, XCON).
CO6:	Integrate AI techniques for problem solving, decision making, learning, and expert systems to develop intelligent applications in real-world scenarios.

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1								
CO2	3	3	3	2	1							
CO3	3	3	3	2	2							
CO4	3	3	3	2	2							
CO5	3	3	3	2	2			2				3
CO6	3	3	3	3	2			2	2			3

UNIT-I

Introduction: AI problems, foundation of AI and history of AI intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

UNIT-II

Searching- Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Hill climbing, A* ,AO* Algorithms, Problemreduction, Game Playing-Adversialsearch,Games,mini-maxalgorithm,optimaldecisionsin multiplayer games, Problem in Game playing, Alpha-Beta pruning, Evaluation functions.

UNIT-III

Representation of Knowledge: Knowledge representation issues, predicate logic-logicprogramming, semantic nets- frames and inheritance, constraint propagation, representing knowledge using rules, rules based deduction systems. Reasoning under uncertainty, review of probability,Bayes' probabilistic interferences and dempstershafer theory.

UNIT-IV

Logic concepts: First order logic. Inference in first order logic, propositional vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution, Learning from observation Inductive learning, Decision trees, Explanation based learning, Statistical Learning methods, Reinforcement Learning.

UNIT-V

Expert Systems: Architecture of expert systems, Roles of expert systems – Knowledge Acquisition MetaknowledgeHeuristics.Typicalexpertsystems –MYCIN,DART,XCON: Expert systemsshells.

Textbooks:

1. S.RusselandP.Norvig,"ArtificialIntelligence–AModernApproach",SecondEdition, Pearson Education.
2. KevinNightandElaineRich,NairB.,"ArtificialIntelligence(SIE)",McGrawHill

ReferenceBooks:

1. DavidPoole,AlanMackworth,RandyGoebel,"ComputationalIntelligence:alogical

approach", Oxford University Press.
2. G.Luger,"ArtificialIntelligence:StructuresandStrategiesforcomplexproblemsolving", FourthEdition,PearsonEducation.
3. J.Nilsson,"ArtificialIntelligence:AnewSynthesis",ElsevierPublishers.
4. ArtificialIntelligence,SarojKaushik,CENGAGELearning.

OnlineLearningResources:

1. https://ai.google/
2. https://swayam.gov.in/nd1_noc19_me71/preview

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DEPARTMENT OF INFORMATION TECHNOLOGY

IIIYear-ISemester	Course Code: BT24CS31P1D	L	T	P	C
		0	0	3	1.5
MICROPROCESSORS & MICROCONTROLLERS					

CourseObjectives:

- Tointroducefundamentalarchitecturalconceptsofmicroprocessorsandmicrocontrollers.
- Toimpartknowledgeonaddressingmodesandinstructionsetof8086and8051
- Tointroduceassemblylanguageprogrammingconcepts
- Toexplainmemoryandl/Ointerfacingwith8086and8051
- Tointroduce16bitand32bitmicrocontrollers.

CO1:.	Explain the architecture, features, and operation of the 8086 microprocessor, including its internal structure, execution unit, bus interfacing, and system configurations.
CO2	Develop assembly language programs for the 8086 microprocessor using different instructions, addressing modes, and assembler directives.
CO3:	Design and implement microprocessor interfacing with memory, I/O devices, programmable peripheral interfaces, and hardware/software interrupts.
CO4:.	Explain the architecture, instruction set, addressing modes, and programming concepts of the 8051 microcontroller.
CO5: .	Implement interfacing and programming of 8051 microcontroller with timers, serial ports, LCDs, keyboards, ADC/DAC, sensors, stepper motors, and waveform generation.
CO6:	Compare microprocessors, microcontrollers, and modern embedded processors (PIC, ARM) and integrate knowledge to design small embedded systems.

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2								
CO2	3	3	3	2	1							
CO3	3	3	3	2	2			2				
CO4	3	2	2	2								
CO5	3	3	3	2	2			2				3
CO6	3	3	3	3	2							3

UNITI:

8086 Architecture: Main features, pin diagram/description, 8086 microprocessor family, internal architecture, bus interfacing unit, execution unit, interrupts and interrupt response, 8086 system timing, minimum mode and maximum mode configuration.

UNITII:

8086 Programming: Program development steps, instructions, addressing modes, assembler directives, writing simple programs with an assembler, assembly language program developmenttools.

UNIT III:

8086 Interfacing: Semiconductor memories interfacing (RAM, ROM), Intel 8255 programmable peripheralinterface,InterfacingswitchesandLEDS,Interfacingsevensegmentdisplays,softwarean d hardware interrupt applications, Intel 8251 USART architecture and interfacing, Intel 8237a DMA controller, stepper motor, A/D and D/A converters, Need for 8259 programmable interruptcontrollers.

UNITIV:

Microcontroller, Architecture of 8051, Special Function Registers(SFRs), I/O Pins Ports and Circuits, Instruction set, Addressing modes, Assembly language programming.

UNITV:

Interfacing Microcontroller, Programming 8051 Timers, Serial Port Programming, Interrupts Programming, LCD & Keyboard Interfacing, ADC, DAC & Sensor Interfacing, External Memory Interface,Stepper Motor and Waveform generation,Comparison of Microprocessor,Microcontroller, PIC and ARM processors

Textbooks:

1. MicroprocessorsandInterfacing–ProgrammingandHardwarebyDouglasVHall,SSSP Rao, Tata McGraw Hill Education Private Limited, 3rdEdition,1994.
2. K M Bhurchandi, A K Ray, Advanced Microprocessors and Peripherals, 3rdedition, McGraw Hill Education, 2017.
3. RajKamal,Microcontrollers:Architecture,Programming,InterfacingandSystemDesign,2nd edition,Pearson,2012.

ReferenceBooks:

1. RameshSGaonkar,MicroprocessorArchitectureProgrammingandApplicationswiththe 8085, 6thedition, Penram International Publishing, 2013.
2. KennethJ.Ayala,The8051Microcontroller,3rdedition,CengageLearning,2004.

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DEPARTMENT OF INFORMATION TECHNOLOGY

IIIYear-ISemester	Course Code: BT24IT31P1B	L	T	P	C
		0	1	2	2
DATAWARE HOUSING & DATA MINING					

Pre-requisites: Data Structures, Algorithms, Probability & Statistics, Data Base Management Systems

CourseObjectives: Themainobjectiveofthecourseisto

- Introducebasicconceptsandtechniquesofdatawarehousinganddatamining
- Examinethetypesofthedatatobeminedandapplypre-processingmethodsonrawdata
- Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.

CO1:.	Explain the fundamental concepts of data warehousing, OLAP, cloud data warehouses, and their applications in data analysis and pattern mining.
CO2	Perform data preprocessing including data cleaning, integration, reduction, transformation, and discretization to prepare datasets for analysis.
CO3:	Apply classification techniques, including decision tree induction, Bayesian classification, and rule-based classifiers, to solve data mining problems.
CO4:.	Implement association analysis using algorithms such as Apriori and FP-Growth to discover frequent itemsets and association rules.
CO5: .	Analyze clustering methods, including K-means, hierarchical clustering, and DBSCAN, and evaluate their effectiveness for different types of datasets.
CO6:	Integrate data warehousing and data mining techniques to design solutions for real-world business intelligence and analytics applications.

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2								
CO2	3	3	3	2	1							
CO3	3	3	3	2	2							
CO4	3	3	3	2	2							
CO5	3	3	3	2	2							
CO6	3	3	3	3	2							3

UNIT–I: Data Warehousing and Online Analytical Processing: Basic concepts, DataWarehouse Modeling: DataCube and OLAP,Data Warehouse Design and Usage,Data Warehouse Implementation, Cloud Data Warehouse, Data Mining and Patten Mining, Technologies, Applications, Major issues, Data Objects & Attribute Types, Basic Statistical Descriptions of Data, Data Visualization, Measuring Data Similarity and Dissimilarity. (Text Book- 1)

UNIT II: Data Preprocessing: An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization. (Text Book- 1)

UNIT–III: Classification: Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Attribute Selection Measures, Tree Pruning, Scalability and DecisionTree Induction, Visual Mining for Decision Tree Induction, Bayesian Classification Methods: Bayes Theorem, Naïve Bayes Classification, Rule-Based Classification, Model Evaluation and Selection. (Text Book- 2)

UNIT–IV: Association Analysis: Problem Definition, Frequent Itemset Generation, Rule Generation: Confident Based Pruning, Rule Generation in Apriori Algorithm, Compact Representation of frequent item sets, FP-Growth Algorithm. (Text Book- 2)

UNIT–V: Cluster Analysis: Overview, Basics and Importance of Cluster Analysis, Clustering techniques, Different Types of Clusters; K-means: The Basic K-means Algorithm, K-means Additional Issues, Bi-secting K Means, Agglomerative Hierarchical Clustering: Basic Agglomerative Hierarchical Clustering Algorithm DBSCAN: Traditional Density Center-Based Approach, DBSCAN Algorithm, Strengths and Weaknesses. (Text Book- 2)

Text Books:

1. DataMiningconceptsandTechniques,3rdedition, Jiawei Han, Michel Kamber, Elsevier, 2011.
2. Introduction to Data Mining: Pang-Ning Tan & Michael Steinbach, Vipin Kumar, Pearson,2012.

ReferenceBooks:

1. DataMining:VikramPudiandP.RadhaKrishna,OxfordPublisher.
2. DataMiningTechniques,ArunKPujari,3rdedition,UniversitiesPress,2013.
3. (NPTELcoursebyProf.PabitraMitra)http://onlinecourses.nptel.ac.in/noc17_mg24/preview
4. http://www.saedsayad.com/data_mining_map.htm

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BALUSUMUDI, BHIMAVARAM, W.G. Dist., A.P., PIN-534 202

DEPARTMENT OF INFORMATION TECHNOLOGY

IIIYear-ISemester	Course Code: BT24CS3105	L	T	P	C
		0	1	2	2
ADVANCED JAVA LAB					

CourseObjectives:themainobjectivesofthecourse are

- TomakeuseofServletandJSPAPIintheprocessofenterpriseapplication deployment.
- ImplementcomponentssuchasJSTL
- DistinguishApplicationServer,WebContainer,JDBC
- DesignandDevelopmentofwebapplicationhavingcollaborationofServlets,JSPs,Spring

Labshouldcoverthefollowingconcepts:

- JDBCprogramming
- J2EE andWeb development
- Servlets
- JavaServer Pages
- JavaWeb Frameworks

SampleListofExperiments:

1. WriteaJDBCapplicationwhichwillinteractwithDatabaseandperformthefollowingtask.
   a. CreateStudentTablewithRoll No,Name,andAddressfieldandinsertfewrecords.
   b. UsingStatementObjectdisplaythecontentofRecord.
   c. UsingStatementObjectInsertTwoRecord.
   d. UsingStatementObjectUpdateOneRecord.
   e. UsingStatementObjectDeleteOneRecord.
   f. UsingStatementObjectdisplaythecontentofRecord.
2. WriteaJDBCapplicationwhichwillinteractwithDatabaseandperformthefollowingtask.
   a. CreateStudentTablewithRoll No,Name,andAddressfieldandinsertfewrecords.
   b. UsingPreparedStatementObjectdisplaythecontentofRecord.
   c. UsingPreparedStatementObjectInsertTwoRecord.
   d. UsingPreparedStatementObjectUpdateOneRecord.
   e. UsingPreparedStatementObjectDeleteOneRecord.
   f. UsingPreparedStatementObjectdisplaythecontentofRecord
3. WriteaJDBCapplicationwhichwillinteractwithDatabaseandperformthefollowingtask.
   a. Createastoreprocedurewhichwillinsertonerecordintoemployeetable.
   b. Createastoreprocedurewhichwillretrievesalaryforgivenemployee id.
   c. Write a java application which will call the above procedure and display appropriate information on screen
4. DesignaJDBCapplicationwhichwilldemonstrateScrollableResultSetfunctionality.
5. DesignaJDBCapplicationwhichwilldemonstrateUpdatableResult Setfunctionality.
6. WritedowntheProgramfortestingtheServletandstudydeployment descriptor.
7. Writedowntheprogramfortestingtheincludeactionforservletcollaboration.

8. Createloginformandperformstatemanagementusing Cookies,HttpSessionandURL Rewriting.
9. WritedowntheProgramwhichdisplaysthesimpleJSPfile
10. Write down the program in which input the two numbers in an html file and then display the addition in JSP file.
11. PerformDatabaseAccessthroughJSP.
12. Writedownaprogramwhichdemonstratesthecoretagof JSTL.
13. Writedownaprogramwhichdemonstratesthe Formattagof JSTL.
14. Writedownaprogramwhichdemonstratesthe Functiontagof JSTL.
15. Writedownaprogramwhichdemonstratesthe SQLtagof JSTL.
16. StudyandImplementMVCusingSpring Framework
17. UsingSpringTemplatemanageDatabaseandTransaction.

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DEPARTMENT OF INFORMATION TECHNOLOGY

IIIYear-ISemester	Course Code: BT24CS3106	L	T	P	C
		0	1	2	2
COMPUTER NETWORKS LAB					

Course Objectives:

Learn basic concepts of computer networking and acquire practical notions of protocols with theemphasisonTCP/IP.Alabprovidesapracticalapproachto Ethernet/Internetnetworking: networksareassembled, andexperimentsaremadetounderstandthelayeredarchitecture and how do some important protocols work

List ofExperiments:

1. StudyofNetworkdevicesindetail andconnect thecomputersin LocalAreaNetwork.
2. WriteaProgramtoimplementthedatalinklayerfarmingmethodssuchas i)Characterstuffing ii)bit stuffing.
3. WriteaProgram toimplement datalinklayer farmingmethod checksum.
4. Writeaprogramfor HammingCodegenerationforerrordetectionand correction.
5. WriteaProgramtoimplementonadatasetofcharactersthethreeCRCpolynomials– CRC12,CRC16andCRC CCIP.
6. WriteaProgramtoimplementSlidingwindowprotocolforGobackN.
7. WriteaProgramtoimplementSlidingwindowprotocolforSelective repeat.
8. WriteaProgram toimplementStop andWait Protocol.
9. Writeaprogram for congestioncontrol usingleakybucket algorithm
10. WriteaProgramtoimplementDijkstra'salgorithmtocomputetheShortestpaththrough agraph.
11. Write a Program to implement Distance vector routing algorithm by obtaining routing table at each node (Take an example subnet graph with weights indicating delay between nodes).
12. WriteaProgram toimplement Broadcasttreebytaking subnetof hosts.
13. Wireshark
    i. PacketCaptureUsing Wireshark
    ii. StartingWireshark
    iii. ViewingCapturedTraffic
    iv. AnalysisandStatistics&Filters.
14. HowtorunNmap scan
15. OperatingSystemDetectionusingNmap
16. Do thefollowing using NS2 Simulator
    i. NS2Simulator-Introduction
    ii. SimulatetoFind theNumber ofPacketsDropped
    iii. SimulatetoFind theNumberofPacketsDroppedby TCP/UDP
    iv. Simulateto Find theNumber ofPacketsDropped dueto Congestion
    v. SimulatetoCompareDataRate&Throughput.

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DEPARTMENT OF INFORMATION TECHNOLOGY

IIIYear-ISemester	Course Code: BT24CS3107	L	T	P	C
		0	1	2	2
FULLSTACKDEVELOPMENT -1					

Course Objectives:

Themain objectivesof thecourse areto

- Makeuseof HTMLelementsandtheirattributesfordesigningstaticweb pages
- Buildaweb pagebyapplying appropriateCSSstylestoHTMLelements
- ExperimentwithJavaScripttodevelopdynamicwebpagesandvalidateforms

Experimentscoveringthe Topics:

- Lists,LinksandImages
- HTMLTables,FormsandFrames
- HTML5andCascadingStyleSheets,TypesofCSS
- Selectorforms
- CSSwithColor,Background,Font, TextandCSSBox Model
- ApplyingJavaScript-internaland external, I/O,Type Conversion
- JavaScriptConditionalStatementsandLoops,Pre-definedandUser-definedObjects
- JavaScriptFunctionsand Events

Sample Experiments:

1. Lists,Linksand Images

a. WriteaHTML program,toexplain theworkingoflists.
Note: It should have an ordered list, unordered list, nested lists and ordered list in an unordered list and definition lists.

b. Write a HTML program, to explain the working of hyperlinks using <a> tag and href, target Attributes.

c. Create a HTML document that has your image and your friend's image with a specific height and width. Also when clicked on the images it should navigate to their respective profiles.

d. Write a HTML program, in such a way that, rather than placing large images on a page, the preferred technique is to use thumbnails by setting the height and width parameters to something like to 100*100 pixels. Each thumbnail image is also a link to a full sized version of the image. Create an image gallery using this technique

2. HTMLTables,FormsandFrames

a. WriteaHTMLprogram,toexplaintheworkingoftables.(usetags:<table>,<tr>,<th>, <td>andattributes:border,rowspan,colspan)

b. Write a HTML program, to explain the working of tables by preparing a timetable. (Note: Use <caption> tag to set the caption to the table & also use cell spacing, cell padding, border, rowspan, colspan etc.).

c. Write a HTML program, to explain the working of forms by designing Registration form.

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(Note: Include text field, password field, number field, date of birth field, checkboxes, radio buttons, list boxes using <select>&<option> tags, <text area> and two buttons ie: submit and reset. Use tables to provide a better view).

d. Write a HTML program, to explain the working of frames, such that page is to be divided into 3 parts on either direction. (Note: first frame□ image, second frame□ paragraph, thirdframe□hyperlink.Andalsomakesureofusing"noframe"attributesuchthat framestobe fixed).

3. HTML5andCascadingStyleSheets,TypesofCSS

a. WriteaHTMLprogram,thatmakesuseof<article>,<aside>,<figure>,<figcaption>, <footer>,<header>,<main>,<nav>,<section>, ,tags.
b. WriteaHTML program,to embedaudioand videointo HTMLweb page.
c. Writeaprogramtoapplydifferenttypes(orlevelsofstylesorstylespecificationformats) -inline,internal,externalstylestoHTMLelements.(identifyselector,propertyandvalue).

4. Selectorforms

a. Writeaprogramtoapplydifferenttypesofselector forms
   i. Simpleselector(element, id,class,group,universal)
   ii. Combinatorselector(descendant,child,adjacentsibling,generalsibling)
   iii.Pseudo-class selector
   iv. Pseudo-elementselector
   v. Attributeselector

5. CSSwithColor,Background,Font,TextandCSSBoxModel

a. Writeaprogramto demonstratethevariouswaysyoucanreferenceacolor in CSS.
b. WriteaCSSrulethatplacesabackgroundimagehalfwaydownthepage,tiltingithorizontally. The image should remain in place when the user scrolls up or down.
c. Writeaprogram usingthefollowing termsrelatedto CSSfontand text:
   i. font-size ii.font-weight iii.font-style
   iv.text-decoration v. text-transformation vi.text-alignment
d. Writeaprogram,to explain theimportanceof CSSBox model using
   i. Content ii. Border iii. Margin iv. padding

6. ApplyingJavaScript-internalandexternal,I/O,Type Conversion

a. WriteaprogramtoembedinternalandexternalJavaScriptinaweb page.
b. Writeaprogram toexplain thedifferentwaysfordisplaying output.
c. Writeaprogramto explainthedifferentwaysfortaking input.
d. Createawebpagewhichusespromptdialogueboxtoaskavoterforhisnameandage. Display the information in table format along with either the voter can vote or not

7. JavaScriptPre-definedandUser-definedObjects

a. Writeaprogram using document object propertiesand methods.
b. Writeaprogramusingwindowobjectpropertiesandmethods.
c. Writeaprogramusingarrayobjectpropertiesandmethods.
d. Writeaprogramusing mathobject propertiesandmethods.
e. Writeaprogram usingstringobject propertiesand methods.
f. Writeaprogram usingregexobject propertiesandmethods.
g. Writeaprogramusing date objectpropertiesandmethods.
h. Write a program to explain user-defined object by using properties, methods, accessors,constructors and display.

8. JavaScriptConditionalStatementsand Loops

a. Write a program which asks the user to enter three integers, obtains the numbers from the user and outputs HTML text that displays the larger number followed by the words "LARGERNUMBER"inan informationmessagedialog.Ifthenumbers areequal,output HTML text as "EQUAL NUMBERS".
b. Writeaprogramto displayweek daysusing switch case.
c. Writeaprogramto print1 to10 numbersusing for,while anddo-while loops.
d. Writeaprogramto printdatain objectusingfor-in, for-eachandfor-of loops
e. Develop a program to determine whether a given number is an 'ARMSTRONG NUMBER'ornot.[Eg: 153isanArmstrongnumber,sincesumofthecube ofthedigitsis equal to the number i.e.,13 + 53+ 33 = 153]
f. Write a program to display the denomination of the amount deposited in the bank in terms of 100's, 50's, 20's, 10's, 5's, 2's & 1's. (Eg: If deposited amount is Rs.163, the output should be 1-100's, 1-50's, 1- 10's, 1-2's & 1-1's)

9. JavascriptFunctionsand Events

a. Designaappropriatefunctionshouldbecalledtodisplay
    i. Factorialofthatnumber
    ii. Fibonacciseriesuptothatnumber
    iii. Primenumbersupto that number
    iv. Isit palindromeor not
b. DesignaHTMLhavingatextboxandfourbuttonsnamedFactorial,Fibonacci,Pr ime, and Palindrome. When a button is pressed an appropriate function should be called to display
    i. Factorialofthatnumber
    ii. Fibonacciseriesuptothatnumber
    iii. Primenumbersupto that number
    iv. Isit palindromeor not
c. Writeaprogramto validatethefollowingfieldsinaregistration page
    i. Name(startwithalphabetandfollowedbyalphanumericandthelengthshoul dnot be less than 6 characters)
    ii. Mobile(onlynumbersandlength10 digits)
    iii. E-mail(shouldcontainformatlike xxxxxxx@xxxxxx.xxx)

TextBooks:

1. ProgrammingtheWorld WideWeb,7thEdition,RobetWSebesta,Pearson,2013.
2. WebProgrammingwithHTML5,CSSandJavaScript,JohnDean,Jones&Bartlet t Learning, 2019 (Chapters 1-11).
3. Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, and Node, Vasan Subramanian, 2nd edition, APress, O'Reilly.

WebLinks:

1. https://www.w3schools.com/html
2. https://www.w3schools.com/css
3. https://www.w3schools.com/js/

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Course Code: BT24IT3201 | **DR24** | HTNO

D.N.R COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

B.Tech III-II Semester Regular Examinations (Model Paper)

MACHINE LEARNING

Time: 3Hrs Max.Marks:70

S.no			PART-A **Answer All the Questions.**	**Marks**
				20M
1.	a		What is the evolution of ML?	CO1-K2(2M)
	b		What is data representation?	CO1-K2(2M)
	c		What is the difference between a metric **and a** non-metric distance function?	CO2-K2(2M)
	d		How is similarity between **binary patterns** typically measured?	CO2-K2(2M)
	e		Define a **decision tree** in the context of machine learning.	CO3-K2(2M)
	f		What is the main idea behind **the** Bayes classifier**?**	CO3-K2(2M)
	g		State the key idea behind the **perceptron learning algorithm**	CO4-K2(2M)
	h		Define a **linearly non-separable case** in SVM.	CO4-K2(2M)
	i		What is the difference between **partitioning** and **hierarchical clustering**?	CO5-K2(2M)
	j		What is the main idea behind **spectral clustering**?	CO5-K2(2M)
			PART-B **All Questions Carry Equal Marks**	
				10M
2.	A.	i.	Explain learning by rote, learning by induction, and reinforcement learning with examples	CO1- K3(5M)
		ii.	Explain data acquisition and feature engineering.	CO1- K3(5M)
			OR	
	B.	i.	Explain model selection and criteria for choosing a model.	CO1- K3(5M)
		ii.	Describe model prediction and its applications.	CO1- K3(5M)
				10M
3.	A.	i.	Explain how the **K-Nearest Neighbor classifier** works. Include a small example with K=3.	CO2-K3(10M)
		ii	Discuss the performance evaluation metrics for **KNN classifiers**. Include at least two metrics.	
			OR	
	B.	i.	Describe how **proximity between binary patterns** is computed. Give one real-world application.	CO2-K3(10M)
		ii	Discuss the concept of **non-metric similarity functions** and give two examples.	
				10M
4.	A.	i.	Describe the process of **decision tree regression** with an example.	CO3- K3(5M)
		ii.	Explain the **bias–variance trade-off** in decision tree learning and how it affects performance.	CO3- K3(5M)
			OR	
	B.	i.	Discuss the **optimality of the Bayes classifier**. Why is it considered optimal?	CO3- K3(5M)
		ii.	Describe how **multi-class classification** is handled using the Bayes classifier.	CO3- K3(5M)
				10M
5.	A.	i.	Discuss the **limitations of the perceptron** and how they are addressed in more advanced models.	CO4- K3(5M)
		ii.	Describe how **SVM handles linearly non-separable data**.	CO4- K3(5M)
			OR	
	B.	i.	Derive the **sigmoid function** used in logistic regression and explain why it is	CO4- K3(5M)

			suitable for classification.	
		ii.	Describe the architecture of a **multi-layer perceptron** and explain the role of hidden layers.	CO4- K3(5M)
				10M
6.	A.	i.	Explain the difference between **divisive** and **agglomerative clustering** with examples.	CO5- K3(5M)
		ii.	Describe the **fuzzy C-means clustering** algorithm and explain how it handles membership values.	CO5- K3(5M)
			OR	
	B.	i.	Describe **Expectation Maximization (EM) based clustering** and explain how it works.	CO5- K3(5M)
		ii.	Compare **hierarchical clustering** and **partitioning clustering** in terms of algorithm, output, and applications.	CO5- K3(5M)
			* * *	

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D.N.R COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

B.Tech III-II Semester Regular Examinations (Model Paper)

CLOUD COMPUTING

Time: 3Hrs Max.Marks:70

Sno			PART-A **Answer All the Questions.**	**Marks**
				20M
1.	a		List any two characteristics of cloud computing.	CO1-K2(2M)
	b		Name any two services offered by Amazon Web Services.	CO1-K2(2M)
	c		What is meant by ubiquitous Internet?	CO2-K2(2M)
	d		List any two elements of parallel computing.	CO2-K2(2M)
	e		What is meant by taxonomy of virtualization techniques?	CO3-K2(2M)
	f		Mention any two disadvantages of virtualization.	CO3-K2(2M)
	h		Define scalability in cloud computing.	CO4-K2(2M)
	g		What are the basic goals of computer security?	CO4-K2(2M)
	h		What is server less computing architecture?	CO5-K2(2M)
	i		Mention any two applications of IoT.	CO5-K2(2M)
			PART-B **All Questions Carry Equal Marks**	
				10M
2.	A.	i.	Explain cloud computing and its key characteristics.	CO1- K3(5M)
		ii.	Explain the different types of cloud services: IaaS, PaaS, and SaaS.	CO1- K3(5M)
			OR	
	B.	i.	Explain the role of cloud service providers in cloud computing.	CO1- K3(5M)
		ii.	Explain how cloud computing supports scalability and cost efficiency.	CO1- K3(5M)
				10M
3.	A.	i.	Explain cloud enabling technologies and their role in cloud computing.	CO2-K3(10M)
		ii	Explain parallel computing and its basic elements.	
			OR	
	B.	i.	Describe Web services and their role in cloud computing.	CO2-K3(10M)
		ii	Discuss how virtualization acts as a backbone of cloud computing.	
				10M
4.	A.	i.	Explain the relationship between virtualization and cloud computing.	CO3- K3(5M)
		ii.	Explain virtualization technologies with examples: XEN and VMware.	CO3- K3(5M)
			OR	
	B.	i.	Describe Docker Swarm and its features.	CO3- K3(5M)
		ii.	Discuss the advantages of containers over traditional virtualization.	CO3- K3(5M)
				10M
5.	A.	i.	Explain techniques used to achieve fault tolerance in clouds.	CO4- K3(5M)
		ii.	What is a federated cloud? Explain its advantages and challenges	CO4- K3(5M)
			OR	
	B.	i.	Explain data security and privacy issues in cloud computing.	CO4- K3(5M)
		ii.	Explain compliance and regulatory challenges in cloud computing.	CO4- K3(5M)
				10M
6.	A.	i.	Explain Internet of Things (IoT) and its applications.	CO5- K3(5M)
		ii.	Explain DevOps and its importance in cloud computing.	CO5- K3(5M)

		OR	
B.	i.	Discuss challenges and future trends in advanced cloud computing.	CO5- K3(5M)
	ii.	Describe DevOps tools and practices.	CO5- K3(5M)
		* * *	

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Course Code: BT24IT3203 | **DR24** | HTNO | | | | | | | | | | |

D.N.R COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

B.Tech III-II Semester Regular Examinations (Model Paper)

CRYPTOGRAPHY & NETWORK SECURITY

Time: 3Hrs Max.Marks:70

no			PART-A **Answer All the Questions.**	**Marks**
				20M
1.	a		What are the basic goals of computer security?	CO1-K2(2M)
	b		What is authentication?	CO1-K2(2M)
	c		What is symmetric key encryption?	CO2-K2(2M)
	d		Give one difference between block ciphers and stream ciphers.	CO2-K2(2M)
	e		Why is factorization hard?	CO3-K2(2M)
	f		What are the mathematical foundations of RSA?	CO3-K2(2M)
	h		What is the difference between message integrity and message authentication?	CO4-K2(2M)
	g		List any two services provided by digital signatures.	CO4-K2(2M)
	h		What is SSL?	CO5-K2(2M)
	i		What are the two modes of IPSec?	CO5-K2(2M)
			PART-B **All Questions Carry Equal Marks**	
				10M
2.	A.	i.	Explain security services and their importance.	CO1- K3(5M)
		ii.	Explain integer arithmetic and its role in cryptography.	CO1- K3(5M)
			OR	
	B.	i.	Explain how mathematical concepts support encryption algorithms.	CO1- K3(5M)
		ii.	Explain the importance of keys in cryptographic systems.	CO1- K3(5M)
				10M
3.	A.	i.	Describe algebraic structures used in symmetric key cryptography	CO2-K3(10M)
		ii	Explain modern stream ciphers with examples.	
			OR	
	B.	i.	Discuss AES cipher rounds for different key sizes.	CO2-K3(10M)
		ii	Explain block cipher design principles.	
				10M
4.	A.	i.	Explain the principles of asymmetric key cryptography.	CO3- K3(5M)
		ii.	Describe the RSA cryptosystem with key generation, encryption, and decryption.	CO3- K3(5M)
			OR	
	B.	i.	Explain the role of modular arithmetic in public key cryptosystems.	CO3- K3(5M)
		ii.	Discuss the security assumptions behind ElGamal cryptosystem.	CO3- K3(5M)
				10M
5.	A.	i.	Describe the working of SHA-512 hash algorithm.	CO4- K3(5M)
		ii.	Explain key management and its importance.	CO4- K3(5M)
			OR	
	B.	i.	Explain how message authentication is achieved using hash functions.	CO4- K3(5M)
		ii.	Compare digital signatures and message authentication codes (MACs).	CO4- K3(5M)
				10M
6.	A.	i.	Compare PGP and S/MIME.	CO5- K3(5M)
		ii.	Explain SSL and its working.	CO5- K3(5M)

		OR	
B.	i.	Explain Authentication Header (AH) and Encapsulating Security Payload (ESP).	CO5- K3(5M)
	ii.	Describe malicious software: viruses and worms.	CO5- K3(5M)
		* * *	

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DEPARTMENT OF INFORMATION TECHNOLOGY

IIIYear-ISemester	Course Code: BT24CS3108	L	T	P	C
		0	1	2	2
USER INTERFACE DESIGN USING FLUTTER					

CourseObjectives:

- LearnstoImplementFlutterWidgetsandLayouts
- UnderstandsResponsiveUIDesignandwithNavigationinFlutter
- KnowledgeonWidgesandcustomizewidgetsforspecificUIelements,Themes
- Understandtoincludeanimationapartfromfetchingdata

ListofExperiments:

Studentsneedtoimplementthefollowingexperiments

1. a)InstallFlutterandDartSDK.
   b)WriteasimpleDartprogramtounderstandthelanguage basics.
2. a)ExplorevariousFlutterwidgets(Text,Image,Container,etc.).
   b) Implementdifferentlayoutstructuresusing Row,Column,andStackwidgets.
3. a)DesignaresponsiveUIthatadaptstodifferentscreen sizes.
   b) Implementmediaqueriesandbreakpointsforresponsiveness.
4. a)Setupnavigationbetweendifferentscreensusing Navigator.
   b) Implementnavigationwithnamedroutes.
5. a)Learnaboutstatefulandstatelesswidgets.
   b) Implementstatemanagementusingset StateandProvider.
6. a)CreatecustomwidgetsforspecificUIelements.
   b) Applystylingusingthemesandcustomstyles.
7. a)Designaformwithvariousinputfields.
   b) Implementformvalidationanderrorhandling.
8. a)AddanimationstoUIelementsusingFlutter'sanimationframework.
   b) Experimentwithdifferenttypesofanimations(fade,slide,etc.).
9. a)FetchdatafromaRESTAPI.
   b) Displaythefetcheddatainameaningfulwayintheui.
10. a)WriteunittestsforUI components.
    b) UseFlutter'sdebuggingtoolstoidentifyandfixissues.

Text Books:

1. MarcoL.Napoli,BeginningFlutter:AHands-onGuidetoAppDevelopment.

2. RapPayne,BeginningAppDevelopmentwithFlutter:CreateCross-PlatformMobileApps1•Edition, Apres
3. RichardRose,Flutter&DartCookbook,DevelopingFullstackApplicationsforthe Cloud, Oreilly.

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Dept of Basic Sciences & Humanities (English)

Meeting of BOS Schedule, A.Y. 2026-27

Minutes of meeting of Board of Studies, Dept of Basic Sciences & Humanities (English) held 20-01-2026 (Wednesday)with the following points of agenda.

Venue: English Laboratory

Meeting held on: 20-01-2026, *3.00PM.*

Mode of conducting meeting: Zoom online platform

Meeting link:

https://us06web.zoom.us/j/89517282322?pwd=vIFmv0e96cva0ZeNPqfqLRbaWfwtR1.1

Agenda:

1. Introduction of members
2. . To discuss and finalize the proposed III B. Tech. I & II Semester Soft Skills Labcourse of DR -24 Regulations. **(Annexure-A)**
3. To discuss and finalize the proposed III B. Tech. II Semester Technical Paper Writing & IPR a mandatory course of DR -24 Regulations. **(Annexure-A)**
4. To discuss II B Tech and III B Tech Community service and internship Project guidelines and its assessment and evaluation process.
5. To finalize the Evaluation procedure for Continuous Internal Evaluation (CIE) andSemester End Evaluation (SEE) **(Annexure-B)**
6. Ratification of Course Objectives and Course Out comes, CO – PO Mapping for theproposed subjects. **(Annexure-C)**
7. Finalization of Text Books and Reference Books. **(Annexure-D)**
8. Any other item with the permission of the chairman

Members Present:

S. NO	Name(s) of the Member(s)/	Designation	Designation in Committee	Signature
1.	Dr. G G Ratnam	Professor & Head, Dept of BS&H	Chairperson	
2.	Dr. K. Sree Ramesh	Professor, Dept. of English Adikavi Nannaya University, Rajamahendravaram	Member (University Nominee)	Attended Online

3.	Dr. K Vijayalakshmi	Associate professor Dept. of English Vishnu Institute of Technology Bhimavaram	Member (Subject expert)	Attended online
4.	Dr. B V N Lakshmi	Head Dept. of English &Foreign Language, SRKR Engineering College, Bhimavaram	Member (Subject expert)	Attended online
5.	Mr. B Meshak Raju	Asst. Professor of English, DNRCET	Member	
6.	Mr. V Praveen	Asst. Professor of English, DNRCET	Member	20/1/26
7.	Mr. G. Moshe	Asst. Professor of English, DNRCET	Member	
8	Mr. R Atchutha Ramayya	Asst. Professor of English, DNRCET	Member	
9.	Mr. T. Pranams	Managing Director Pranams Hotels, Bhimavaram	Member (Industrial Expert)	Attended online
10.	Ms. K. Siva Syamala	R. No: 149P5A0503 Batch: 2013-17	Member (College alumni)	Attended online

Minutes of meeting of Board of Studies, Dept of Basic Sciences & Humanities (English) held on 19-01-2026 at *3.00PM* with the following Resolutions:

At the outset, the principal of DNRCET presented his gratitude to the university nominee and other members of BOS and handed over the session to the chairman of BOS.

Resolution-1: Introduction of Members

The BOS chairman welcomed and introduced the eminent professors of BOS Meeting. He briefed them about structure and pattern of the course. The BOS members expressed their appreciation for novel structure of curriculum and content of the course. The chairman of BOS placed the agenda for the deliberation of the members. The following deliberations were made as per the items of circular agenda.

Resolution-2: Finalize of proposed III B. Tech. I & II Semester Soft Skills Labcourse of DR -24 Regulations. (Annexure-A)

Resolved that the proposed III B. Tech. I & II Semester Soft Skills Lab course under the DR–24 Regulations is discussed in detail by the Board. Based on the valuable suggestions of the University Nominee and other members of subject expert, along with prescribed content some innovative delivery methods are discussed and finalized. The approved course emphasizes innovative and experiential learning approaches like **team-based projects** involving groups of five students, understanding **stress management and emotional balance through selected movie clippings** and illustrative activities, and the organization of **mock interviews to familiarize students with current company requirements.** In addition, basic grammar exercises are incorporated to improve accuracy and clarity in students' oral communication. After due deliberation, some sorts of enhancements is **finalized and approved for implementation from the academic year 2026–27.**

Resolution-3: To discuss and finalize the proposed III B. Tech. II Semester Technical Paper Writing & IPR a mandatory course of DR -24 Regulations.

Resolved the proposed syllabus of Technical Paper Writing & IPR, a mandatory course of III B. Tech II Semester DR-24 Regulations were discussed in detail. After considering the inputs from all members, the course is finalized and approved for implementation in the upcoming academic year 2026-27.

Resolution-4: The committee has discussed and finalized the II B Tech and III B Tech Community service and internship Project guidelines and its assessment and evaluation process.

Resolution-5: Finalization of Evaluation Procedure for CIE and SEE. (Annexure-B)

Resolved course evaluation procedure, the course shall carry 100 marks and shall be evaluated through continuous assessments during the semester for 30 sessional marks and end examination shall be for 70 marks. Day-to-day work in the class / laboratory shall be evaluated for 30 marks by the concerned teacher based on the regularity/assignments/viva/mid semester test. The end examination shall be conducted for 70 marks by the concerned teacher and an expert were discussed and finalized.

Resolved course evaluation procedure of Technical paper writing and IPR, a mandatory course. The midterm internal marks evaluated for 30 marks and Semester end exam evaluated for 70 marks by the internal faculty only

Resolved the course evaluation procedure of the community service project assessment and evaluation process is conducted within the departmental committees under the internal faculty supervision for the maximum marks of 50.

Resolution-6: Ratification of Course Objectives and Course Outcomes, CO – PO Mapping for the Proposed Subjects. (Annexure-C)

Resolved the Course Objectives and Course Outcomes for the proposed subjects were reviewed and ratified. Additionally, the CO-PO mapping was discussed and approved, ensuring alignment with the educational goals of the program.

Resolution-7: Finalization of Text Books and Reference Books. (Annexure-D)

Discussed and Resolved the textbooks and reference books for the III B. Tech I & II Semester Soft Skills, Technical Paper writing and Community service Project course. The following books were approved as the primary textbooks

Resolution-8: Any Other Item with the Permission of the Chairman

Resolved the additional items raised with the permission of the Chairman were discussed.

The chairman concluded the meeting by summarizing all the agenda points and resolutions and closed with a note of thanks to all members for their suggestions and participation.

20/11/2024

HEAD
Dept. of Basic Sciences
D.N.R. College of Engg. & Tech
BHIMAVARAM-534 202.

Annexure –C

D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY
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III B Tech I & II Semester

Course Name: SOFT SKILLS- *BT24BS3101, BT24BS3201*

COURSE OUT COMES

After completion of this course the student will be able to learn

COs	Statements	Blooms Level
CO1	**Demonstrate** analytical thinking and active listening skills to make informed decisions and effectively solve real-world problems.	K5
CO2	**Implement** self-management strategies to develop resilience, and goal-oriented behavior in academic and professional environments.	K3
CO3	**Use** standard grammar structures accurately in both speaking and writing to ensure clear and effective communication in global contexts.	K3
CO4	**Develop** job-oriented communication and presentation skills that align with current industry standards and digital tools.	K6
CO5	**Build** and sustain effective interpersonal relationships through empathy, teamwork in diverse professional settings.	K4
CO6	**Integrate** critical thinking, workplace readiness, and social intelligence to succeed in today's competitive job market.	K6

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	-	-	-	-	-	-	-	2	2	3	-	2
CO 2	-	-	-	-	-	-	-	2	3	2	-	3
CO 3	-	-	-	-	-	-	-	2	2	3	-	2
CO 4	-	-	-	-	-	-	-	2	3	3	-	2
CO 5	-	-	-	-	-	-	-	2	3	2	-	2
CO 6	-	-	-	-	-	-	-	3	3	3	-	3
Overall	-	-	-	-	-	-	-	**2.1**	**2.6**	**2.6**	-	**2.3**

MAPPING LEVELS:

Correlation levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

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Annexure –D

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Department of Basic Sciences and Humanities

Course Name: SOFT SKILLS- *BT24BS3101, BT24BS3201*

The following books were approved as the primary textbooks for Soft Skills Laboratory

Text books:

1. Barun K. Mitra, Personality Development and Soft Skills, Oxford University Press, 2011.
2. S.P. Dhanavel, English and Soft Skills, Orient Blackswan, 2010.

Reference books:

1. R.S.Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning, S.Chand& Company Ltd., 2018.
2. Raman, Meenakshi& Sharma, Sangeeta, Technical Communication Principles and Practice, Oxford University Press, 2011.

E-resources:

https://swayam-plus.swayam2.ac.in/courses/course-details?id=P_CAMBR_01

29/11/24

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IIIYearII Semester	TECHNICALPAPERWRITING&IPR	L	T	P	C
		2	0	0	-

Course Objective : The course will explain the basic related to writing the technical reports andunderstandingtheconceptsrelatedtoformattingandstructuringthereport.Thiswillhelp students to comprehend the concept of proofreading, proposals and practice

Course Outcomes

COs	Statements	Blooms Level
CO1	*Apply* basic principles of technical writing to plan, structure, and write clear technical reports and minutes of meetings.	K3
CO2	*Draft* and *edit* technical reports using proper design, grammar, plain English, and effective illustrations.	K6
CO3	*Prepare* accurate summaries and *present* final technical reports and proposals using effective written and verbal skills.	K3
CO4	*Use* word processing tools to format, edit, review, protect, and manage technical documents efficiently.	K3
CO5	*Understand* the concepts, processes, and international aspects of intellectual property and patent development.	K2
CO6	*Develop* clear, well-structured technical documents by applying effective writing, editing, presentation, word-processing, and intellectual property principles.	K6

Unit I: Introduction: An introduction to writing technical reports, technical sentences formation, using transitions to join sentences, Using tenses for technical writing. Planning and Structuring: Planning the report, identifying reader(s), Voice, Formatting and structuring the report, Sections of a technical report, Minutes of meeting writing.

Unit II: Drafting report and design issues: The use of drafts, Illustrations and graphics.Final edits: Grammar, spelling, readability and writing in plain English: Writing in plain English, Jargon and final layout issues, Spelling, punctuation and Grammar, Padding, Paragraphs, and Ambiguity.

Unit III: Proof reading and summaries: Proofreading, summaries, Activities on summaries. Presenting final reports: Printed presentation, Verbal presentation skills, Introduction to proposals and practice.

Unit IV: Using word processor: Adding a Table of Contents, Updating the Table of Contents. Deleting the Table of Contents, Adding an Index, Creating an Outline, Adding Comments, Tracking Changes, Viewing Changes, Additions, and Comments, Accepting and Rejecting Changes , Working with Footnotes and Endnotes, Inserting citations and Bibliography, Comparing Documents, Combining Documents, Mark documents final and make them read only., Password protect Microsoft Word documents., Using Macros,

Unit V:Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property

TextBooks:

1. Kompal Bansal & Parshit Bansal, "Fundamentals of IPR for Beginner's", 1st Ed., BS Publications, 2016.
2. WilliamS.PfeifferandKayeA.Adkins,"TechnicalCommunication:APractical Approach", Pearson.
3. Ramappa,T.,"IntellectualPropertyRightsUnderWTO",2nd Ed.,SChand,2015.

ReferenceBooks:

1. AdrianWallwork,EnglishforWritingResearchPapers,SpringerNewYork Dordrecht Heidelberg London, 2011.
2. DayR,HowtoWriteandPublishaScientificPaper,CambridgeUniversity Press(2006)

E-resources:

1. https://www.udemy.com/course/reportwriting/
2. https://www.udemy.com/course/professional-business-english-and-technical-report-writing/
3. https://www.udemy.com/course/betterbusinesswriting/

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DEPARTMENT OF MASTER OF BUSINESS ADMINISTRATION

CIRCULAR

Bhimavaram,
Dt: 06-01-2026.

To
The faculty members,
MBA Department,
DNRCET

Dear sir/madam,

Sub: DNR College of Engineering & Technology, MBA Department – Board of Studies Meeting-Reg..

I take the privilege in inviting you for the Board of Studies (BOS) Meeting of MBA Department, DNR College of Engineering & Technology. It is proposed to discuss and finalize the following agenda for the AY: 2026-27.

1. Welcome Speech by the Chairperson.
2. To discuss and finalize the proposed DR – 24 B.Tech III Year I Semesters Subject Entrepreneurship Development & Venture Creation Course Code; BT24HS3101 and Syllabus, offered by CSE, ECE, EEE, CIVIL and ME Branches.
3. To discuss and finalize the proposed DR – 24 B.Tech III Year I Semesters Subject Entrepreneurship Course Code: BT24HS3102 and Syllabus, offered by Mechanical Engineering Branch.
4. To discuss and finalize the proposed DR – 24 B.Tech III Year II Semesters Subject Research Methodology & IPR Course Code; BT24HS3201 and Syllabus, offered by ECE and EEE Branches.
5. To discuss and finalize the proposed DR – 25 M.Tech II Year I Semesters Subject Research Methodology & IPR Course Code: D2530000 and Syllabus, offered by CSE, ECE, CIVIL and ME Branches.
6. Any other item with the Permission of the Chair.

In this regard, you are requested to attend the online meeting Scheduled to be held on 08-01-2026, Thursday at 11:30 AM in the Board Room.

HOD and Chairman, BOS

Copy To:

- Faculty Members, MBA Dept
- Dean Academics DNRCET
- Principal DNRCET

Circulation among Faculty Members:

1. Mr. K. Chandra Mouli Raju :
2. Mr. K.S.V.N. Satyanarayana :
3. Mr. V.R.E.S.Santosh Kumar :
4. Mr. M Raju :
5. Mrs.P.Naga Jyothi :
6. Ms. S. Beula Kiran :
7. Ms.Ch. Ratnavali :
8. Ms.P.Yasaswini :
9. Mrs. Ch. K. L. Prasanna :
10. Mrs. Ch. Manju :
11. Mr.P V M K Raju :

Members Present:

S.NO	Designation in Committee	Name(s) of the Member(s)	Designation	Signature
1.	Chairman	Dr. G.V. Jagapathi Rao	HOD & Assoc. Prof, MBA Department, DNR College of Engineering & Technology, Bhimavaram - 534202	
2.	Expert Nominated by the Vice-Chancellor (University Nominee)	Prof. P. Uma Maheswari Devi	Professor, Dept of Commerce & Management Studies Adikavi Nannaya University Rajamahendravaram	Attended online
3.	Subject experts from outside the parent University	Prof. D. Surya Chandra Rao	Rector, Krishna University, Machilipatnem	Attended online
		Dr. BVR Naidu	Professor & Head Dept. of Management Studies Godavari Institute of Engg & Tech(A), Rajamahendravaram	Attended online
4.	Representative from industry Expert	Mr. T. C. V. Narasimha Rao	Mg Partner, UNO Feeds, Komarada, Bhimavaram Mandal, WG dt.	Attended online
5.	Faculty Members	Mr. K. Chandra Mouli Raju	Asst. Prof, MBA Department, DNR College of Engineering & Technology, Bhimavaram – 534202	
		Mr. K.S.V.N. Satyanarayana	Asst. Prof, MBA Department, DNR College of Engineering & Technology, Bhimavaram - 534202	
		Mr. V.R.E.S.Santosh Kumar	Asst. Prof, MBA Department, DNR College of Engineering & Technology, Bhimavaram - 534202	
		Ms. S. Beula Kiran	Asst. Prof, MBA Department, DNR College of Engineering & Technology, Bhimavaram – 534202	
		Ms.Ch. Ratnavali	Asst. Prof, MBA Department, DNR College of Engineering & Technology, Bhimavaram - 534202	
		Mrs.Ch. K. L. Prasanna	Asst. Prof, MBA Department, DNR College of Engineering & Technology, Bhimavaram - 534202	
		Mrs.Ch. Manju	Asst. Prof, MBA Department, DNR College of Engineering & Technology, Bhimavaram - 534202	

		Mr. M Raju	Asst. Prof, MBA Department, DNR College of Engineering & Technology, Bhimavaram - 534202	
		Mrs.P.Naga Jyothi	Asst. Prof, MBA Department, DNR College of Engineering & Technology, Bhimavaram - 534202	
		Ms.P.Yasaswini	Asst. Prof, MBA Department, DNR College of Engineering & Technology, Bhimavaram - 534202	
		Mr.P V M K Raju	Asst. Prof, MBA Department, DNR College of Engineering & Technology, Bhimavaram - 534202	

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MASTER OF BUSINESS ADMINISTRATION

MEETING OF BOS SCHEDULE, AY: 2026-27

Minutes of meeting of Board of Studies, Dept of Master of Business Administration held on 08-01-2026 at 11:30 AM.

Venue: Board Room

Meeting held on: 08-01-2026, 11:30 AM

Mode of conduction Meeting: Zoom online platform

Meeting Link: https://us06web.zoom.us/j/84496320710?pwd=ULox5dfR7sacgnIqcChJ1haLbOLt4k.1

AGENDA:

1. Welcome Speech by the Chairperson.
2. To discuss and finalize the proposed DR – 24 B.Tech III Year I Semesters Subject: Entrepreneurship Development & Venture Creation Course Code: BT24HS3101 and Syllabus, offered by CSE, ECE, EEE, CIVIL and ME Branches.
3. To discuss and finalize the proposed DR – 24 B.Tech III Year I Semesters Subject: Entrepreneurship Course Code: BT24HS3102 and Syllabus, offered by Mechanical Engineering Branch.
4. To discuss and finalize the proposed DR – 24 B.Tech III Year II Semesters Subject: Research Methodology & IPR Course Code: BT24HS3201 and Syllabus, offered by ECE and EEE Branches.
5. To discuss and finalize the proposed DR – 25 M.Tech II Year I Semesters Subject: Research Methodology & IPR Course Code: D2530000 and Syllabus, offered by CSE, ECE, CIVIL and ME Branches.
6. Any other item with the Permission of the Chair.

HOD, MBA

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Minutes of Meeting

At the outset, the Principal of D.N.R College of Engg. &Tech. expressed his gratitude to the University Nominee and other Members of BOS and handed over the session to the Chairman of BOS.

1. **Welcome speech by the Chairperson.**

Resolution:

The BOS chairman welcomed the Members of the Meeting. He briefed them about structure and pattern of the course. The chairman of BOS placed the Agenda for the deliberation of the members. The following deliberations were made as per the items of Circular Agenda.

2. **Approval the proposed DR – 24 III B.Tech I Semester Subject: Entrepreneurship Development & Venture Creation (Open Elective – 1) Course Code: BT24HS3101 and Syllabus, offered by CSE, ECE, EEE, CIVIL and ME Branches. (Annexure – I)**

Suggestion: Discussions made to finalize the proposed DR – 24 III B.Tech I Semester Subject Entrepreneurship Development & Venture Creation (Open Elective – 1) Course Code: BT24HS3101 and Syllabus, offered by CSE, ECE, EEE, CIVIL and ME Branches to implement.

Prof. P. Uma maheshware Devi, University Nominee suggested to introduce Mini Project on the EDVC subject along with regular class teaching.

Resolution: BOS members resolved to implement the proposed DR – 24 III B.Tech I Semester Subject Entrepreneurship Development & Venture Creation(Open Elective – 1) Course Code: BT24HS3101 and Syllabus, offered by CSE, ECE, EEE, CIVIL and ME Branches from the AY: 2026-2027 onwards.

3. **Approve the proposed DR – 24 III B.Tech I Semester Subject: Entrepreneurship (Open Elective – 1) Course Code: BT24HS3102 and Syllabus, offered by Mechanical Engineering Branch.**
(Annexure – II)

Suggestion: Discussion held on DR – 24 III B.Tech I Semester Subject Entrepreneurship (Open Elective – 1) Course Code: BT24HS3102 and Syllabus, offered by Mechanical Engineering Branch to implement.

Prof. D. Surya Chandra Rao Subject expert, proposed to implement syllabus deviation in III B.Tech Open Elective Subject.

Resolution: Since the paper introduced from this academic year onwards, as per the guideline of the JNTUK, no deviation is possible. It is resolved and approved the Entrepreneurship Syllabus prescribed by the DNRCET.

4. a) **Approve the proposed DR – 24 III B.Tech II Semester Subject Research Methodology & IPR Course Code: BT24HS3201 and Syllabus, offered by ECE and EEE Branches. (Annexure – III)**

Suggestion: Discussions made on the III B.Tech II Sem, Research methodology & IPR Subject.

Resolution: Unanimously resolved to implement the Syllabus Prescribed by the DNRCET.

b) **Ratification of Course Objectives and Course Outcomes of B.Tech III Year, I & II Semesters Entrepreneurship Development and Venture Creation, Entrepreneurship and Research Methodology & IPR Subjects.**

Suggestion: Discussion was held on the course objectives as well as course outcomes of the subjects.

Resolution: Resolved the course objectives and course outcomes of B.Tech III Year, I & II Semesters Subjects to adopt.

5. a) **Approve the proposed DR – 25 M.Tech II Year I Semester Subject Research Methodology & IPR Course Code: D2530000 and Syllabus, offered by CSE, ECE, CIVIL and ME Branches. (Annexure – IV)**

Suggestion: Discussions made on the M.Tech II Year I Sem, Research Methodology & IPR Subject.

Resolution: Unanimously resolved to implement the Syllabus Prescribed by the DNRCET.

b) **Ratification of Course Objectives and Course Outcomes of M.Tech II Year, I Semester Research Methodology & IPR Subject.**

Suggestion: Discussion was held on the course objectives as well as course outcomes of the subject.

Resolution: Resolved the course objectives and course outcomes of M.Tech II Year, I Semester Subject to adopt.

6. **No further item to discuss proposed by BOS Members**

The chairman of BOS concluded the meeting by summarizing all the agenda points and resolutions.

HOD and Chairman, BOS

Prof. P. Uma Maheswari Devi
University Nominee
Adikavi Nannaya University

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B.TECH III YEAR - I SEMESTER
Common to CSE,ECE,EEE,CE,ME,CSE(AIML)&CSE(AIDS) Branches

III Year-I Semester	Course Code: BT24HS3101	L	T	P	C
		3	0	0	3

ENTRPRENEURSHIP DEVELOPMENT&VENTURE CREATION
(Open Elective - 1)

Course Objectives:

By the end of the program, students will be/able to:

1. Inspired; develop entrepreneurial mind-set and attributes; entrepreneurial skill sets for venture creation and entrepreneurial leadership
2. Apply process of problem-opportunity identification and feasibility assessment through developing a macro perspective of the real market, industries, domains and customers while using design thinking principles to refine and pivot their venture idea.
3. Analyze Customer and Market segmentation, estimate Market size, develop and validate Customer Persona.
4. Initiate Solution design, Prototype for Proof of Concept. Understand MVP development and validation techniques to determine Product-Market fit
5. Craft initial Business and Revenue models, financial planning and pricing strategy for profitability and financial feasibility of a venture. Understand relevance and viability of informal and formal funding with respect to different business models.
6. UnderstandanddevelopGo-to-Marketstrategieswithafocusondigitalmarketingchannels.

Course Outcomes

At the end of the course, students will be able to

1. Develop an entrepreneurial mindset and appreciate the concepts of entrepreneurship, cultivate essential attributes to become an entrepreneur or Entrepreneur and demonstrate skills such as problem solving, team building, creativity and leadership
2. Comprehendtheprocessofproblem-opportunityidentificationthroughdesignthinking, identify market potential and customers while developing a compelling value proposition solution
3. Analyse and refine business models to ensure sustainability and profitability
4. Build Proto type for Proof of Concept and validate MVP of their practice venture idea
5. Create business plan, conduct financial analysis and feasibility analysis to assess the financial viability of a venture
6. Prepare and deliver an investible pitch deck of their practice venture to attract stakeholders

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B.TECH III YEAR - I SEMESTER
Common to CSE,ECE,EEE,CE,ME,CSE(AIML)&CSE(AIDS) Branches

Mapping of Course Outcomes with Program Outcomes and Program SpecificOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	-	-	2	1	2	3	2	1	3	-	-
CO2	1	3	2	1	-	1	1	-	2	2	-	2	-	-
CO3	1	3	3	-	-	2	2	-	1	1	3	2	-	-
CO4	2	2	3	3	3	-	-	-	2	1	1	1	2	3
CO5	1	2	2	1	-	2	1	-	1	1	3	2	-	1
CO6	-	1	1	-	-	1	-	-	2	3	2	2	-	-
Avg	1	2	2	1	3	2	1	2	2	2	2	2	2	2

Course Content
Twelve learning modules organized over 14weeks in the following logical flow of units

Unit I: Entrepreneurship Fundamentals & Context

Meaning and concept, attributes and mindset of entrepreneurial and entrepreneurial leadership, role models in each and their role in economic development. An understanding of how to build entrepreneurial mindset, skillets, attributes and networks while on campus.

Core Teaching Tool: Simulation, Game, Industry Case Studies (Personalized for students – 16 industries to choose from), Venture Activity.

Unit II: Problem &Customer Identification

Understanding and analyzing the macro-Problem and Industry perspective, technological, socio economic and urbanization trends and their implication on new opportunities. Identifying passion, identifying and defining problem using Design thinking principles. Analyzing problem and validating with the potential customer. Iterating problem-customer fit. Understanding customer segmentation, creating and validating customer personas. Competition and Industry trends mapping and assessing initial opportunity.

Core Teaching Tool: Several types of activities including Class, game, Gen AI, 'Get out of the Building' And Venture Activity.

Unit III: Solution design, Prototyping & Opportunity Assessment and Sizing

Understanding Customer Jobs-to-be-done and crafting innovative solution design to map to customer's needs and create a strong value proposition. Developing Problem-solution fit in an iterative manner. Understanding prototyping and MVP. Developing a feasibility prototype with differentiating value, features and benefits. Initial testing for proof-of-concept and iterate on the prototype. Assess relative market position via competition analysis, sizing the market and assess scope and potential scale of the opportunity.
Core Teaching Tool: Venture Activity, no-code Innovation tools, Class activity

Unit IV: Business & Financial Model, Go-to-Market Plan

Introduction to Business model and types, Lean approach,9block lean canvas model, riskiest assumptions to Business models. Importance of Build - Measure – Lean approach.

Business planning: components of Business plan- Sales plan, People plan and financial plan. Financial Planning: Types of costs, preparing a financial plan for profitability using financial template, understanding basics of Unit economics and analyzing financial performance.

Introduction to Marketing and Sales, Selecting the Right Channel, creating digital presence, building customer acquisition strategy.

Choosing a form of business organization specific to your venture, identifying sources of funds: Debt & Equity, Map the Start-up Lifecycle to Funding Options.

Core Teaching Tool: Founder Case Studies–Sama and Securely Share; Class activity and discussions; Venture Activities

Unit V: Scale Outlook and Venture Pitch readiness

Understand and identify potential and aspiration for scale visa is your venture idea. Persuasive Story telling and its key components. Build an Investor ready pitch deck.

Core Teaching Tool: Expert talks; Cases; Class activity and discussions; Venture Activities.

Suggested Reading:

- RobertD.Hisrich,MichaelP.Peters,DeanA.Shepherd,SabyasachiSinha(2020). Entrepreneurship, McGrawHill, 11th Edition.
- Ries,E.(2011).TheLeanStartup:HowToday'sEntrepreneursUseContinuous Innovation to Create Radically Successful Businesses. Crown Business
- Osterwalder,A.,&Pigneur,Y.(2010).BusinessModelGeneration:AHandbookfor Visionaries, Game Changers, and Challengers. John Wiley & Sons.
- SimonSinek(2011)StartwithWhy,PenguinBookslimited
- BrownTim(2019)ChangebyDesignRevised&Updated:HowDesignThinking Transforms Organizations and Inspires Innovation, Harper Business
- NamitaThapar(2022)TheDolphinandtheShark:StoriesonEntrepreneurship,Penguin Books Limited
- SarasD.Sarasvathy,(2008)Effectuation:ElementsofEntrepreneurialExpertise,Elgar Publishing Ltd

Web Resources

- Learningresource-Ignite5.0CourseWadhwaniplatform(Includes200+componentsof customcreatedmodularcontent +500+componentsofthemostrelevantcuratedcontent)

HOD, MBA

SupportedEvaluation

Evaluationisdesignedtomeasureindividualandgroupwork.

OngoingAssessmentcomponents:

Enableremedialactionintheclassroombythefacultyandadditionalassistancebyan AITutor.

1. ThreeSystem-assessed,randomizedshortanswertypeassessmentsduringthe14weekstoassess individuallearner'sunderstandingandinternalizationofcoreconcepts-includesquestionsof
   a. multiplechoice
   b. fillinthe blanks
   c. matchthe options
   d. 'trueandfalse'

2. Two interim assessments of the Venture application milestones submission via the platform (teamwork). Simple and easy way for the faculty to assess the milestones and the team's work.

FinalAssessmentcomponent:

Assessmentthatprovidesanoverallassessmentoflearningandapplication.Evaluatedbyfaculty against an assessment rubric.

1. Final Venture Idea Pitch submission and presentation (team application work) (Students build a Practice Venture with Venture activities progressively leading to the development of a pitch presentationdeckwithvariousmilestonestomarkadvancement.Itisreflectionoftheirlearningaswell as a practical application of concepts to identifying, building and validating a venture idea.)

Additionalevaluationmechanisms:InAdditiontothis,mandatoryindividualexercisesare embedded in the course, faculty can use those for any additional evaluation that they mayneedtoscorethestudents

TeachingLearningProcess(Pedagogy),Tools,StudentExperience

I. **ProgramFacilitationandLearningTools**
   a. **DynamicFacilitation:**Ledbyexpertfacilitatorsutilizingacomprehensivesuiteofmicro-learning materials.
      - Audio-visualcontent,writtenmaterials,andinfographics.
      - Real-worldexamplesenhancingthelearningexperience.

   b. **InteractiveLearning:**Engagingcasestudies,games,simulations,andkinesthetic classroom activities.
      - FocusoncurrentIndianstartupstoprovidecontext-relevantlearning.
      - AimedatGenZlearnersforinformative,immersiveandauthenticlearning experience.

II. VentureDevelopmentActivities

a. InnovationandStrategicApplication:Fosteringinnovativethinkingandstrategic problem-solving.
   - StudentscreateVentureIdeasPitchandfeasibilityprototypesaddressingreal- world scalable problem-opportunities.

b. PracticalExperience:Combiningacademicrigorwithpractical,hands-onentrepreneurial activities.
   - Functionsasanincubatorforaspiringentrepreneursandintrapreneurialleaders.

III. Anytime,anywhereGenAISupportedDigitalLearning

a. Multi-ModalDigitalTools:Arangeofdigitalresourcesavailableforstudents.
   - Comprehensiveconceptandreferenceguidesandhandbooks.
   - AITutorandAIAssistanttoenhancelearningandapplicationviadevelopmentof a feasible Venture Idea Pitch.

IV. Ongoing Inspiration and Learning with Practitioners

1. Seminars, Workshops and Masterclasses: Access to live talks and specialized classes running through each semester.
   - Founderstories,includingsocial entrepreneurs.
   - TechnologyTrendandIndustryOpportunitysessions
   - InnovationandIPRManagementsession
   - StartupEcosystemoverview

V. Certification and CommunityEngagement

a. RecognitionandNetworking:Opportunitiesavailableuponcoursecompletion.
   - VentureIdeasPitchDeckevaluationforcertificationbyorganizationslikethe Wadhwani Foundation.
   - Accesstoaglobalcommunityfosteringconnectionsandsupportforcompetitions. Groupmentoringandindividualmentorshipsessionstofurtherguidestudents

HOD, MBA

D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY
AUTONOMOUS
Approved by AICTE, New Delhi & Permanently Affiliated to JNTUK, Kakinada
Accredited with A^{++} Grade by NAAC & Accredited by NBA (B. TECH – CSE, ECE & EEE)
B.TECH III YEAR-II SEMESTER
Common to ECE&EEE Branches

III Year-II Semester	Course Code: BT24HS3201	L	T	P	C
		2	0	0	-

RESEARCH METHODOLOGY & IPR
(AUDIT COURSE)

COURSE OBJECTIVES:

1. To understand the knowledge on basics of research and its types.
2. To familiarize students with research design and methods, including data collection, sampling techniques, and measurement tools.
3. To impart the concept of Literature Review, Technical Reading, Attributions and Citations.
4. To know the Ethics in Engineering Research.
5. To know the concepts of Intellectual Property Rights in Engineering
6. To understand the importance of IPR protection and management for innovation, commercialization, and technology transfer in business and industry.

COURSE OUTCOMES:

1. Understand research problem formulation.
2. Analyze research related information, Follow research ethics
3. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
4. Understanding that when IPR would take such important place in growth of individuals& nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
5. Understand that IPR protection provides an incentive to inventors for further research work and investment in R&D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
6. Identify procedure to protect different forms of IPRs national and international level

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3	-	2	-	-	-	-	-	1	-	2	-	-
CO2	-	2	-	2	-	1	-	3	-	1	-	2	-	-
CO3	-	1	2	-	1	-	-	-	-	1	-	3	-	-
CO4	-	-	-	-	-	2	-	3	-	1	-	2	-	-
CO5	-	-	1	-	-	2	1	2	-	-	1	2	-	-
CO6	-	1	-	-	-	3	-	3.	-	1	-	2	-	-
Avg	1	1.75	1.5	2	1	2	1	2	-	1	1	2	-	-

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B.TECH III YEAR-II SEMESTER
Common to ECE&EEE Branches

Unit1:

Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem, Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

Unit2:

Effective literature studies approaches, analyze is Plagiarism, Research ethics, Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

Unit3:

Nature of Intellectual Property: Patents, Designs, Trademarks and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT

Unit4:

Patent Rights: Scope of Patent Rights, Licensing and transfer of technology, Patent information and databases, Geographical Indications.

Unit5:

New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc, Traditional knowledge Case Studies, IPR and IITs

TEXT BOOKS

1. StuartMelvilleandWayneGoddard,"Researchmethodology:anintroductionforscience& engineering students'".
2. WayneGoddardandStuartMelville,"ResearchMethodology:AnIntroduction"

REFERENCE BOOKS

1. RanjitKumar,2ndEdition,"ResearchMethodology:AStepbyStepGuideforbeginners"
2. Halbert,"ResistingIntellectualProperty",Taylor&FrancisLtd,2007.
3. Mayall,"IndustrialDesign",McGrawHill,1992

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Accredited with A^{++} Grade by NAAC & Accredited by NBA (B. TECH – CSE, ECE & EEE)
M.TECH II YEAR – I SEMESTER
(Common to CSE,ECE,CE&ME Branches)

II Year -I Semester	Course Code: D2530000	L	T	P	C
		3	0	0	3

RESEARCH METHODOLOGY AND IPR

COURSE OBJECTIVES:

1. To understand the knowledge on basics of research and its types.
2. To impart the concept of Literature Review, Technical Reading, Attributions and Citations.
3. To familiarize students with research design and methods, including data collection, sampling techniques, and measurement tools.
4. To know the Ethics in Engineering Research.
5. To know the concepts of Intellectual Property Rights in Engineering.
6. To understand the importance of IPR protection and management for innovation, commercialization, and technology transfer in business and industry.

COURSE OUT COMES: At the end of the course, student will be able to

1. Explain the meaning of engineering research and apply to develop an appropriate framework for research studies.
2. Identify the procedure of Literature Review, Technical Reading, etc. and apply to develop a research design during their project work.
3. Explainandapplythefundamentalsofpatentlawsanddraftingprocedureintheirresearch works.
4. Demonstrate the copy right laws, subject matters of copyrights, designs etc.to apply in patent filing.
5. Identifythenewdevelopmentsin IPRandemploytheapplicationsofcomputersoftwareinwriting/ filing patents in future.

Mapping of course outcomes with program outcomes and Program Specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	2	2	-	-	2	-	2	2	-	2	-	2
CO2	-	3	2	2	-	-	2	2	2	-	-	2	1	-
CO3	-	-	3	-	2	-	-	2	-	-	2	2	2	-
CO4	-	-	3	-	2	-	-	2	-	-	2	2	1	-
CO5	-	-	3	-	2	-	-	2	-	-	-	2	1	-
CO6	-	-	3	-	2	-	-	2	2	-	-	2	-	-
Avg	-	3	2.6	2	2	-	2	2	2	2	2	2	1	2

Unit-I:

Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

Unit-II:

Effective literature studies approaches, analysis Plagiarism, Research ethics, Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee.

Unit-III:

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

Unit-IV:

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

Unit-V:

New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR.

TEXTBOOKS:

1. C.R.Kothari,2nd Edition,"ResearchMethodology:MethodsandTechniques".
2. RanjitKumar,2nd Edition,"ResearchMethodology:AStep-by-StepGuideforbeginners"

REFERENCEBOOKS:

1. StuartMelvilleandWayneGoddard,"Researchmethodology:anintroductionforscience& engineering students.
2. Wayne Goddard and Stuart Melville,"Research Methodology: AnIntroduction".
3. Halbert, "ResistingIntellectualProperty", Taylor&Francis Ltd,2007.
4. Mayall,"IndustrialDesign",McGrawHill,1992.
5. Niebel,"ProductDesign",McGraw Hill,1974.
6. Asimov,"IntroductiontoDesign",PrenticeHall, 1962.
7. RobertP.Merges,PeterS.Menell,MarkA.Lemley,"IntellectualPropertyinNew Technological Age", 2016.
8. T.Ramappa,"IntellectualPropertyRightsUnderWTO",S.Chand,2008.

WEB REFERENCES:

- Pleaseincludehyperlinksrelated toNPTEL/VLabsetc.,

HOD, MBA

Course Code: BT24IT31P1C | DR24 | HTNO

D.N.R COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

III B.Tech I Semester Regular Examinations Jun-2026 (Model Paper)

Department of IT

ARTIFICIAL INTELLIGENCE

Time:3 Hrs | Max. Marks:70

				PART-A **Answer All the Questions.**	**Marks**
					20 M
1.	a			Differentiate between human intelligence and machine intelligence.	CO1-K2(2M)
	b			List the steps involved in solving general problem in AI.	CO1-K2(2M)
	c			What are the current trends in AI?	CO2-K2(2M)
	d			Define state-space search?	CO2-K2(2M)
	e			Difference between Fuzzy set and Fuzzy?	CO3-K2(2M)
	f			Write the applications of cyc theory?	CO3-K2(2M)
	h			Write the advantages and disadvantages of expert systems.	CO4-K2(2M)
	g			What are the applications of expert systems?	CO4-K2(2M)
	h			Define membership functions?	CO5-K2(2M)
	i			Differentiate A* and AO* Algorithm with example?	CO5-K2(2M)
				PART-B **All Questions Carry Equal Marks**	
					10 M
2.	A.		i.	Define uniformed search? What is best first search Illustrate with an example?	CO1- K3(5M)
			ii.	Explain about Artificial intelligence systems?	CO1- K3(5M)
				OR	
	B.		i.	Describe with necessary diagrams, a suitable state space representation for 8 puzzle problem and explain how the problem can be solved by state space search? Show how heuristic can improve the efficiency of search?	CO1- K3(5M)
			ii.	Define uniformed search? What is best first search Illustrate with an example?	CO1- K3(5M)
					10 M
3.	A.		i.	Write a pseudo code and working of Alpha beta pruning?	CO2- K3(10M)
				OR	
	B.		i.	What are the different steps followed in developing AI-languages? Explain.	CO2- K3(10M)
					10 M
4.	A.		i.	List and Explain about axiomatic system?	CO3- K3(5M)
			ii.	Consider the following facts: (i) John likes anyone who likes playing tennis and football (ii) A is brother of B if A is a male, A has father F and mother M and B has the same mother and father as A does. Translate these facts into formulae in predicate logic and prepositional logic.	CO3- K3(5M)
				OR	
	B.		i.	What is propositional logic in artificial intelligence? How it is different from predicate logic?	CO3- K3(5M)
			ii.	Explain in detail about natural deduction system?	CO3- K3(5M)
					10 M

5.	A.		i.	What are the different types of semantic network? What do you understand by extension of semantic network?	CO4- K3(5M)
			ii.	Write a brief introduction to the technical standards of the semantic web?	CO4- K3(5M)
				OR	
	B.		i.	What are the approaches to knowledge representation? Discuss.	CO4- K3(5M)
			ii.	Explain in detail about script structure?	CO4- K3(5M)
6.					**10 M**
	A.		i.	Write about various shells and tools used in expert system in detail?	CO5- K3(5M)
			ii.	With neat sketch explain the architecture of expert system?	CO5- K3(5M)
				OR	
	B.		i.	Explain in brief about Rule based expert systems?	CO5- K3(5M)
			ii	EExplain briefly about the Dempster Shafer theory?	CO5- K3(5M)
				* * *	

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D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY(Autonomous)
BALUSUMUDI, BHIMAVARAM, W.G. Dist., A.P., PIN-534 202

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIIYear-IISemester	Course Code: BT24CS3201	L	T	P	C
		0	1	2	2

COMPILER DESIGN

Course Objectives:

Understandthebasicconceptofcompiler design,anditsdifferentphaseswhichwillbe helpful to construct new tools like LEX, YACC, etc.

UNITI:

LexicalAnalysis: LanguageProcessors,StructureofaCompiler,LexicalAnalysis,TheRole of the Lexical Analyzer, Bootstrapping, Input Buffering, Specification of Tokens, Recognition of Tokens, Lexical Analyzer Generator-LEX, Finite Automata, Regular Expressions and Finite Automata, Design of a Lexical Analyzer Generator.

Syntax Analysis: The Role of the Parser, Context-Free Grammars, Derivations, Parse Trees, Ambiguity, Left Recursion, Left Factoring,

UNITII:

Top Down Parsing: Pre Processing Steps of Top Down Parsing, Backtracking, Recursive Descent Parsing, LL (1) Grammars, Non-recursive Predictive Parsing, Error Recovery in Predictive Parsing.

Bottom Up Parsing: Introduction, Difference between LR and LL Parsers, Types of LR Parsers, Shift Reduce Parsing, SLR Parsers, Construction of SLR Parsing Tables, More Powerful LR Parses, Construction of CLR (1) and LALR Parsing Tables, Dangling Else Ambiguity, Error Recovery in LR Parsing, Handling Ambiguity Grammar with LR Parsers.

UNITIII:

Syntax Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax Directed Translation, Syntax-Directed Translation Schemes, Implementing L-Attributed SDD's. **Intermediate Code Generation:** Variants of Syntax Trees,Three Address Code, Types and Declarations, Translation of Expressions, Type Checking, Control Flow, Backpatching, Intermediate Code for Procedures.

UNITIV:

Code Optimization: The Principle Sources of Optimization, Basic Blocks, Optimization of Basic Blocks, Structure Preserving Transformations, Flow Graphs, Loop Optimization, Data-Flow Analysis, Peephole Optimization

UNITV:

Run Time Environments: Storage Organization, Run Time Storage Allocation, Activation Records, Procedure Calls, Displays

Code Generation: Issues in the Design of a Code Generator, Object Code Forms, Code Generation Algorithm, Register Allocation and Assignment.

TextBooks:

1.Compilers:Principles,TechniquesandTools,SecondEdition,AlfredV.Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, Pearson, 2007.

ReferenceBooks:

1. Compiler Construction, Principles and Practice, Kenneth C Louden, Cengage Learning, 2006

2. Modern compiler implementation in C, Andrew W Appel, Revised edition, CambridgeUniversity Press.
3. OptimizingCompilersforModernArchitectures,RandyAllen,KenKennedy, Morgan Kauffmann, 2001.
4. Levine, J.R., T. Mason and D. Brown, Lex andYacc, edition, O'Reilly & Associates,1990

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIIYear-IISemester	Course Code: BT24CS3202	L	T	P	C
		0	1	2	2
CLOUD COMPUTING					

Course Objectives:

- Toexplaintheevolvingutilitycomputingmodelcalledcloud computing.
- Tointroducethevariouslevelsofservicesofferedbycloud.
- Todiscussthefundamentalsofcloudenablingtechnologiessuchasdistributedcomputing, service-oriented architecture and virtualization.
- Toemphasizethe securityand otherchallengesincloud computing.
- Tointroducetheadvancedconceptssuchascontainers,serverlesscomputingand cloud-centric Internet of Things.

UNIT-I:IntroductiontoCloudComputingFundamentals
Cloud computing at a glance, defining a cloud, cloud computing reference model, types of services (IaaS, PaaS, SaaS), cloud deployment models (public, private, hybrid), utility computing, cloud computing characteristics and benefits, cloud service providers (Amazon Web Services, Microsoft Azure, Google AppEngine).

UNIT-II:CloudEnablingTechnologies
Ubiquitous Internet, parallel and distributed computing, elements of parallel computing, hardware architectures for parallel computing (SISD, SIMD, MISD, MIMD), elements of distributedcomputing,Inter-processcommunication,technologiesfordistributedcomputing, remote procedure calls (RPC), service-oriented architecture (SOA), Web services, virtualization.

UNIT-III:Virtualizationand Containers
Characteristics of virtualized environments, taxonomy of virtualization techniques, virtualization and cloud Computing, pros and cons of virtualization, technology examples (XEN, VMware), building blocks of containers, container platforms (LXC, Docker), containerorchestration,DockerSwarmandKubernetes,publiccloudVM(e.g.AmazonEC2) and container (e.g. Amazon Elastic Container Service) offerings.

UNIT-IV:Cloudcomputingchallenges
Economics of the cloud, cloud interoperability and standards, scalability and fault tolerance, energy efficiency in clouds, federated clouds, cloud computing security, fundamentals of computer security, cloud security architecture, cloud shared responsibility model, security in

cloud deployment models.

UNIT-V: Advancedconceptsincloudcomputing
Serverless computing, Function-as-a-Service, serverless computing architecture, public cloud (e.g. AWS Lambda) and open-source (e.g. OpenFaaS) serverless platforms, Internet ofThings (IoT), applications, cloud-centric IoT and layers, edge and fog computing, DevOps, infrastructure-as-code, quantum cloud computing.

TextBooks:

1. MasteringCloudComputing,2nd edition,RajkumarBuyya,ChristianVecchiola,Tham arai Selvi, Shivananda Poojara, Satish N. Srirama, Mc Graw Hill, 2024.
2. Distributed and Cloud Computing, Kai Hwang,Geoffery C. Fox, Jack J. Dongarra,Elsevier, 2012.

ReferenceBooks:

1. Cloud Computing, Theory and Practice, Dan C Marinescu, 2nd edition, MK Elsevier, 2018.
2. EssentialsofcloudComputing,K.Chandrasekhran,CRCpress,2014.
3. Online documentation and tutorials from cloud service providers (e.g., AWS, Azure, GCP)

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIIYear-IISemester	Course Code: BT24CS3203	L	T	P	C
		0	1	2	2
CRYPTOGRAPHY& NETWORK SECURITY					

Course Objectives:

The main objectives of this course are to explore the working principles and utilities of various cryptographic algorithms including secret key cryptography, hashes and message digests, publickey algorithms, design issues andworking principles ofvarious authentication protocols and various secure communication standards including Kerberos, IPsec, and SSL/TLS.

UNITI:

Basic Principles : Security Goals, Cryptographic Attacks, Services and Mechanisms, Mathematics of Cryptography- integer arithmetic, modular arithmetic, matrices, linear conguence.

UNITII:

Symmetric Encryption: Mathematics of Symmetric Key Cryptography-algebraic structures, GF(2^n) Fields, Introduction to Modern Symmetric Key Ciphers-modern block ciphers, modern stream ciphers, Data Encryption Standard- DES structure, DES analysis, Security of DES, Multiple DES, Advanced Encryption Standard-transformations, key expansions, AES ciphers, Analysis of AES.

UNITIII:

Asymmetric Encryption: Mathematics of Asymmetric Key Cryptography-primes, primality testing, factorization, CRT, Asymmetric Key Cryptography- RSA crypto system, Rabin cryptosystem, Elgamal Crypto system, ECC

UNITIV:

Data Integrity, Digital Signature Schemes & Key Management : Message Integrity and Message Authentication-message integrity, Random Oracle model, Message authentication, Cryptographic Hash Functions-whirlpool, SHA-512, Digital Signature- process, services, attacks, schemes, applications, Key Management-symmetric key distribution, Kerberos.

UNITV:

Network Security-I: Security at application layer: PGP and S/MIME, Security at the Transport Layer: SSL and TLS, **Network Security-II :** Security at the Network Layer:IPSec-two modes,

two security protocols, security association, IKE, ISAKMP, System Security-users, trust, trusted systems, buffer overflow, malicious software, worms, viruses, IDS, Firewalls.

TextBooks:

1. CryptographyandNetworkSecurity,3rdEditionBehrouzAForouzan,Debdeep Mukhopadhyay, McGraw Hill,2015
2. Cryptographyand NetworkSecurity,4thEdition,WilliamStallings, (6e) Pearson,2006
3. EverydayCryptography,1stEdition,KeithM.Martin,Oxford,2016

ReferenceBooks:

1. Network Security and Cryptography, 1st Edition, Bernard Meneges, Cengage Learning,2018

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIIYear-IISemester	Course Code: BT24CS32P2A	L	T	P	C
		0	1	2	2
SOFTWARE TESTING METHODOLOGIES					

Course Objectives

- Toprovideknowledgeoftheconceptsinsoftwaretestingsuchastestingprocess, criteria, strategies, and methodologies.
- Todevelopskillsinsoftwaretestautomationandmanagementusingthelatest tools.

UNIT-I

Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT-II

TransactionFlowTesting:transactionflows,transactionflowtesting techniques.
Data Flow testing: Basics of data flow testing, strategies in data flow testing, application ofdata flow testing.
DomainTesting:domainsandpaths,Nice&uglydomains,domaintesting,domainsand interfaces testing, domain and interface testing, domains and testability.

UNIT-III

Paths,PathproductsandRegularexpressions:pathproducts&pathexpression,reduction procedure, applications, regular expressions & flow anomaly detection.
LogicBasedTesting:overview,decisiontables,pathexpressions,kvcharts,specifications.

UNIT-IV

State,StateGraphsandTransitiontesting:stategraphs,good&badstategraphs,statetesting, Testability tips.

UNIT-V

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like Jmeter/selenium/soapUI/Catalon).

TextBooks:

1. SoftwareTestingtechniques-BarisBeizer,Dreamtech,second edition.
2. SoftwareTestingTools –Dr.K.V.K.K.Prasad,Dreamtech.

ReferenceBooks:

1. Thecraftofsoftwaretesting -BrianMarick,Pearson Education.
2. SoftwareTestingTechniques– SPD(Oreille)
3. SoftwareTestingintheRealWorld–Edward Kit,Pearson.
4. EffectivemethodsofSoftwareTesting,Perry,JohnWiley.
5. ArtofSoftwareTesting –Meyers,JohnWiley.

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIIYear-IISemester	Course Code: BT24CS32P2B	L	T	P	C
		0	1	2	2
CYBER SECURITY					

Course Objectives:

Theaim of thecourseisto

- identifysecurityrisksandtakepreventive steps
- understandtheforensics fundamentals
- understandtheevidencecapturingprocess
- understandthepreservationofdigital evidence

UNIT I: Introduction to Cybercrime: Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Cyber criminals,Classificationsof Cybercrime, Cyberstalking, Cybercafe and Cybercrimes, Botnets. Attack Vector,Proliferation ofMobile and Wireless Devices, Security Challenges Posed by Mobile Devices, Attacks on Mobile/Cell Phones, Network and Computer Attacks.

UNIT II: Tools and Methods : Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, Sniffers, Spoofing, Session Hijacking Buffer over flow, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Identity Theft (ID Theft), Foot Printing and Social Engineering, Port Scanning, Enumeration.

UNIT III: Cyber Crime Investigation: Introduction, Investigation Tools, eDiscovery, Digital Evidence Collection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP Tracking, E-Mail Recovery, Hands on Case Studies. Encryption and Decryption Methods, Search and Seizure of Computers, Recovering Deleted Evidences, Password Cracking.

UNIT IV: Computer Forensics and Investigations: Understanding Computer Forensics, Preparing for Computer Investigations. Current Computer Forensics Tools: Evaluating Computer Forensics Tools, Computer Forensics Software Tools, Computer Forensics Hardware Tools, Validating and Testing Forensics Software, Face, Iris and Fingerprint Recognition, Audio Video Analysis, Windows System Forensics, Linux System Forensics, Graphics and Network Forensics, E-mail Investigations, Cell Phone and Mobile Device Forensics.

UNIT V: Cyber Crime Legal Perspectives: Introduction, Cybercrime and the Legal Landscape around the World, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weaknessin InformationTechnology

Act,Digital SignaturesandtheIndianITAct,AmendmentstotheIndianIT Act,CybercrimeandPunishment, Cyberlaw, Technology and Students: Indian Scenario.

TextBooks:

1. SunitBelapureNinaGodbole"CyberSecurity:UnderstandingCyberCrimes,Computer Forensics and Legal Perspectives", WILEY, 2011.
2. NelsonPhillipsandEnfingerSteuart,"ComputerForensicsandInvestigations", CengageLearning,New Delhi,2009.

ReferenceBooks:

1. MichaelT.Simpson,KentBackmanandJamesE.Corley,"HandsonEthical Hacking and Network Defence", Cengage, 2019.
2. Computer Forensics,Computer Crime InvestigationbyJohnR.Vacca,Firewall Media, New Delhi.
3. AlfredBasta,NadineBasta,MaryBrownandRavinderKumar"CyberSecurity and Cyber Laws" , Cengage,2018.

E-Resources:

1. CERT-InGuidelines-http://www.cert-in.org.in/
2. https://www.coursera.org/learn/introduction-cybersecurity-cyber-attacks[Online Course]
3. https://computersecurity.stanford.edu/free-online-videos[FreeOnline Videos]
4. Nickolai Zeldovich. 6.858 Computer Systems Security. Fall 2014. Massachusetts Institute of Technology: MIT OpenCourseWare, https://ocw.mit.eduLicense: Creative Commons BY-NC-SA.

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIIYear-IISemester	Course Code: BT24CS32P2C	L	T	P	C
		0	1	2	2
DEVOPS					

Course Objectives:

Themain objectivesof thiscourseareto:

- Describetheagilerelationshipbetweendevelopmentandlt operations.
- Understand the skill sets and high-functioning teams involved in DevOps and related methods to reach a continuous delivery capability.
- ImplementautomatedsystemupdateandDevOps lifecycle.

UNIT-I

Introduction to DevOps: Introduction to SDLC, Agile Model. Introduction to Devops. DevOps Features, DevOps Architecture, DevOps Lifecycle, Understanding Workflow and principles, Introduction to DevOps tools, Build Automation, Delivery Automation, Understanding Code Quality, Automation of CI/ CD. Release management, Scrum, Kanban, delivery pipeline, bottlenecks, examples

UNIT-II

Source Code Management (GIT): The need for source code control, The history of source code management, Roles and code, source code management system and migrations. What is Version Control and GIT, GIT Installation, GIT features, GIT workflow, working withremote repository, GIT commands, GIT branching, GIT staging and collaboration. UNIT TESTING - CODE COVERAGE: Junit, nUnit & Code Coverage with Sonar Qube, SonarQube - Code Quality Analysis.

UNIT-III

BuildAutomation-ContinuousIntegration(CI): BuildAutomation,WhatisCIWhy Clis Required, CI tools, Introduction to Jenkins (With Architecture), jenkins workflow, jenkins master slave architecture, Jenkins Pipelines, PIPELINE BASICS - Jenkins Master, Node, Agent, and Executor Freestyle Projects & Pipelines, Jenkins for Continuous Integration, Create and Manage Builds, User Management in Jenkins Schedule Builds, Launch Builds on Slave Nodes.

UNIT-IV

Continuous Delivery (CD): Importance of Continuous Delivery, CONTINUOUS DEPLOYMENT CD Flow, Containerization with Docker: Introduction to Docker, Docker installation, Docker commands, Images & Containers, DockerFile, Running containers, Working with containers and publish to Docker Hub.

TestingTools: IntroductiontoSeleniumanditsfeatures,JavaScripttesting.

UNIT-V

ConfigurationManagement-ANSIBLE: IntroductiontoAnsible,Ansibletasks,Roles, Jinja templating, Vaults, Deployments using Ansible.

CONTAINERIZATION USING KUBERNETES(OPENSHIFT): Introduction to Kubernetes Namespace & Resources, CI/CD - On OCP, BC, DC & ConfigMaps, Deploying Apps on Openshift Container Pods. Introduction to Puppet master and Chef.

TextBooks:

1. Joyner,Joseph.,DevopsforBeginners:DevopsSoftwareDevelopmentMethodGuide for Software Developers and It Professionals, 1st Edition Mihails Konoplows, 2015.
2. AlissonMachadodeMenezes.,Hands-onDevOpswithLinux,1st Edition,BPBPublications, India, 2021.

ReferenceBooks:

1. LenBass,IngoWeber,LimingZhu.DevOps:ASoftwareArchitect'sPerspective. Addison Wesley; ISBN-10
2. GeneKimJeHumble,PatrickDebois,JohnWillis.TheDevOpsHandbook,1st Edition, IT Revolution Press, 2016.
3. Verona,JoakimPracticalDevOps,1st Edition,PacktPublishing,2016.
4. JoakimVerona.PracticalDevops,Ingramshorttitle;2nd edition(2018).ISBN10: 1788392574
5. DeepakGaikwad,Viral Thakkar.DevOpsTools from Practitioner'sViewpoint.Wiley publications. ISBN: 9788126579952

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIIYear-IISemester	Course Code: BT24CS32P2D	L	T	P	C
		0	1	2	2
MACHINE LEARNING					

Course Objectives:

Theobjectivesofthe courseisto

- Definemachinelearninganditsdifferenttypes(supervisedandunsupervised)and understand their applications.
- Applysupervisedlearningalgorithmsincludingdecisiontreesandk-nearest neighbours (k-NN).
- Implementunsupervised learningtechniques,such asK-meansclustering.

UNIT-I: Introduction to Machine Learning: Evolution of Machine Learning, Paradigms for ML, Learning by Rote, Learning by Induction, Reinforcement Learning, Types of Data, Matching, Stages in Machine Learning, Data Acquisition, Feature Engineering, Data Representation, Model Selection, Model Learning, Model Evaluation, Model Prediction, Search and Learning, Data Sets.

UNIT-II: Nearest Neighbor-Based Models: Introduction to Proximity Measures, Distance Measures, Non-Metric Similarity Functions, Proximity Between Binary Patterns, Different Classification Algorithms Based on the Distance Measures ,K-Nearest Neighbor Classifier, Radius Distance Nearest Neighbor Algorithm, KNN Regression, Performance of Classifiers, Performance of Regression Algorithms.

UNIT-III: Models Based on Decision Trees: Decision Trees for Classification, Impurity Measures, Properties, Regression Based on Decision Trees, Bias–Variance Trade-off, Random Forests for Classification and Regression. The Bayes Classifier: Introduction to the Bayes Classifier, Bayes' Rule and Inference, The Bayes Classifier and its Optimality, Multi- Class Classification, Class Conditional Independence and Naive Bayes Classifier (NBC)

UNIT-IV: Linear Discriminants for Machine Learning: Introduction to Linear Discriminants, Linear Discriminants for Classification, Perceptron Classifier, Perceptron Learning Algorithm, Support Vector Machines, Linearly Non-Separable Case, Non-linear SVM, Kernel Trick, Logistic Regression, Linear Regression, Multi-Layer Perceptrons (MLPs), Backpropagation for Training an MLP.

UNIT-V: Clustering : Introduction to Clustering, Partitioning of Data, Matrix Factorization, Clustering of Patterns, Divisive Clustering, Agglomerative Clustering, Partitional Clustering, K-

Means Clustering, Soft Partitioning, Soft Clustering, Fuzzy C-Means Clustering, Rough Clustering, Rough K-Means Clustering Algorithm, Expectation Maximization-Based Clustering, Spectral Clustering.

TextBooks:"MachineLearningTheoryandPractice",MNMurthy,VSAnanthanarayana, UniversitiesPress(India),2024

ReferenceBooks:

1. "MachineLearning", TomM.Mitchell,McGraw-HillPublication,2017
2. "MachineLearningin Action",PeterHarrington,DreamTech
3. "IntroductiontoDataMining",Pang-NingTan,MichelStenbach,VipinKumar,7th Edition, 2019.

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIIYear-IISemester	Course Code: BT24CS32P3A	L	T	P	C
		0	1	2	2
SOFTWAREPROJECTMANAGEMENT					

Course Objectives:

Attheend ofthe course,the studentshall beable to:

- To describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project
- Tocompare anddifferentiateorganizationstructuresandprojectstructures
- To implement a project to manage project schedule, expenses and resources with the application of suitable project management tools

UNIT-I:

Conventional Software Management: The waterfall model, conventional software Management performance.

Evolution of Software Economics: Software Economics, pragmatic software costestimation.

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT-II:

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

UNIT-III:

Modelbasedsoftwarearchitectures:AManagementperspectiveandtechnicalperspective.

Work Flows of the process: Software process workflows, Iteration workflows.**Checkpointsoftheprocess:Major**milestones,MinorMilestones,Periodicstatus assessments.

IterativeProcessPlanning: Workbreakdownstructures,planningguidelines,costand schedule estimating, Iteration planning process, Pragmatic planning.

UNIT-IV:

ProjectOrganizationsandResponsibilities: Line-of-BusinessOrganizations,Project Organizations, evolution of Organizations.

ProcessAutomation: AutomationBuildingblocks,TheProject Environment.

Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.

UNIT-V:

Agile Methodology, ADAPTing to Scrum, Patterns for Adopting Scrum, Iterating towards Agility.

Fundamentals of DevOps: Architecture, Deployments, Orchestration, Need, Instance of applications, DevOps delivery pipeline, DevOps eco system. DevOps adoption in projects: Technology aspects, Agiling capabilities, Tool stack implementation, People aspect, processes

TextBooks:

1. SoftwareProjectManagement,WalkerRoyce,PEA,2005.
2. Succeeding with Agile: Software Development Using Scrum, Mike Cohn, Addison Wesley.
3. The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations, Gene Kim , John Willis , Patrick Debois , Jez Humb,1st Edition, O'Reilly publications, 2016.

ReferenceBooks:

1. SoftwareProjectManagement,BobHughes,3/e,MikeCotterell,TMH
2. SoftwareProjectManagement,JoelHenry,PEA
3. SoftwareProjectManagementinpractice,PankajJalote,PEA,2005,
4. EffectiveSoftwareProjectManagement,RobertK.Wysocki,Wiley,2006.
5. ProjectManagementinIT,KathySchwalbe,Cengage

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIIYear-IISemester	Course Code: BT24CS32P3B	L	T	P	C
		0	1	2	2
MOBILEADHOCNETWORKS					

Course Objectives:

Fromthe coursethe student will learn

- Architectsensornetworksforvariousapplicationsetups.
- Deviseappropriatedatadisseminationprotocolsandmodellinkscost.
- Understandingofthefundamentalconceptsofwirelesssensornetworksandhasa basic knowledge of the various protocols at various layers.
- Evaluatetheperformanceof sensornetworksandidentify bottlenecks.

UNIT I: Introduction to Ad Hoc Wireless Networks- Cellular and Ad Hoc Wireless Networks, Characteristics of MANETs, Applications of MANETs, Issues and Challenges of MANETs, Ad Hoc Wireless Internet, MAC protocols for Ad hoc Wireless Networks-Issues, Design Goals and Classifications of the MAC Protocols.

UNIT II: Routing Protocols for Ad Hoc Wireless Networks- Issues in Designing aRouting Protocol, Classifications of Routing Protocols, Topology-based versus Position- based Approaches, Issues and design goals of a Transport layer protocol, Classification of Transport layer solutions, TCP over Ad hoc Wireless Networks, Solutions for TCP over Ad Hoc Wireless Networks, Other Transport layer protocols.

UNIT III: Security protocols for Ad hoc Wireless Networks- Security in Ad hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, Secure Routing in Ad hoc Wireless Networks, Cooperation in MANETs, Intrusion Detection Systems.

UNIT IV: Basics of Wireless Sensors and Applications- The Mica Mote, Sensing and Communication Range, Design Issues, Energy Consumption, Clustering of Sensors, Applications, Data Retrieval in Sensor Networks-Classification of WSNs, MAC layer, Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

UNIT V: Security in WSNs- Security in WSNs, Key Management in WSNs, Secure Data Aggregation in WSNs, Sensor Network Hardware-Components of Sensor Mote, Sensor Network Operating Systems–TinyOS, LA-TinyOS, SOS, RETOS, Imperative Language- nesC, **Dataflow**

Style Language-TinyGALS, Node-Level Simulators, NS-2 and its sensor network extension, TOSSIM.

TextBooks:

1. AdHocWirelessNetworks–ArchitecturesandProtocols,1st edition,C.SivaRam Murthy, B. S. Murthy, Pearson Education, 2004
2. Ad Hoc and Sensor Networks – Theory and Applications, 2nd edition *Carlos Corderio Dharma P.Aggarwal,* World Scientific Publications / Cambridge University Press, March 2006

ReferenceBooks:

1. Wireless Sensor Networks: An Information Processing Approach, 1st edition, *Feng Zhao, Leonidas Guibas,*Elsevier Science imprint, Morgan Kauffman Publishers,2005, rp2009
2. Wireless Ad hoc Mobile Wireless Networks – Principles, Protocols and Applications, 1st edition,SubirKumarSarkar,etal.,AuerbachPublications,Taylor&FrancisGroup, 2008
3. AdhocNetworking,1st edition,*CharlesE.Perkins,*PearsonEducation,2001
4. Wireless Ad hoc Networking, 1st edition, *Shih-Lin Wu, Yu-Chee Tseng,* Auerbach Publications, Taylor & Francis Group, 2007
5. Wireless Sensor Networks – Principles and Practice, 1st edition, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIIYear-IISemester	Course Code: BT24CS32P3C	L	T	P	C
		0	1	2	2
NATURALLANGUAGEPROCESSING					

Course Objectives:

Thiscourseintroducesthefundamentalconceptsandtechniquesofnaturallanguage processing (NLP).

- Students will gain an in-depth understanding of the computational properties of natural languages and the commonly used algorithms for processing linguistic information.
- The course examines NLP models and algorithms using both the traditional symbolic and the more recent statistical approaches.
- Enablestudentstobecapabletodescribetheapplicationbasedonnaturallanguage processing and to show the points of syntactic, semantic and pragmatic processing.

UNITI:

INTRODUCTION: Origins and challenges of NLP – Language Modeling: Grammar-based LM, Statistical LM – Regular Expressions, Finite-State Automata – English Morphology, Transducers for lexicon and rules, Tokenization, Detecting and Correcting Spelling Errors, Minimum Edit Distance.

UNITII:

WORD LEVEL ANALYSIS: Unsmoothed N-grams, Evaluating N-grams, Smoothing, Interpolation and Backoff – Word Classes, Part- of-Speech Tagging, Rule-based, Stochastic and Transformation-based tagging, Issues in PoS tagging – Hidden Markov and Maximum Entropy models.

UNITIII:

SYNTACTIC ANALYSIS: Context-Free Grammars, Grammar rules for English,Treebanks, Normal Forms for grammar – Dependency Grammar – Syntactic Parsing, Ambiguity, Dynamic Programming parsing – Shallow parsing Probabilistic CFG, Probabilistic CYK, Probabilistic Lexicalized CFGs – Feature structures, Unification offeature structures

UNITIV:

SEMANTICS AND PRAGMATICS: Requirements for representation, First-Order Logic, Description Logics – Syntax-Driven Semantic analysis, Semantic attachments – WordSenses, Relations between Senses, Thematic Roles, selectional restrictions – Word Sense

Disambiguation, WSD using Supervised, Dictionary & Thesaurus, Bootstrapping methods – Word Similarity using Thesaurus and Distributional methods.

UNITV:

DISCOURSE ANALYSIS AND LEXICAL RESOURCES: Discourse segmentation, Coherence – Reference Phenomena, Anaphora Resolution using Hobbs and Centering Algorithm–CoreferenceResolution–Resources:PorterStemmer,Lemmatizer,Penn Treebank,Brill'sTagger,WordNet,PropBank,FrameNet,BrownCorpus,BritishNational Corpus(BNC).

TextBooks:

1. Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech, 2nd Edition, Daniel Jurafsky, James H. Martin - Pearson Publication,2014.
2. Natural Language Processing with Python, First Edition, Steven Bird, Ewan Klein and Edward Loper, OReilly Media,2009.

ReferenceBooks:

1. Language Processingwith Java and Ling Pipe Cookbook, 1st Edition, Breck Baldwin,Atlantic Publisher, 2015.
2. NaturalLanguageProcessingwithJava,2nd Edition,RichardMReese,OReilly Media,2015.
3. HandbookofNaturalLanguageProcessing,Second,NitinIndurkhyaandFredJ. Damerau, Chapman and Hall/CRC Press, 2010.Edition
4. NaturalLanguageProcessingandInformationRetrieval,3rd Edition,TanveerSiddiqui, U.S.Tiwary,Oxford UniversityPress,2008.

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIIYear-IISemester	Course Code: BT24CS32P3D	L	T	P	C
		0	1	2	2
BIGDATA ANALYTICS					

CourseObjectives: Thiscourseisaimedat enablingthestudentsto

- Toprovidean overview ofanexciting growingfieldof bigdata analytics.
- TointroducethetoolsrequiredtomanageandanalyzebigdatalikeHadoop,NoSQL, Map Reduce, HIVE, Cassandra, Spark.
- To teach the fundamental techniques and principles in achieving big data analytics withscalability and streaming capability.
- Tooptimizebusinessdecisionsandcreate competitiveadvantagewithBigDataanalytics

UNIT I: big data, convergence of key trends, unstructured data, industry examples of big data, web analytics, big data and marketing, fraud and big data, risk and big data, credit risk management, big data and algorithmic trading, big data and healthcare, big data in medicine, advertising and big data, big data technologies, introduction to Hadoop, open source technologies, cloud and big data, mobile business intelligence, Crowd sourcing analytics,inter and trans firewall analytics.

UNIT II: Introduction to NoSQL, aggregate data models, aggregates, key-value and document data models, relationships, graph databases, schema less databases, materialized views, distribution models, sharding, master-slave replication, peer- peer replication, shardingand replication, consistency, relaxing consistency, version stamps, Working with Cassandra ,Table creation, loading and reading data.

UNIT III: Data formats, analyzing data with Hadoop, scaling out, Architecture of Hadoop distributed file system (HDFS), fault tolerance ,with data replication, High availability, Data locality , Map ReduceArchitecture, Process flow, Javainterface, data flow, Hadoop I/O, data integrity, compression, serialization. Introduction to Hive, data types and file formats, HiveQL data definition, HiveQL data manipulation, Logical joins, Window functions, Optimization, Table partitioning, Bucketing, Indexing, Join strategies.

UNIT IV: Apache spark- Advantages over Hadoop, lazy evaluation, In memory processing, DAG, Spark context, Spark Session, RDD, Transformations- Narrow and Wide, Actions,Dataframes,RDDtoDataframes,Catalystoptimizer,DataFrameTransformations,Working with Dates and Timestamps, Working with Nulls in Data, Working with Complex Types, Working

with JSON, Grouping, Window Functions, Joins, Data Sources, Broadcast Variables, Accumulators, Deploying Spark- On-Premises Cluster Deployments, Cluster Managers-StandaloneMode, Sparkon YARN, SparkLogs, TheSparkUI-SparkUIHistory Server, Debugging and Spark First Aid

UNIT V: Spark-Performance Tuning, Stream Processing Fundamentals, Event-Time and StatefullProcessing -EventTime,StatefullProcessing,WindowsonEventTime-Tumbling Windows,HandlingLateDatawithWatermarks,DroppingDuplicatesinaStream, Structured Streaming Basics - Core Concepts, Structured Streaming in Action, Transformations on Streams, Input and Output.

TextBooks:

1. BigData,BigAnalytics:Emerging,MichaelMinnelli,MichelleChambers,and AmbigaDhiraj, 1st edition ,2013
2. SPARK:TheDefinitiveGuide,BillChambers&MateiZaharia,O'Reilley,2018-first Edition.
3. Business Intelligence and Analytic Trends for Today's Businesses", Wiley, First edition- 2013.
4. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World Polyglot Persistence", Addison-Wesley Professional, 2012
5. TomWhite, "Hadoop: TheDefinitiveGuide", Third Edition, O'Reilley, 2012

ReferenceBooks:

1. "HadoopOperations",O'Reilley,EricSammer,FirstEdition-2012.
2. "ProgrammingHive",O'Reilley,E. Capriolo,D.Wampler,andJ.Rutherglen,2012.
3. "HBase:TheDefinitiveGuide",O'Reilley,Lars George,September2011:First Edition..
4. "Cassandra: The Definitive Guide", O'Reilley, Eben Hewitt, 2010.

"ProgrammingPig",O'Reilley,AlanGates,October2011:FirstEdition

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIIYear-IISemester	Course Code: BT24CS32P3E	L	T	P	C
		0	1	2	2
DISTRIBUTEDOPERATING SYSTEM					

Course Objectives:

The main objective of the course is to introduce design issues and different message passing techniques in DOS, distributed systems, RPC implementation and its performance in DOS, distributed shared memory and resource management, distributed file systems and evaluate the performance in terms of fault tolerance, file replication as major factors

Unit I:

Fundamentals:

What is Distributed Computing Systems? Evolution of Distributed Computing System; Distributed Computing System Models; What is Distributed Operating System? Issues in Designing a Distributed Operating System; Introduction to Distributed Computing Environment(DCE).

Message Passing:

Introduction, Desirable features of a Good Message Passing System, Issues in PC byMessage Passing, Synchronization, Buffering, Multi-datagram Messages, Encoding and Decoding of Message Data, Process Addressing, Failure Handling, Group Communication, Case Study: 4.3 BSD UNIX IPC Mechanism.

UnitII:RemoteProcedureCalls:

Introduction, The RPC Model, Transparency of RPC, Implementing RPC Mechanism, Stub Generation, RPC Messages, Marshaling Arguments and Results, Server Management, Parameter-Passing Semantics, Call Semantics, Communication Protocols for RPCs, Complicated RPCs, Client-Server Binding, Exception Handling, Security, Some Special Types of RPCs, RPC in Heterogeneous Environments, Lightweight RPC, Optimization for Better Performance, Case Studies: Sun RPC

UnitIII:DistributedShared Memory:

Introduction, General Architecture of DSM systems, Design and Implementation Issues of DSM, Granularity, Structure of Shared Memory Space, Consistency Models, Replacement Strategy, Thrashing, Other approaches to DSM, Heterogeneous DSM, Advantages of DSM. Synchronization: Introduction, Clock Synchronization, Event Ordering, Mutual Exclusion, Dead Lock, Election Algorithms

UnitIV:Resource Management:

Introduction, Desirable Features of a Good Global Scheduling Algorithm, Task Assignment Approach, Load – Balancing Approach, Load – Sharing Approach Process Management: Introduction, Process Migration, Threads.

UnitV:DistributedFile Systems:

Introduction, Desirable Features of a Good Distributed File System, File models, File–AccessingModels,File–SharingSemantics,File –CachingSchemes,FileReplication,Fault Tolerance, Atomic Transactions and Design Principles.

Textbooks

1. Pradeep.K.Sinha:DistributedOperatingSystems:ConceptsandDesign,PHI,2007.

ReferenceBooks:

1. AndrewS.Tanenbaum:DistributedOperatingSystems,PearsonEducation,2013.
2. AjayD. KshemkalyaniandMukeshSinghal,DistributedComputing:Principles,Algorithms and Systems, Cambridge University Press, 2008
3. SunitaMahajan,Seema Shan,"DistributedComputing",OxfordUniversityPress,2015

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIIYear-IISemester	Course Code: BT24CS3204	L	T	P	C
		0	1	2	2
CLOUDCOMPUTING LAB					

Course Objectives:

- Tointroducethevariouslevelsofservicesofferedbycloud.
- Togivepracticalknowledgeaboutworkingwithvirtualizationand containers.
- Tointroducetheadvancedconceptssuchasserverlesscomputingandcloud simulation.

CourseOutcomes: At theendofthe course, thestudentshould beable to

- Demonstratevariousservicetypes,deliverymodelsandtechnologiesofacloud computing environment.
- Distinguishtheservicesbasedonvirtualmachinesandcontainersinthecloud offerings.
- Assessthechallengesassociated withacloud-based application.
- Discussadvancedcloudconceptssuch asserverlesscomputingandcloudsimulation.
- Examine various programming paradigms suitable to solve real world and scientificproblems using cloud services.

List ofExperiments:

1. Labonwebservices
2. Labon IPC,messaging,publish/subscribe
3. InstallVirtual Box/VMwareWorkstationwithdifferentflavoursof LinuxorwindowsOS on top of windows8 or above.
4. Install a C compiler in the virtual machine created using Virtual Box and execute Simple Programs.
5. Create an Amazon EC2 instance and set up a web-server on the instance and associate an IP address with the instance. In the process, create a security group allowing access toport 80 on the instance.

OR

6. Dothesamewith OpenStack
7. Install Google App Engine. Create a hello world app and other simple web applications using python/java.
8. Start a Docker container and set up a web-server (e.g. apache2 or Python based

Flask micro web framework) on the instance. Map the host directory as a data volume for the container.

9. Find aprocedureto transferthe files from onevirtual machineto anothervirtual machine. Similarly, from one container to another container.
10. Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)
11. InstallHadoopsinglenodeclusterandrunsimpleapplicationslikewordcount.
12. Utilize OpenFaaS – Serverless computing framework and demonstrate basic event driven function invocation.
13. SimulateacloudscenariousingCloudSimandrunaschedulingalgorithmthatisnot present in CloudSim.

TextBooks:

1. MasteringCloudComputing,2nd edition,RajkumarBuyya,ChristianVecchiola,Thamarai Selvi, Shivananda Poojara, Satish N. Srirama, McGraw Hill, 2024.
2. Distributed and Cloud Computing, Kai Hwang,Geoffery C. Fox, Jack J. Dongarra,Elsevier, 2012.

ReferenceBooks:

1. Cloud Computing, Theory and Practice, Dan C Marinescu, 2nd edition, MK Elsevier, 2018.
2. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
3. Online documentation and tutorials from cloud service providers (e.g. AWS, Google App Engine)
4. Docker,Referencedocumentation, https://docs.docker.com/reference/ .
5. OpenFaaS,ServerlessFunctionsMadeSimple, https://docs.openfaas.com/

Head of the Dept.
Department of IT
D.N.R. College of Engg. & Tech.
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D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY(Autonomous)
BALUSUMUDI, BHIMAVARAM, W.G. Dist., A.P., PIN-534 202

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIIYear-IISemester	Course Code: BT24CS3205	L	T	P	C
		0	1	2	2
CRYPTOGRAPHY & NETWORK SECURITY LAB					

Course Objectives:

- Tolearnbasicunderstandingofcryptography,howithasevolved,andsomekey encryption techniques used today.
- Tounderstandandimplementencryptionanddecryptionusing CeaserCipher, Substitution Cipher, Hill Cipher.

List ofExperiments:

1. WriteaCprogramthatcontainsastring(charpointer)withavalue\HelloWorld'.The programshouldXOReachcharacterinthisstringwith0anddisplaysthe result.
2. Write a C program that contains a string (char pointer) with a value \Hello World'. The program should AND or and XOR each character in this string with 127 and display the result
3. Write a Java program to perform encryption and decryption using the following algorithms:
   a) CeaserCipher
   b) Substitution Cipher
   c) Hill Cipher
4. WriteaJavaprogram toimplement theDES algorithm logic
5. WriteaC/JAVAprogramtoimplementtheBlowFishalgorithmlogic
6. WriteaC/JAVAprogramtoimplementtheRijndaelalgorithmlogic.
7. UsingJavaCryptography,encryptthetext"Helloworld"usingBlowFish.Createyour ownkeyusingJavakey tool.
8. WriteaJavaprogramto implement RSAAlgorithm
9. Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript. Considertheend useras oneoftheparties(Alice)andtheJavaScriptapplicationasother party (bob).
10. Calculatethemessagedigest ofatext usingthe SHA-1algorithm in JAVA.

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BALUSUMUDI, BHIMAVARAM, W.G. Dist., A.P., PIN-534 202

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIIYear-IISemester	Course Code:	L	T	P	C
		0	1	2	2
SOFT SKILLS					

Course Objectives:

- Toequipthestudentswiththeskillstoeffectively communicateinEnglish
- Totrainthestudentsininterviewskills,groupdiscussionsandpresentationskills
- Tomotivatethe studentstodevelop confidence
- Toenhancethestudents' interpersonalskills
- Toimprovethe students'writing skills

UNIT–I

Analytical Thinking & Listening Skills: Self-Introduction, Shaping Young Minds - ATalk by Azim Premji (Listening Activity), Self – Analysis, Developing Positive Attitude, Perception.

Communication Skills: Verbal Communication; Non Verbal Communication (Body Language)

UNIT–II

Self-Management Skills: Anger Management, Stress Management, Time Management, Six Thinking Hats, Team Building, Leadership Qualities

Etiquette: SocialEtiquette,BusinessEtiquette,TelephoneEtiquette,DiningEtiquette

UNIT–III

Standard Operation Methods : Basic Grammars, Tenses, Prepositions, Pronunciation, Letter Writing; Note Making, Note Taking,Minutes Preparation, Email & Letter Writing

UNIT-IV

Job-Oriented Skills: Group Discussion, Mock Group Discussions, Resume Preparation, Interview Skills, Mock Interviews

UNIT-V

Interpersonal relationships: Introduction, Importance, Types, Uses,Factors affecting interpersonal relationships, Accommodating different styles, Consequences of interpersonal

relationships

Textbooks:

1. Barun K. Mitra, Personality Development and Soft Skills, Oxford University Press,2011.
2. S.P.Dhanavel,EnglishandSoftSkills,OrientBlackswan,2010.

Referencebooks:

1. R.S.Aggarwal, A Modern Approachto Verbal&Non-VerbalReasoning,S.Chand& Company Ltd., 2018.
2. Raman,Meenakshi&Sharma,Sangeeta,TechnicalCommunicationPrinciplesand Practice, Oxford University Press, 2011.

E-resources:

1. https://swayam-plus.swayam2.ac.in/courses/course-details?id=P_CAMBR_01

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIIYear-IISemester	Course Code: BT24CS3206	L	T	P	C
		0	1	2	2

TECHNICAL PAPER WRITING & IPR

Course Objective : The course will explain the basic related to writing the technical reports andunderstandingtheconceptsrelatedtoformattingandstructuringthereport.Thiswillhelp students to comprehend the concept of proofreading, proposals and practice

Unit I:

Introduction: An introduction to writing technical reports, technical sentences formation, using transitions to join sentences, Using tenses for technical writing.

PlanningandStructuring: Planning the report, identifying reader(s), Voice, Formatting and structuring the report, Sections of a technical report, Minutes of meeting writing.

Unit II:

Draftingreportanddesignissues: Theuseofdrafts, Illustrationsand graphics.

Final edits: Grammar, spelling, readability and writing in plain English: Writing in plain English, Jargon and final layout issues, Spelling, punctuation and Grammar, Padding, Paragraphs, Ambiguity.

Unit III:

Proofreading and summaries: Proofreading, summaries, Activities on summaries.

Presenting final reports: Printed presentation, Verbal presentation skills, Introduction to proposals and practice.

UnitIV:Usingwordprocessor:

Adding a Table of Contents, Updating the Table of Contents, Deleting the Table of Contents, Adding an Index, Creating an Outline, Adding Comments, Tracking Changes, Viewing Changes, Additions, and Comments, Accepting and Rejecting Changes , Working with Footnotes and Endnotes, Inserting citations and Bibliography, Comparing Documents, Combining Documents, Mark documents final and make them read only., Password protect Microsoft Word documents., Using Macros,

Unit V:

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of

Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property

TextBooks:

1. Kompal Bansal & Parshit Bansal, "Fundamentals of IPR for Beginner's", 1st Ed., BS Publications, 2016.
2. WilliamS.PfeifferandKayeA.Adkins,"TechnicalCommunication:APractical Approach", Pearson.
3. Ramappa,T.,"IntellectualPropertyRightsUnderWTO",2nd Ed.,SChand,2015.

ReferenceBooks:

1. AdrianWallwork,EnglishforWritingResearchPapers,SpringerNewYork Dordrecht Heidelberg London, 2011.
2. DayR,HowtoWriteandPublishaScientificPaper,CambridgeUniversity Press(2006)

E-resources:

1. https://www.udemy.com/course/reportwriting/
2. https://www.udemy.com/course/professional-business-english-and-technical-report-writing/
3. https://www.udemy.com/course/betterbusinesswriting/

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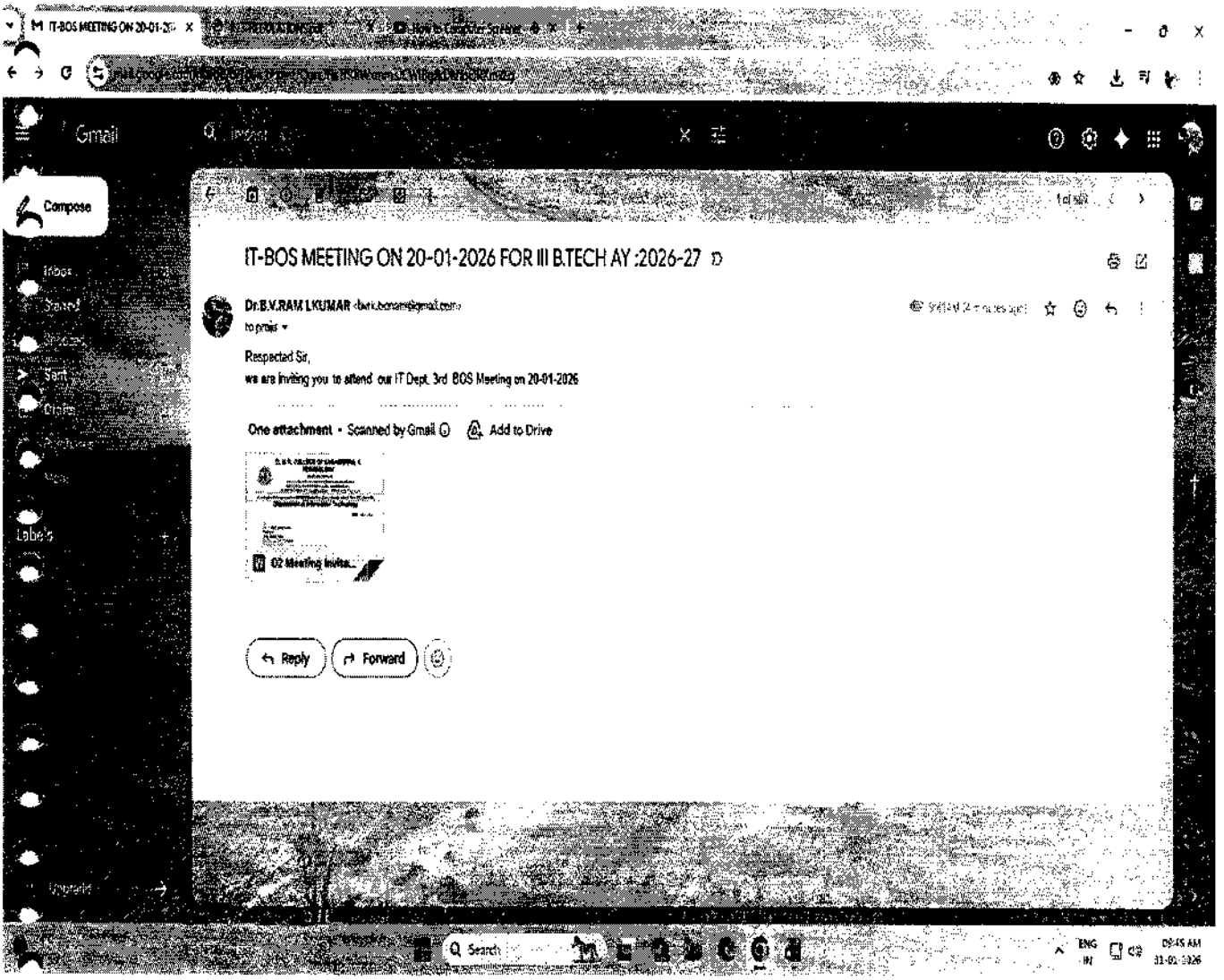
Mail Comminution to Dr.V.Purushotham Raju ,Dean Acd , Shri Vishnu Engineering College for Women (A), Bhimavaram



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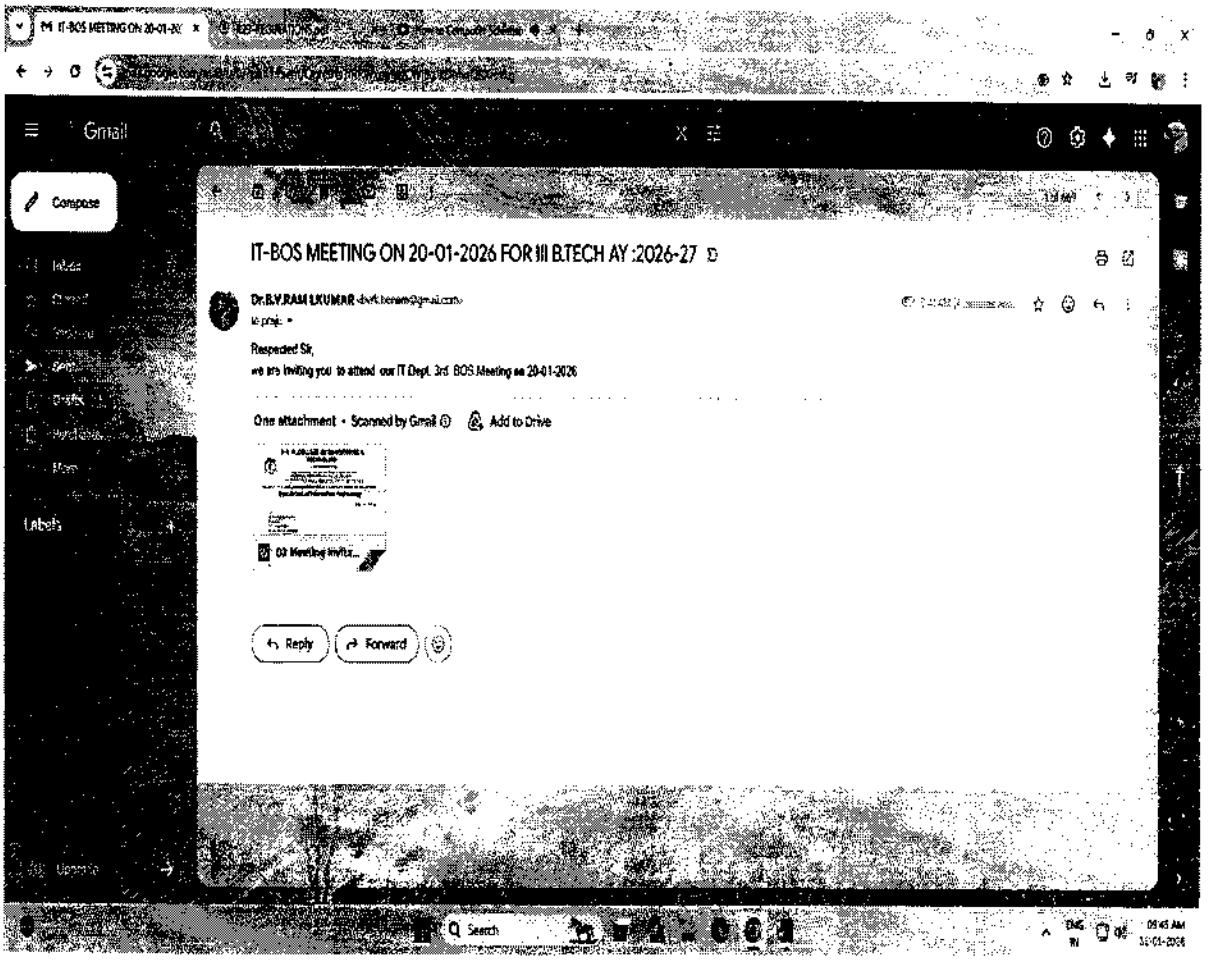
Comminution to Dr. N. Ramakrishnaiah Professor, CSE Department, UCEK, JNTUK Kakinada,

Kakinada



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V. Comminution to Dr. V. Chandrasekhar, Professor & HoD, Department of CSE,

S. K. R. Engineering College (A), BHIMAVARAM

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Dept. of IT
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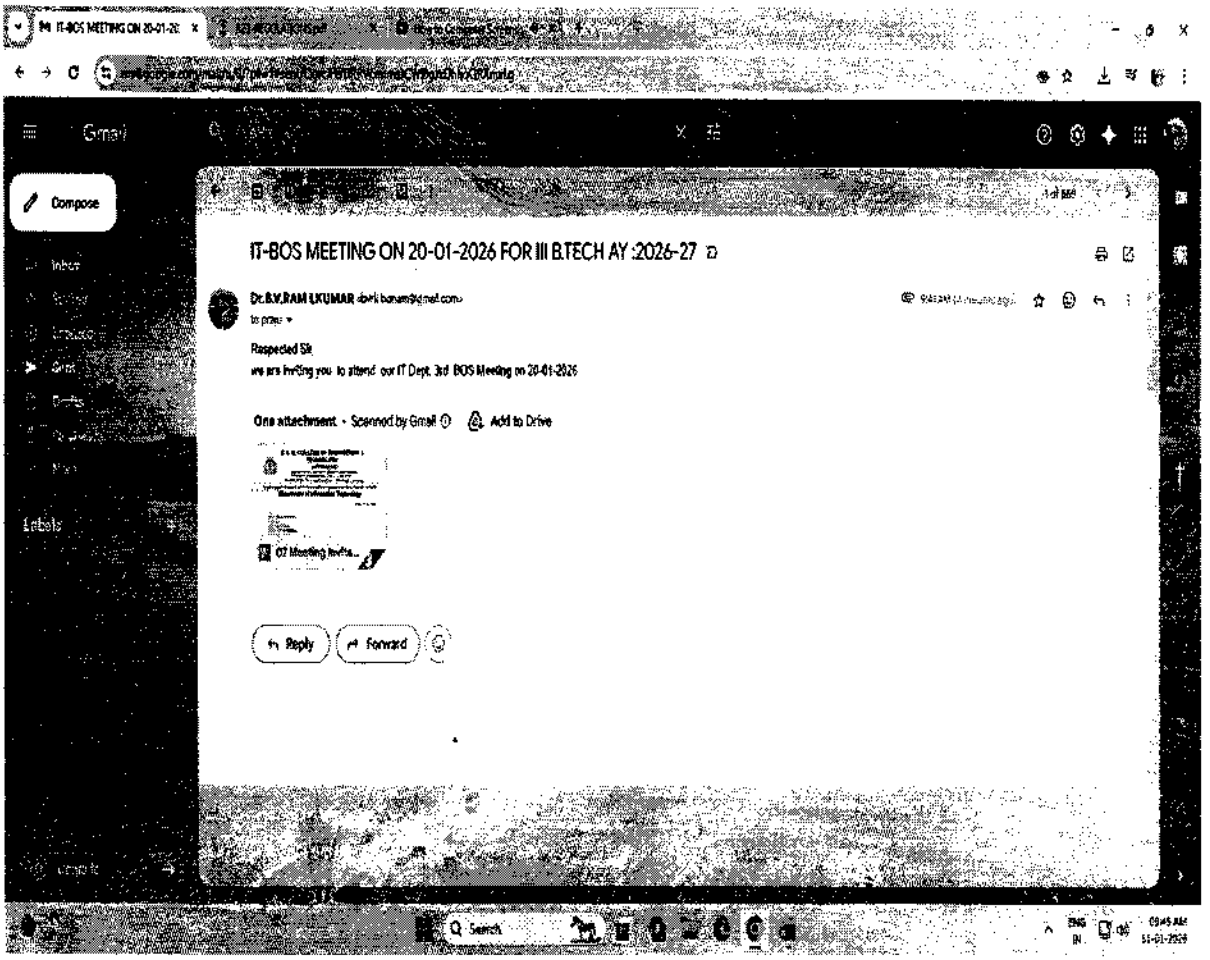
Mail Comminution to Dr. P. Kiran Sree, Professor & HoD, Department of CSE,

Shri Vishnu Engineering College for Women (A), Bhimavaram



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Course Code: BT24CS32P3A | **DR24** | HTNO | | | | | | | | | | |

D.N.R COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

B.Tech III-II Semester Regular Examinations (Model Paper)

SOFTWARE PROJECT MANAGEMENT

Time: 3 Hrs | Max. Marks: 70

S.no			PART-A **Answer All the Questions.**	**Marks**
				20 M
1.	a		What is late risk resolution?	CO1-K2(2M)
	b		What are the top five principles of a modern process?	CO1-K2(2M)
	c		Define transition phase.	CO2-K2(2M)
	d		Define product release milestone	CO2-K2(2M)
	e		What are five staffing principles?	CO3-K2(2M)
	f		Define late design breakage	CO3-K2(2M)
	h		Explain about configuration baseline	CO4-K2(2M)
	g		Who are stakeholders? List them.	CO4-K2(2M)
	h		What are the sources of architectural risks?	CO5-K2(2M)
	i		What are the major components of software cost? Why?	CO5-K2(2M)
			PART-B **All Questions Carry Equal Marks**	
				10 M
2.	A.	i.	What are the problems with Traditional waterfall model? What are the necessary recommendations for it?	CO1- K3(5M)
		ii.	Discuss the pragmatic software cost estimation process.	CO1- K3(5M)
			OR	
	B.	i.	Explain briefly the principles of modern software management	CO1- K3(5M)
		ii.	What are the five parameters used for software estimations? Describe the relationship between them.	CO1- K3(5M)
				10 M
3.	A.	i.	How to achieve concurrence among stakeholders in the inception phase?	CO2- K3(10M)
		ii	List the activities and evolution criteria in construction phase of life cycle process.	
			OR	
	B.	i.	Give artifact sequences across a life cycle	CO2- K3(10M)
		ii	Write a short note on engineering and production stages of a project.	
				10 M
4.	A.	i.	Define iteration. Discuss the sequence of activities in an iteration workflow.	CO3- K3(5M)
		ii.	What is the technical perspective of a project? How architecture is different from architecture baseline?	CO3- K3(5M)
			OR	
	B.	i.	Explain briefly planning balance throughout the life cycle.	CO3- K3(5M)
		ii.	Compare major mile stones and minor milestones	CO3- K3(5M)
				10 M
5.	A.	i.	Illustrate default roles in a software Line-of-Business Organization.	CO4- K3(5M)
		ii.	What is round trip engineering? Explain.	CO4- K3(5M)
			OR	
	B.	i.	Discuss in detail about the three fundamental sets of management metrics.	CO4- K3(5M)
		ii.	Discuss the life cycle expectations in software project management..	CO4- K3(5M)
				10 M
6.	A.	i.	What is Agile methodology? Discuss its key elements.	CO5- K3(5M)
		ii.	Explain the difference between the traditional Waterfall model and the Agile model.	CO5- K3(5M)

		OR	
B.	i.	How will you approach a project that needs to implement DevOps?	CO5- K3(5M)
	ii.	Explain tool stack implementation for DevOps.	CO5- K3(5M)
		* * *	

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Course Code: BT24IT31P1A | **DR24** | HTNO | | | | | | | | | | |

D.N.RCOLLEGEOF ENGINEERING&TECHNOLOGY

(AUTONOMOUS)

B.Tech III-II Semester Regular Examinations (Model Paper)

CYBER SECURITY

Time: 3Hrs Max.Marks:70

S.no			PART-A **Answer All the Questions.**	**Marks**
				20M
1.	a		What is meant by **Information Security?**	CO1-K2(2M)
	b		What is meant by **wireless device proliferation?**	CO1-K2(2M)
	c		Define a **Trojan horse.**	CO2-K2(2M)
	d		What is **steganography?**	CO2-K2(2M)
	e		Define **digital evidence**	CO3-K2(2M)
	f		What is **search and seizure of computers?**	CO3-K2(2M)
	h		Define **computer forensics software tools.**	CO4-K2(2M)
	g		What is **fingerprint recognition?**	CO4-K2(2M)
	h		What is meant by **cyber law?**	CO5-K2(2M)
	i		What is meant by **technology misuse by students?**	CO5-K2(2M)
			PART-B **All Questions Carry Equal Marks**	
				10M
2.	A.	i.	Explain the **classification of cybercrime** with suitable examples.	CO1- K3(5M)
		ii.	Discuss the **proliferation of mobile and wireless devices** and the resulting security risks.	CO1- K3(5M)
			OR	
	B.	i.	Describe the relationship between **Cybercrime and Information Security.**	CO1- K3(5M)
		ii.	Explain various **network and computer attacks** with examples.	CO1- K3(5M)
				10M
3.	A.	i.	Explain **proxy servers and anonymizers** and their role in cybercrime.	CO2-K3(10M)
		ii	Explain **sniffing and spoofing attacks.**	CO2-K3(10M)
			OR	
	B.	i.	Explain **key loggers and spyware** with examples.	CO2-K3(10M)
		ii	Describe **foot printing and social engineering techniques.**	CO2-K3(10M)
				10M
4.	A.	i.	Explain the **process of cyber crime investigation**	CO3- K3(5M)
		ii.	Discuss the **methods of digital evidence collection**	CO3- K3(5M)
			OR	
	B.	i.	Write a short note on **hands-on case studies in cyber crime investigation.**	CO3- K3(5M)
		ii.	Explain **password cracking techniques** used in cybercrime investigations.	CO3- K3(5M)
				10M
5.	A.	i.	Explain the criteria for **evaluating computer forensics tools.**	CO4- K3(5M)
		ii.	Explain **face, iris, and fingerprint recognition techniques** used in forensics.	CO4- K3(5M)
			OR	
	B.	i.	Describe the steps involved in **preparing for a computer forensic investigation.**	CO4- K3(5M)
		ii.	Write a short note on **challenges in computer forensic investigations.**	CO4- K3(5M)
				10M
	A.	i.	Explain **cybercrime and the legal landscape around the world.**	CO5- K3(5M)

6.		ii.	Write a note on **future challenges of cybercrime laws in India.**	CO5- K3(5M)
			OR	
	B.	i.	What are the **consequences of not addressing weaknesses in the IT Act?**	CO5- K3(5M)
		ii.	Explain the **importance of legal awareness among students** in the Indian scenario.	CO5- K3(5M)
			* * *	

Head of the Dept.
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Fax: 0884-2301901

PROCEEDINGS OF THE
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
Kakinada-533003, Andhra Pradesh (India)

Proc. No. JNTUK/DAP/Evaluation Procedure for DT&I/Approval/2025 Date: 27.01.2025

Sub: DAP – Academic Planning – Evaluation Procedure for Design Thinking and Innovation (L-T-P-C) (1-0-2-2) - Orders - Issued.

Read: e-Office No. 2690537 approved by Honourable Vice Chancellor dated 27.01.2025

***

ORDER:

With reference cited above, the Honorable Vice Chancellor, JNTUK is pleased to approve the recommendations for Evaluation Procedure for Design Thinking and Innovation (L-T-P-C) (1-0-2-2) as follows:

Evaluation Procedure for Design Thinking and Innovation (L-T-P-C) (1-0-2-2):

The performance of a student for Design Thinking and Innovation shall be evaluated with a maximum of 100 marks.

A student has to secure not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the mid semester and end examination marks taken together.

Assessment Method	Marks
Internal Assessment	30
Semester End Examination	70
Total	**100**

The distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

a) **Internal Evaluation Procedure**

i) **Of the internal marks of 30, Day to Day Evaluation in the lab will be given a maximum of 7.5 Marks (25%) and Mid Exam(theory), a maximum of 22.5 Marks (75%).**

ii) During the semester, there shall be two midterm examinations. Each midterm examination shall be evaluated for 30 marks of which 10 marks for objective paper (20 minutes duration), 15 marks for subjective paper (90 minutes duration) and 5 marks for assignment. 30 Marks will be scaled down to 22.5 Marks.

a. Objective paper shall contain for 05 short answer questions with 2 marks each OR maximum of 20 bits for 10 marks.
b. Subjective paper shall contain 3 questions of internal choice (i.e., either-or type questions of which student has to answer one from each either-or type of questions, each question carries 10 marks. The marks obtained in the subjective paper are condensed to 15 marks.
c. 5 marks for assignment
d. Mid examinations of Design thinking and Innovation to be conducted by the corresponding college.

Note:

- The subjective paper shall contain 3 either-or type questions of equal weightage of 10 marks. Any fraction shall be rounded off to the next higher mark.
- Assignments shall be in the form of problems, mini projects, design problems, slip tests, quizzes etc., depending on the course content. It should be continuous assessment throughout the semester and the average marks shall be considered.

iii) If the student is absent for the mid semester examination, no re-exam shall be conducted and mid semester marks for that examination shall be considered as zero.

iv) First midterm examination shall be conducted for I, II units of syllabus with one either or type question from each unit and third either or type question from both the units. The second midterm examination shall be conducted for III, IV and V units with one either or type question from each unit.

v) Final mid semester marks shall be arrived at by considering the marks secured by the student in both the mid examinations with 80% weightage given to the better mid exam and 20% to the other.

vi) If the student is absent for any one midterm examination, the final mid semester marks shall be arrived at by considering 80% weightage to the marks secured by the student in the appeared examination and zero to the other.

b) End Examination (Only Practical's) Evaluation:
The end examination shall be evaluated for 70 marks, conducted by the concerned laboratory teacher and a senior expert in the subject from the same department.

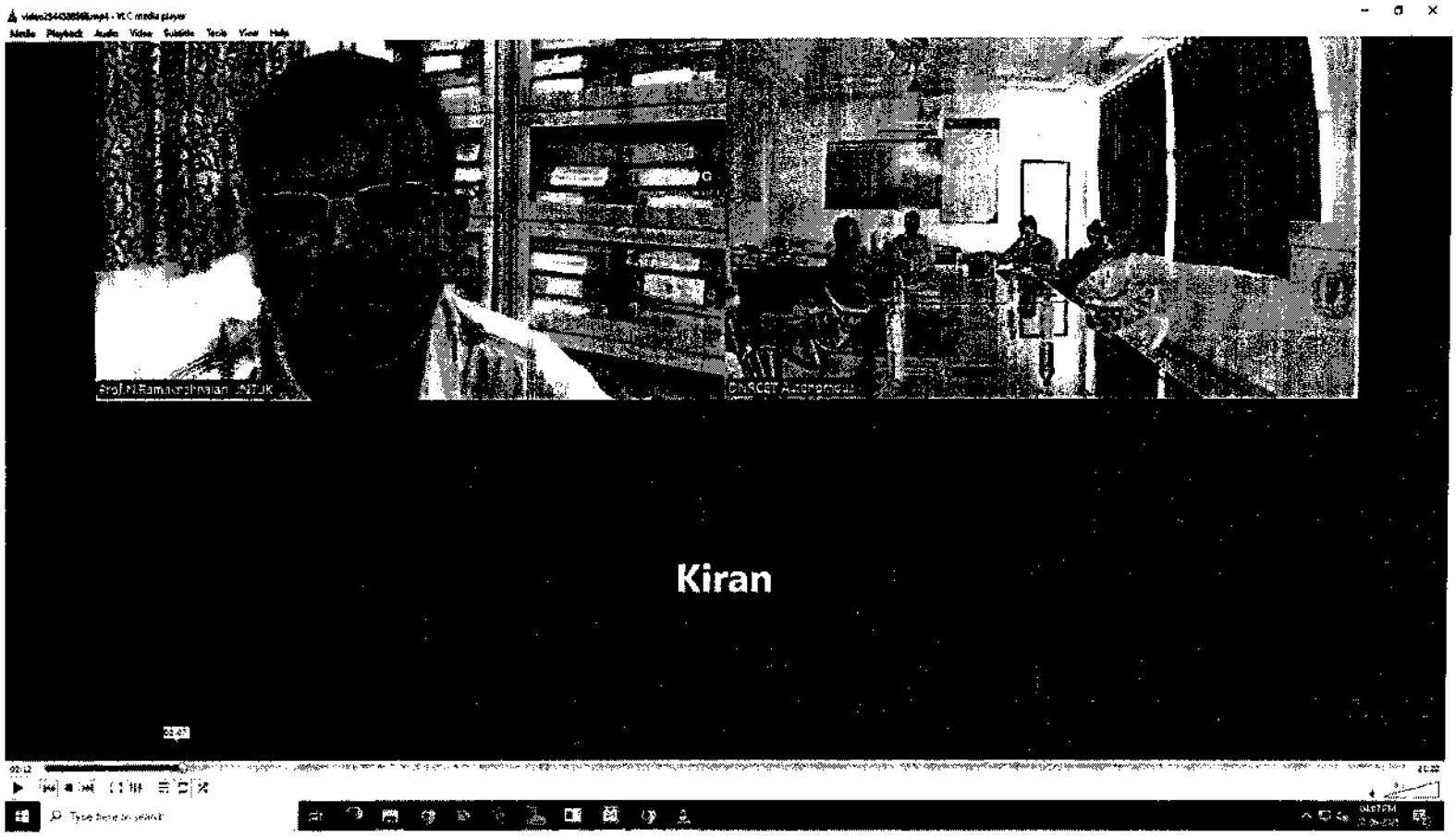
- Procedure: 20 marks
- Experimental work & Results: 30 marks
- Viva voce: 20 marks.

REGISTRAR
REGISTRAR
J.N.T. University Kakinada
Kakinada-533003.

To
The Director of Evaluation, JNTUK Kakinada.
Copy to the Director, Academic Planning, JNTUK Kakinada.
Copy to the Secretary to Hon'ble Vice-Chancellor, JNTUK Kakinada.
Copy to the PA to the Registrar, JNTUK Kakinada.

DNRCET - IT BOS MEETING on 24/3/25

Meeting Sceernshot :



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Department of IT
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