6th Semester
Course Contents

MANAGEMENT & ENTREPRENEURSHIP	
Subject Code: AL61	**Credits: 3:0:0**
Pre requisites: NIL	**Contact Hours: 42L**
Course Coordinators: Dr. M Shilpa/ Dr. M Rajesh	

Course Content

Unit I

Introduction to Management: Definition of Management, Its nature and purpose, Contributions of F.W. Taylor and Henry Fayol to management theory, Functions of managers. **Planning:** Types of plans, Steps in planning, the planning process, Management by Objectives (MBO) **Organizing:** The nature and purpose of organizing, Formal and informal organization. Organization levels and Span of management, Principle of span of management, the structure and process of organizing

- Pedagogy: Chalk and Talk, PowerPoint Presentations
- Links: https://onlinecourses.nptel.ac.in/noc23_mg33/preview
  https://www.digimat.in/nptel/courses/video/110107150/L01.html

Unit II

Staffing: Situational factors affecting staffing. **Leading:** Human factors in managing, definition of leadership, Ingredients of leadership **Controlling:** Basic control process, Critical control points and standards, Control as a feedback system, Feed forward control, Requirements for effective controls.

- Pedagogy: Chalk and Talk, PowerPoint Presentations
- Links: https://nptel.ac.in/courses/110107150

Unit III

Introduction to Entrepreneurship: The Foundations of Entrepreneurship: What is an Entrepreneurship? The benefits of Entrepreneurship, The potential drawbacks of Entrepreneurship; Inside the Entrepreneurial Mind: From Ideas to Reality: Creativity, Innovation and Entrepreneurship, Creative Thinking, Barriers to Creativity

- Pedagogy: Chalk and Talk, PowerPoint Presentations
- Links:https://www.youtube.com/watch?v=Hgj_kRrvbhQ&list=PL7oBzLzHZ1wXW3mtolxV5nIGn48NLKwrb

Unit IV

The Entrepreneurial Journey: Crafting a Business Plan: The benefits of creating a business plan, the elements of a business plan; Forms of Business Ownership and Buying an Existing Business: Sole proprietorships and partnership. **Launching the Business:** Franchising and the Entrepreneur: Types of Franchising, the benefits of buying a Franchise

- Pedagogy: Chalk and Talk, PowerPoint Presentations
- Links:https://www.youtube.com/watch?v=Tzzfd6168jk&list=PLyqSpQzTE6M8EGZbmNUuUM7Vh2GkdbB1R
  https://www.youtube.com/watch?v=5RMqxtMwejM&list=PLyqSpQzTE6M9zMKj_PSm81k9U8NjaVJkR

Unit V

Small Scale Industry: Definition, Characteristics, types, role of SSI in Economic Development, steps to start SSI- Govt. Policy towards SSI, Institutional support- TECKSOK, KIADB, KSSIDC, KSIMC, DIC, NSIC, SIDBI, KSFC.

- Pedagogy: Chalk and Talk, PowerPoint Presentations
- Links:https://www.nptel.ac.in/courses/110/105/110105067/

Text Books:

1. Harold Koontz, H. Weihrich, and A.R. Aryasri, Principles of Management, Tata McGraw-Hill, New Delhi, 2004.
2. Essentials of Entrepreneurship and Small Business Management – Norman Scarborough & Jeffrey Cornwall (Pearson, 2016)
3. Management and Entrepreneurship by K. R. Phaneesh, Sudha Publications, Bangalore

References:

1. Innovation & Entrepreneurship – Peter Drucker (Harper, 2006)
2. Entrepreneurship: The Art, Science, and Process for Success – Charles Bamford & Garry Bruton (McGraw-Hill, 2015)
3. Managent and Enterpreneuship-NVR Naidu, T Krishna Rao, I.K. International Publishing House Pvt. Ltd.@ 2008
4. Poornima M Charantimath, Entrepreneurship Development and Small Business Enterprises, Pearson Education, 2006.

Course Outcomes (COs):

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

1. Plan and organize for the manpower in the given type of organization (PO-6,9,11)
2. Use staffing Leading and controlling functions for the given organization. (PO-6,8,9,10)
3. Analyze the advantages and potential drawbacks of Entrepreneurship. (PO-6,7,8)
4. Develop a basic business plan and analyze the benefits of buying Franchise. (PO-3,5,7,8,11)
5. Identify the various institutions that provide financial support to small scale industries. (PO-6,11)

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks		
Assessment Tool	**Marks**	**Course outcomes addressed**
Internal test-I	30	CO1, CO2
Internal test-II	30	CO3, CO4, CO5
Average of the two internal tests shall be taken for 30marks.		
Other components		
Quiz	10	CO1, CO2,CO3
Assignment	10	CO1, CO2, CO3, CO4, CO5
Semester End Examination (SEE)	100	CO1, CO2, CO3, CO4, CO5

INTRODUCTION TO DEEP LEARNING	
Course Code: CI62	Credits: 3:1:0
Prerequisites: Nil	Contact Hours: 42L+14T
Course Coordinator/s: Dr. S Aarathi	

Course Contents

Unit 1

Introduction to Deep Learning: Brief history of DL, Working of weights and bias, Working of single neuron, Working of a layer, layer implementation with numpy, Dense layer.
Activation Functions: Uses of activation function, Sigmoid, ReLu activation, Softmax Activation functions.

- Pedagogy: Chalk and board, Active Learning, Problem based learning.

Unit II

Loss Function: Categorical cross entropy loss, Binary cross - Entropy loss and Accuracy calculation.
Backpropagation and other Differentiation Algorithms, optimizers: Stochastic Gradient Descent (SGD), Learning Rate and LR decay, SGD with momentum, AdaGrad, RMSProp, Adam.

- Pedagogy: Chalk and board, Active Learning, Demonstration.

Unit III

Convolutional Networks: The Convolution Operation, Pooling, Convolution and Pooling as an Infinitely Strong Prior, Variants of the Basic Convolution Function, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features- LeNet, AlexNet.

- Pedagogy: Chalk and board, Problem based learning, Demonstration.

Unit IV

Recurrent and Recursive Neural Networks: Unfolding Computational Graphs, Recurrent Neural Network, Bidirectional RNNs, Deep Recurrent Networks, Recursive Neural Networks, The Long Short- Term Memory and Other Gated RNNs.

- Pedagogy: Chalk and board, Problem based learning, Demonstration

Unit V

Transformers and Vision transformers: Self Attention and Multi-Head attention mechanism, positional encoding, residual connection, Encoder and Decoder. Applications: Applications of Encoder, Decoder and Encoder-Decoder type models.

- Pedagogy: Chalk and board, MOOC
- Additional Links: https://jalammar.github.io/illustrated-transformer/

Text Books:

1. Harrison Kinsley & Daniel Kukiela, Neural Network from scratch in Python, Kinsley Enterprises Inc, MIT license,2020.
2. Ian Goodfellow, Yoshua Bengio, Aaron Courville, Deep Learning, MIT Press, November 2016.
3. Denis Rothman, Transformers for Natural Language Processing, Packt, 2e, March 2022.

References Books:

1. Bengio, Yoshua. Learning deep architectures for AI. Foundations and trends in Machine Learning, 2009.
2. N.D. Lewis, Deep Learning Made Easy with R: A Gentle Introduction for Data Science, January 2016.
3. Nikhil Buduma, Fundamentals of Deep Learning: Designing Next-Generation Machine Intelligence Algorithms, O'Reilly publications.

Course Outcomes (COs):

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

1. Understand the concepts and applications of neural networks and deep learning. (PO 1,2,3,4,5,6,12 PSO 1,2)
2. Describe how various types of learning models and how they can be used. (PO 1,2,3,4,5,6,12 PSO 1,2)
3. Apply deep feed forward networks and convolutional neural networks to solve real time problems. (PO 1,2,3,4,5,6,12 PSO 1,2,3)
4. Demonstrate the working of recurrent and recursive neural network functions. (PO 1,2,3,4,5,6,12 PSO 1,2)
5. Design end-to-end deep learning architectures involving various types of feedforward networks, auto encoders and generative adversarial networks for practical applications. (PO 1,2,3,4,5,6,12 PSO 1,2,3).

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks		
Assessment Tool	**Marks**	**Course outcomes addressed**
Internal test-I	30	CO1, CO2, CO3
Internal test-II	30	CO3, CO4, CO5
The average of two internal tests shall be taken for 30 marks.		
Other components		
Tutorial Assignment	10	CO1, CO2, CO3
Case Study	10	CO1, CO2, CO3, CO4, CO5
Semester End Examination (SEE)	100	CO1, CO2, CO3, CO4, CO5

DEEP LEARNING LABORATORY	
Course Code: CIL65	**Credits: 0:0:1**
Prerequisites: Nil	**Contact Hours: 14P**
Course Coordinator/s: Dr. S Aarathi	

Course Contents

1. Implement training rate and all activation functions.
2. Implement Categorical cross entropy Loss function with forward and backward pass.
3. Implement Simple ANN with Activation and loss function.
4. Study the effect of batch normalization and dropout in neural network classifier
5. Implement a Simple CNN to compare performance of any two optimizers on a same dataset.
6. Image segmentation using UNet.
7. Implement LeNet-5 architecture for image classification on CIFAR-10 dataset.
8. Implement AlexNet architecture for digit classification on MNIST.
9. Implement a Simple RNN with one dense layer.
10. Text generation using LSTMs.
11. Implement transformer's Multi head attention mechanism.
12. Implement Auto encoders.

Text Books:

1. Harrison Kinsley & Daniel Kukiela, Neural Network from scratch in Python, Kinsley Enterprises Inc, MIT license,2020.
2. Ian Goodfellow, Yoshua Bengio, Aaron Courville, Deep Learning, MIT Press, November 2016.
3. Denis Rothman, Transformers for Natural Language Processing, Packt, Second Edition, March 2022.

Course Outcomes (COs):

At the end of the course, the student should be able to:

1. Build deep learning models using regularization and convolutional operations. (PO 1,2,3,5,9,10,11,12 PSO 1,2,3)
2. Analyze sequential data to build image segmentation and captioning. (PO 1,2,3,5,9,10,11,12 PSO 1, 3)
3. Develop and analyze the applications using Network Visualization and bi-directional LSTMs (PO 1,2,3,5,9,10,11,12 PSO 1,3)

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks		
Assessment Tools	**Marks**	**Course Outcomes (COs) addressed**
Lab Test-I	10	CO1, CO2
Lab Test-II	10	CO3
Weekly Evaluation+Lab Record	30	CO1, CO2, CO3
The Final CIE out of 50 Marks = Marks of Lab Record + Marks scored in Lab Test-I + Marks scored in Lab Test-II		
Semester End Examination (SEE)	50	CO1, CO2, CO3

BIG DATA ANALYTICS LABORATORY	
Course Code: CIL66	**Credits: 0:0:1**
Prerequisites: Nil	**Contact Hours: 14P**
Course Coordinator/s: Mrs. Akshatha G C	

Course Contents

1. Understanding different Hadoop modes. Configuration files.
2. Hadoop implementation of file management tasks, such as Adding files and directories, retrieving files and Deleting files.
3. Develop MapReduce applications to analyse different data sets.
4. Develop spark applications to analyse different data sets.
5. Execute applications to demonstrate the usage of various commands supported by pig Latin.

Text Books:

1. Tom White, Hadoop: The Definitive Guide, Third Edition, O'reilly Media, 2012.
2. Matei Zaharia, Bill Chambers, Spark: The Definitive Guide - Big Data Processing Made Simple (Greyscale Indian Edition) Paperback – 1 January 2018

Course Outcomes (COs):

At the end of the course, the student should be able to:

1. Understand Hadoop HDFS file manipulation commands. (PO 1,2,3,5,9,10,11;12 PSO 1,3)
2. Develop and execute Hadoop Map reduce applications and Apache spark applications to analyse the given data set. (PO 1,2,3,5,9,10,11,12 PSO 1,3)
3. Develop and execute pig Latin scripts to analyse the given data. (PO 1,2,3,5,9,10,11,12 PSO 1,3)

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks		
Assessment Tools	**Marks**	**Course Outcomes (COs)addressed**
Lab Test-I	10	CO1, CO2
Lab Test-II	10	CO3
Weekly Evaluation+Lab Record	30	CO1, CO2, CO3
The Final CIE out of 50 Marks = Marks of Lab Record + Marks scored in Lab Test-I + Marks scored in Lab Test-II		
Semester End Examination (SEE)	50	CO1, CO2, CO3

PRINCIPLES OF CRYPTOGRAPHY	
Course Code: CIE632	**Credits: 3:0:0**
Prerequisites: Nil	**Contact Hours: 42L**
Course Coordinator/s: Ms. Pallavi T P	

Course Contents

Unit I

Introduction: Security Goals, Attacks, Services and Mechanism, Techniques.
Mathematics of Cryptography: Integer Arithmetic, Modular Arithmetic, Matrices, Linear Congruence.

- Pedagogy / Course delivery tools: Chalk and talk, Powerpoint presentation.

Unit II

Traditional Symmetric-Key Ciphers: Introduction, Substitution Ciphers, Transposition Ciphers, Stream and Block Ciphers. **Data Encryption Standard (DES):** Introduction, DES Structure, DES Analysis, Multiple DES, Security of DES.

- Pedagogy / Course delivery tools: Chalk and talk, Powerpoint presentation.

Unit III

Advanced Encryption Standard: Introduction, Transformations, Key Expansion, The AES Ciphers, Examples, Analysis of AES.
Asymmetric Key Cryptography: Introduction, RSA Cryptosystem, Rabin Cryptosystem, Elgamal Cryptosystem.

- Pedagogy / Course delivery tools: Chalk and talk, Powerpoint presentation.

Unit IV

Message authentication: Authentication Requirements, Authentication Functions, Message Authentication Codes.
Digital signatures: Digital Signatures, NIST Digital Signature Algorithm.
Key management and distribution: Distribution of public keys, X.509 certificates.

- Pedagogy / Course delivery tools: Chalk and talk, Powerpoint presentation.

Unit V

System security: Intruders, Intrusion detection. Malicious Software: Types of Malicious Software, Viruses. **Firewalls:** The Need for Firewalls, Firewall Characteristic, Types of Firewalls.

- Pedagogy / Course delivery tools: Chalk and talk, Powerpoint presentation.

Text Books:

1. Behrouz A. Forouzan, Debdeep Mukhopadhyay, Cryptography and Network Security, Tata McGraw-Hill, 3rd Edition, 2015.
2. William Stallings, Cryptography and Network Security, Pearson Education, 7th Edition, 2018.

References Books:

1. Bernard Menezes, Cryptography, Network Security and Cyber Laws, Cengage Learning, First edition, 2018.
2. Atul Kahate, Cryptography and Network Security, 4th Edition, Tata McGraw Hill, 2019.
3. William Stallings, Network Security Essentials: Applications and Standards by, 6th edition, Pearson Education, 2018.

Video Lectures (e-Resources):

- https://a.impartus.com/ilc/#/course/2582489/1205

Course Outcomes (COs):

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

1. Identify security goals, attacks, services and mechanism techniques. (PO 1,2,3 PSO 2).
2. Apply Symmetric Cryptographic techniques depending on the need and security threat perception (PO 1,2,3,5 PSO 2).
3. Illustrate the Symmetric and Asymmetric algorithms. (PO 1,2,3 PSO 2).
4. Summarize the fundamentals of Key Management and Distribution (PO 1,2,3 PSO 2).
5. Understanding the needs of system security in cryptography. (PO 1,2,3 PSO 2).

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks		
Assessment Tool	**Marks**	**Course outcomes addressed**
Internal test-I	30	CO1, CO2, CO3
Internal test-II	30	CO3, CO4, CO5
The average of two internal tests shall be taken for 30 marks.		
Other components		
Assignment 1	10	CO1, CO2, CO3
Assignment 2	10	CO1, CO2, CO3, CO4, CO5
Semester End Examination (SEE)	100	CO1, CO2, CO3, CO4, CO5

CLOUD COMPUTING	
Course Code: CIE641	Credits: 3:0:0
Prerequisites: Nil	Contact Hours: 42L
Course Coordinator/s: Mr. Anil	

Course Contents

Unit I

Introduction: Network centric computing and network centric content, Peer-to-peer systems, Cloud Computing, Cloud Computing delivery models & Services, Ethical issues, Cloud vulnerabilities, Challenges. Cloud Infrastructure: Amazon, Google, Azure & online services, open source private clouds. Storage diversity and vendor lock-in, intercloud, Energy use & ecological impact of data centers, service level and compliance level agreement, Responsibility sharing, user experience, Software licensing.

Unit II

Cloud Computing: Applications & Paradigms, Challenges, existing and new application opportunities, Architectural styles of cloud applications, Workflows: Coordination of multiple activities, Coordination based on a state machine model – the ZooKeeper, The MapReduce programming model, A case study: the GrepTheWeb application, Clouds for science and engineering, High performance computing on a cloud, cloud computing for biological research, Social computing, digital content, and cloud computing.

Unit III

Cloud Resource Virtualization: Virtualization, Layering and virtualization, Virtual machine monitors, Virtual machines, Performance and security isolation, Full virtualization and paravirtualization, Hardware support for virtualization, Case study: Xen -a VMM based on paravirtualization, Optimization of network virtualization in Xen 2.0, vBlades -paravirtualization targeting a x86-64 Itanium processor, A performance comparison of virtual machines, The darker side of virtualization, Software fault isolation.

Unit IV

Cloud Resource Management and Scheduling: Policies and mechanisms for resource management, Applications of control theory to task scheduling on a cloud, Stability of a two-level resource allocation architecture, Feedback control based on dynamic thresholds, Coordination of specialized autonomic performance managers, A utility-based model for cloud-based web services, Resource bundling, combinatorial auctions for cloud resources, Scheduling algorithms for computing clouds, fair queuing, Start time fair queuing, Cloud scheduling subject to deadlines, Scheduling mapreduce applications subject to deadlines.

Unit V

Storage systems: Storage models, file systems, databases, DFS, General parallel File system, GFS, Apache Hadoop, Locks & Chubby, TPS & NOSQL databases, Bigdata, Mega store. Cloud security: Risks, Security, privacy and privacy impacts assessments, Trust, VM Security, Security of virtualization, Security risks in shared images.

Text Book:

1. Dan Marinescu, Cloud Computing: Theory and Practice, 1st edition, MK Publishers, 2013.

References Books:

1. Kai Hwang, Jack Dongarra, Geoffrey Fox, Distributed and Cloud Computing, From Parallel Processing to the Internet of Things, 1st edition, MK Publishers, 2012.
2. Anthony T. Velte, Toby J. Velete, Robert Elsenpeter, Cloud Computing: A Practical Approach, Tata McGraw Hill, 2010.

Course Outcomes (COs):

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

1. Apply the concepts of cloud delivery models and services. (PO 1,2,3,5,7 PSO 2,3)
2. Build various cloud-based applications. (PO 1,2,3,5,7,9,10,12 PSO 2,3)
3. Illustrate different cloud resource virtualization strategies with case studies. (PO 1,2,7 PSO 2,3)
4. Describe cloud resource management and scheduling policies (PO 1,2,7 PSO 2,3)
5. Create cloud instances by applying storage models and security aspects. (PO 1,2,3,5,7,9,10, 12 PSO 2,3)

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks		
Assessment Tool	**Marks**	**Course outcomes addressed**
Internal test-I	30	CO1, CO2, CO3
Internal test-II	30	CO3, CO4, CO5
The average of two internal tests shall be taken for 30 marks.		
Other components		
Programming Assignment	10	CO1, CO2, CO3
Case Study	10	CO3, CO4, CO5
Semester End Examination (SEE)	100	CO1, CO2, CO3, CO4, CO5