R V R & J C COLLEGE OF ENGINEERING (Autonomous),

Chowdavaram, Gunutr-19

B.Tech., Computer Science & Engineering (Data Science)

Syllabus (R20) - Semester VII (Fourth Year)

S. No.	Course Code	Course Title	Hours Per Week			Scheme of Examination			Category Code
			L	T	P	SES	EXT	Credits	
1	CD411	Humanities Elective	3	-	-	30	70	3	HS
2	CD412	Professional Elective-III	2	1	-	30	70	3	PE
3	CD413	Professional Elective-IV	2	1	-	30	70	3	PE
4	CD414	Professional Elective-V(MOOCS)	-	-	-	-	100	3	PE
5	CD415	Open/Job Oriented Course-III	3	-	-	30	70	3	OE
6	CD416	Open /Job Oriented Elective-IV(MOOCS)	-	-	-	0	100	3	OE
7	CD452	Internship/Certification	-	-	-	100	-	3	PR
8	CDSL5	Skill Oriented Course-V	2	-	-	100	-	2	SC
		Total	12	2	3	350	550	23	

CD411	Industrial Management and Entrepreneurship	L	T	P	C
		3	0	0	3

Course Objectives:

1. To enable the student to demonstrate a thorough working knowledge of Management and Organizations.
2. To alert the students in regular business activity on Time values of money and depreciation.
3. To motivate the students on Entrepreneurial Perspectives at present business.
4. To enable the student on the MSME sector and motivate the startup of MSME and support agencies.

Course Outcomes:

After successful completion of the course, the students are able to

1. To gain insight into contemporary issues in Management and Business Organisation
2. Ability to identify, analyze and interpret various concepts of time values of money and depreciation.
3. An understanding of the impact of knowledge on Entrepreneurship to enable the student to meet the needs of Industry
4. Recognition of the needs and ability to MEME and Support Agencies

Course Content:

UNIT I **(CO1) (10 Periods)**

Management and Business Organization: Management concept-Managerial and operational management-Scientific management-Job Design-Job description and job specification. Sole Proprietorship, Partnership Firm, Limited Liability Partnership (LLP), Joint Stock Company, One Person Company (OPC), Private Company & Public Limited Company form of Organization, Co-Operatives.

UNIT-II **(CO2) (10 Periods)**

Time values of money and depreciation: Simple interest-Compound interest-Present worth re worth factors-Depreciation Concept-Straight-line method of depreciation Diminishing method of depreciation-Sum of the year digits method of depreciation etc along with problems.

UNIT-III **(CO3)(10Periods)**

Entrepreneur and Entrepreneurship-Concept of Entrepreneur-Characteristics of an Entrepreneur Distinction between an Entrepreneur and Intra preneur and a Manager Functions of an Entrepreneur-Types of of Women entrepreneurs-Recent Trends Entrepreneurship-Rural Entrepreneurship Entrepreneurial process -Growth of Entrepreneurship in India

UNIT-IV **(CO4)(10 periods)**

MSME and Support Agencies: Meaning of MSME-Definitions of MSME, Characteristics of MSME-Relationships of MSME- Certificate of MSME - Make in India concept of MSME Commercial Banks- financial institutions-(KVIC) Khadi and Village Industries Commission- (SIDO) Small Industries Development Corporation -(NSIC) National Small Industries Corporation-(NPC) National productivity council-(DIC) District Industries Centre-(SFC)StateFinancialcorporation.

Text Books:

1. KK Ahuja, Industrial Management, Vol. I & II, Dhanpat Rai, 1978.
2. E.PaulDegarmo, John R Chanda, William G Sullivan, Engineering Economy, Mac Millan PublishingCo, 1979.
3. Poornima M Charantimath, Entrepreneurship Development Small business environment, PearsonEducation
4. ShivganeshBhargav, Entrepreneurial Management, Sage Publications, 2008.

Reference Books:

1. Gary Dessler, Human Resource Management,11th Edition, 2008.
2. Heinz Weirich and Harold Koontz, Management, 10th Edition, TMH, 2004.

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Syllabus (R20) - Semester VII (Fourth Year)

CD412	Soft Computing	L	T	P	C
		2	1	0	3

Course Objectives:

1. Explain the principles and core components of these techniques.
2. Equip students with practical skills to apply soft computing techniques to real-world problems.
3. Independently analyze, model, and solve complex problems using soft computing methods.
4. Assess when and where soft computing approaches are most suitable and articulate their reasoning.

Course Outcomes:

1. Understand the principles and concepts of soft computing, including fuzzy sets, neural networks, genetic algorithms =, and other related techniques.
2. Proficiency in designing, training and implementing neural networks, including feed forward and recurrent architectures.
3. Apply fuzzy logic, sets, and relations in decision making and control systems.
4. Apply genetic algorithms to optimization and search problems.

Course Content:

UNIT-I **(CO1) 12Periods**

Introduction: Neural Networks, Application Scope of Neural Networks, Fuzzy Logic, Genetic Algorithm, Hybrid Systems, Soft Computing.

Supervised Learning Network: Back propagation Network, Radial Basis Function Network, Time Delay Neural network, Functional link network, wavelet neural network.

Associative memory networks: Introduction, Training algorithms for pattern association, Auto-associative memory networks, Hetero associative memory networks, Bidirectional Associative Memory (BAM): Theory, Architecture

UNIT-II **(CO2) 12 Periods**

Unsupervised Learning Networks- Introduction, Fixed Weight Competitive Nets (MaxNet, Mexican Hat Net, Hamming Net), Kohonen Self-Organizing Feature Maps (KSOFM), Learning Vector Quantization (LVQ), Counter Propagation Networks, Adaptive Resonance Theory network(ART):Theory, ART 1, ART 2

UNIT-III **(CO3) 12Periods**

Introduction to Fuzzy Logic, Classical Sets and Fuzzy Sets: Introduction to Fuzzy Logic, Classical Sets, Fuzzy Sets.

Classical Relations and Fuzzy Relations: Introduction, Cartesian Product of Relation, Classical Relation, Fuzzy Relations, Tolerance and Equivalence Relations, Non interactive Fuzzy Sets.

UNIT-IV **(CO4) 10Periods**

Genetic Algorithms: Introduction, Biological Background, Traditional Optimization and Search Techniques, Genetic Algorithm and Search Space, Generic Algorithm vs. Traditional Algorithms, Basic Terminologies in Genetic Algorithm, Simple GA, General Genetic Algorithm, Stopping Condition for Genetic Algorithm.

Operators in Genetic Algorithm: Encoding, Selection, Crossover, Mutation

Text Books:

1. Principles of Soft Computing by S. N. Sivanandan and S. N. Deepa, 2nd edition, Wiley India 2007.

Reference Books:

1. Neural Networks, Fuzzy Logic, And Genetic Algorithms: Synthesis Andapplications (With Cd-Romby S. Rajasekaran And G. A. Vijayalakshmi Pai, Phi, 2013.
2. Soft computing and Intelligent Systems: Theory and Applications, by Naresh K. Sinha, Madan N. Gupta, Academic Press 2000.

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Syllabus (R20) - Semester VII (Fourth Year)

CD413	Time Series Analysis and Forecasting	L	T	P	C
		2	1	0	3

UNIT – I **(CO1)(12Periods)**

Introduction to time series analysis, forecasting principles, exploratory data analysis, Time series decomposition, Exponential smoothing methods, Time series regression models, Autoregressive moving average models, ARIMA models, Dynamic regression models, Extrapolative forecasting methods, Causal forecasting methods, modeling non-stationary time series data.

UNIT – II **(CO2)(12Periods)**

Multivariate time series analysis, Copula-based methods for Multivariate time series, Seasonal adjustment and forecasting, Forecasting with long seasonal periods, Trend estimation and seasonality adjustment in non-stationary series, Nonlinear time series models, Forecasting methods, Spectral analysis, Forecasting with neural networks.

UNIT – III **(CO3)(12Periods)**

Forecasting hierarchical or grouped time series, Box-Jenkins methodology, Transfer function models, Intervention analysis, State-space models, Time-varying parameter models and adaptive forecasting approaches Time series data mining, Distance and Similarity measures for time series data, Time series features extraction using Fourier and Wavelet transforms.

UNIT – IV **(CO4)(12Periods)**

Bayesian approaches to uncertainty quantification in time series forecasting, Probabilistic forecasting frameworks and methodologies, Ensemble methods forgenerating probabilistic forecasts,Gaussian Processes for modeling uncertainty in time series data.

Deep learning for time series analysis for sequential data: Recurrent Neural Networks (RNNs), Long Short-Term Memory (LSTM) networks, Gated Recurrent Units (GRUs), Attention mechanisms for temporal patterns.

Text Books:

1. Hyndman, R.J., & Athanasopoulos, G. (2018). Forecasting: principles and practice. OTexts.
2. Shumway, R.H., & Stoffer, D.S. (2017). Time Series Analysis and Its Applications: With R
3. Montgomery, D.C., Jennings, C.L., &Kulahci, M. (2008). Introduction to Time Series Analysis and Forecasting. Wiley.
4. Kaye, D.H. (2014). Applied Time Series Analysis for the Social Sciences: The Data Series Approach. Cambridge University Press.
5. Tsay, R.S. (2021). Multivariate Time Series Analysis and Applications. Wiley. ISBN: 9781119541642.
6. Lane, N.D., Lv, F.M., Oates, T., & Lu, H. (2018). Deep Learning for Time Series Forecasting. O'Reilly Media. ISBN: 9781492045119.
7. Berger, J.O., & Wolpert, R.L. (1988). Probabilistic Time Series Models. CRC Press. ISBN: 9780849349630.

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Syllabus (R20) - Semester VII (Fourth Year)

CD415	Cyber Security	L	T	P	C
		3	0	0	3

Course Objectives:

1. To introduce the different cyber-crimes.
2. To impart the cyber security attacks
3. Describe various methods used in cyber crime
4. List various implications of cyber security

Course Outcomes:

On completion of the course, the students will be able to:

1. Discuss classification of cyber-crimes and Computer Forensics process.
2. Discuss the impact of cyber attacks
3. Describe the tools and methods used in cyber crime
4. Explain organizational implications of cyber security

Course Content:

UNIT – I **(CO1) (12 Periods)**

Introduction of Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Cybercriminals, Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Internet Time Theft, Salami Attack/Salami Technique, Data Diddling, Forgery, Web Jacking, Newgroup Spam, Industrial Espionage, Hacking, Online Frauds, Pornographic Offenses, Software Piracy, Computer Sabotage, E- Mail bombing, computer network intrusions, password sniffing, credit card frauds, identity theft.

Introduction of Computer Forensics: Digital Forensics Science, Need for Computer Forensics, Cyberforensics and digital evidence, Digital Forensic Lifecycle, OSI 7 Layer Models to computer Forensics.

UNIT – II **(CO2) (12 Periods)**

Cyber offenses: Criminals Plan: Categories of Cybercrime Cyber Attacks: Reconnaissance, Passive Attack, Active Attacks, Scanning/Scrutinizing gathered Information, Attack, Social Engineering: Classification of Social Engineering.

Cyberstalking: Types of Stalkers, Working of Stalking, Real-Life Incident of Cyber stalking, Cybercafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Botnet, Attack Vector.

Attacks on mobile/cell phones: Theft, viruses, mishing, vishing, smishing, hacking Bluetooth.

UNIT –III **(CO3)(12 Periods)**

Tools and Methods: Introduction,Proxy Servers and Anonymizers, how phishing works, password cracking, keyloggers and spywares, types of viruses, steganography,DoS and DDoS attacks – classification, types, tools used for launch, DDoS attacks, protection, SQL injection – steps and prevention, Buffer Overflow – types and minimizing attack, Attacks on Wireless Networks.

Phishing: Methods of Phishing, Phishing techniques, Spear Phishing, Types of Phishing scams,Phishing countermeasures.

UNIT-IV **(CO4)(12 Periods)**

Identity (ID) Theft: Personally Identifiable Information (PII), Types of ID Theft, Techniques of ID Theft, Countermeasures. Organizational Implications –Introduction –Insider threats, Privacy, Key challenges to organizations, Cost of Cybercrimes and IPR issues.

Incident Handling: Definitions, Organizations need Incident Response systems, Examples of incidents, what organizations can do to protect, best practices for organizations.

Learning Resources:

Text books

1. Nina Godbole, Sunit Belapur, “Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives”, 2nd edition, Wiley India Publications, April, 2015.

Reference books

1. James Graham, R Howard, R Olson, "Cyber Security Essentials" CRC Press, 2018
2. MarttiLehto, PekkaNeittaanmäki, Cyber Security: Analytics, Technology and Automation edited, Springer International Publishing Switzerland 2015
3. NASSCOM Handbook Study Material.
4. Cyber Security – Attack and Defense Strategies by Yuri Diogenes and ErdalOzkaya.