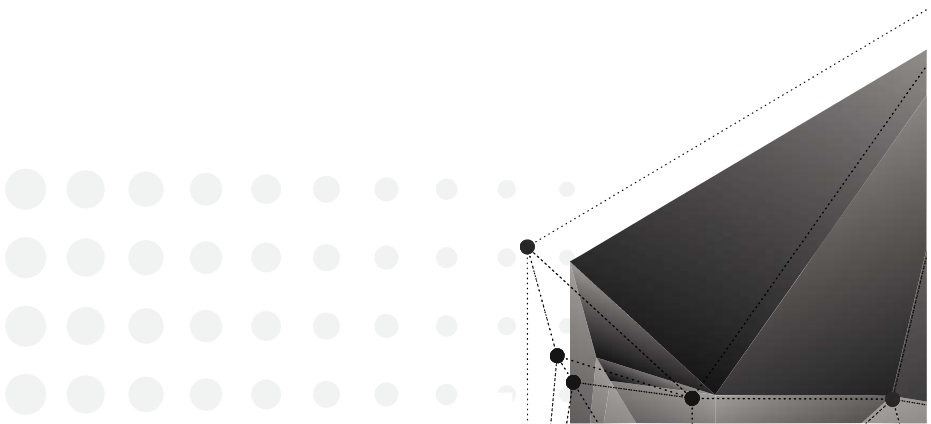


SIXTH SEMESTER
'CLOUD COMPUTING
&
BIG DATA'



BIG DATA ANALYTICS

Course Code:	436005
Course Title	Big Data Analytics
No. of Credits	10 (TH:8,T:0,P:4)

COURSE OUTCOMES: On completion of this course the Students will be able to:

1. Comprehend the concepts and significance of big data analytics, and recognizing the key roles in the Big Data Ecosystem.
2. Demonstrate proficiency in the data analytics life cycle, including the discovery, data preparation, model planning, model building, results communication, and operationalization phases.
3. Apply basic and advanced analytics methods in various real-world scenarios.
4. Utilize clustering, association rules, regression, time series analysis, and text analysis methods for advanced analytical tasks and problem-solving.
5. Understand the challenges and use cases of text analytics in big data, integrating unstructured data with structured data for comprehensive analysis.
6. Familiarize themselves with text analytics tools specifically designed for big data applications, enabling efficient and effective analysis of unstructured data.

COURSE CONTENTS

Unit -1 : Introduction to Big Data Analytics

- 1.1 Big Data Overview
- 1.2 State of the practice in analytics
- 1.3 Key Roles for the New Big Data Ecosystem
- 1.4 Examples of Big Data Analytics

Unit - 2 : Data Analytics Lifecycle (Basic overview only)

- 2.1 Overview
- 2.2 Phase 1: Discovery
- 2.3 Phase 2: Data Preparation
- 2.4 Phase 3: Model Planning
- 2.5 Phase 4: Model Building
- 2.6 Phase 5: Communicate Results
- 2.7 Phase 6: Operationalize

Unit - 3 : Data Analytics Methods

- 3.1 Need of data analytics
- 3.2 Types of data analytics methods
- 3.3 Big Data Analytics Examples
- 3.4 Big Data Analytics Solutions

Unit 4: Advance Analytical Methods

- 4.1 Overview of Clustering
- 4.2 Overview of Association Rules
- 4.3 Overview of Text Analysis

PRACTICAL OUTCOMES: By the end of the, the student will be able to:

1. Effectively handle and analyse large datasets using big data tools and techniques, including Hadoop and MapReduce.
2. Apply data preprocessing methods for cleaning and preparing big data for analysis.
3. Implement clustering, classification, and association rules mining algorithms for data segmentation, prediction, and pattern discovery.
4. Perform time series analysis and sentiment analysis on big data to derive meaningful insights from temporal and unstructured data.
5. Utilize real-time stream processing with Apache Kafka and Spark Streaming to analyze and visualize streaming data.

List of Practical:

1. Explore a large dataset and analyse its characteristics.
2. Handle missing values, duplicates, and outliers in a big dataset using data preprocessing techniques.
3. Set up a Hadoop cluster and implement a basic MapReduce job.
4. Apply K-means clustering algorithm to a large dataset.
5. Implement a classification algorithm (e.g., Decision Trees, Random Forest) on big data.
6. Apply Apriori algorithm on a big transactional dataset for association rules mining.
7. Perform time series analysis on big data with various techniques.
8. Implement sentiment analysis on unstructured text data.
9. Set up an Apache Kafka cluster and use Spark Streaming for real-time stream processing.
10. Deploy a big data analytics application on a cloud platform (e.g., AWS, Azure) and compare its performance.

REFERENCES:

1. "Big Data: A Revolution That Will Transform How We Live, Work, and Think" by Viktor Mayer-Schönberger and Kenneth Cukier
2. "Hadoop: The Definitive Guide" by Tom White
3. "Data Science for Business" by Foster Provost and Tom Fawcett
4. "Python for Data Analysis" by Wes McKinney
5. "Mining of Massive Datasets" by Jure Leskovec, Anand Rajaraman, and Jeffrey D. Ullman
6. "Big Data Analytics: Turning Big Data into Big Money" by Frank J. Ohlhorst

References :

1. Big Data for dummies- Judith S. Hurwitz, Alan F. Nugent, Dr. Fern Halper and Marcia A. Kaufman
2. Data Science and Big Data Analytics -David Dietrich, Barry Heller, Beibei Yang

**‘Open Elective 1-1’
DEEP LEARNING**

Course Code:	436001
Course Title	Deep Learning
No. of Credits	6 (TH:6,T:0,P:0)

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

1. Demonstrate a solid understanding of the basics of artificial neural networks, including the structure of neural networks and their functional units for pattern recognition tasks.
2. Apply feedforward neural networks, specifically multilayer feedforward neural networks (MLFFNNs), & effectively use the perceptron.
3. Utilize backpropagation learning and empirical risk minimization to train neural networks, including deep neural networks (DNNs).
4. Comprehend the architecture and working principles of Convolutional Neural Networks (CNNs).
5. Employ Recurrent Neural Networks (RNNs) for various applications.

COURSE CONTENTS

1. Basics of Artificial Neural Networks (ANN):

Artificial neurons, Basic Structure of neural networks, Functional units of ANN.

2. Feedforward Neural Networks:

Concept of Perceptron, Basic Idea of Multilayer feedforward neural networks (MLFFNNs), Backpropagation learning Fundamental, Basic Principle of Empirical risk minimization.

3. Deep Neural Networks (DNNs):

Basics of DNN, Training Challenges in DNN, Optimization for training DNNs, Advancements in Optimization methods for neural networks.

4. Convolution Neural Networks (CNNs):

Introduction to CNN, Classification of CNN, Basic CNN architecture, Training methodology of a CNN.

5. Recurrent neural networks (RNNs):

Introduction to RNN, Classification of RNN, Brief Idea of Variation of RNNs, Basic RNN Architecture, Difference between RNN and Simple Neural Network, Advantages & Disadvantages of RNN.

6. Applications:

Applications in vision, speech and natural language processing.

Text Books:

1. Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep learning, In preparation for MIT Press, Available online: <http://www.deeplearningbook.org>, 2016

Reference Books :

1. S. Haykin, Neural Networks and Learning Machines , Prentice Hall of India, 2010
2. Satish Kumar, Neural Networks - A Class Room Approach, Second Edition, Tata McGraw-Hill, 2013
3. B. Yegnanarayana, Artificial Neural Networks, Prentice-Hall of India, 1999
4. C.M. Bishop, Pattern Recognition and Machine Learning, Springer, 2006

**‘Open Elective 1-2’
OPERATIONS RESEARCH**

Course Code:	436002
Course Title	Operations Research
No. of Credits	6 (TH:6,T:0,P:0)

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

1. Understand the formulation of Linear Programming (LP).
2. Analyze and Convert the problem into a mathematical model.
3. Understand and implement the transportation problems at workplace.
4. Understand sequencing to optimize the process time for n- job and m-machine.
5. Identify and select suitable methods for various games and apply the LP.

COURSE CONTENTS

Unit-I:

Development of operation research and its definition, characteristics & phases of scientific method, Type of models, General methods for solving operations research models.

Unit-II:

Allocation: Introduction to linear programming formulation (Basic idea only), Various analysis methods.

Unit-III:

Transportation problem, Unbalanced transportation problems, Degeneracy, Assignment problem, Formulation optimal solution.

Unit-IV:

Sequencing: Introduction, Terminology, notations and assumptions, Case study of problems with n-jobs and two machines, optimal sequence algorithm, Case study of problems with n-jobs and three machines.

Reference Books:

1. Operations Research: an introduction, Hamdy A. Taha, Pearson Education.
2. Operations. Research: theory and application, J.K. Sharma, Macmillan Publishers.
3. Introduction to Operations Research: concept and cases, Frederick S. Hillier and Gerald J. Lieberman, Tata McGraw-Hill

**‘Open Elective 2-1’
VIRTUAL REALITY**

Course Code:	436004
Course Title	Virtual Reality
No. of Credits	6 (TH:6,T:0,P:0)

COURSE OUTCOME: On successful completion of this course, the student should be able to:

1. Identify and examine the fundamental techniques for the deployment of VR and AR experiences.
2. Describe how VR and AR systems work. Choose, develop, explain, and defend the use of particular designs for AR and VR experiences.
3. Evaluate the benefits and drawbacks of specific AR and VR techniques on the human body.
4. Identify and examine state of the art AR and VR design problems and solutions from the industry and academia.

COURSE CONTENTS

1. Introduction :

Introduction to Augmented-Virtual and Mixed Reality, Technology and features of augmented reality, difference between AR ,VR and MR, Challenges with AR, AR systems and functionality, Visualization techniques for augmented reality.

2. VR Systems :

VR as a discipline, Basic features of VR systems, Basic Architecture of VR systems, Familiarization with VR input and output hardware (Basic idea only).

3. Stereoscopic Vision & Haptic rendering :

Fundamentals of the human visual system, Depth cues, Stereopsis, Retinal disparity, Haptic sense, Haptic devices.

4. 3D interaction techniques:

3D Manipulation tasks, Manipulation Techniques and Input Devices, Elementary Interaction Techniques for 3D Manipulation.

5. Application of VR in Digital Entertainment:

VR Technology in Film & TV Production. VR Technology in Physical Exercises and Games. Demonstration of Digital Entertainment by VR.

e-Resources :

<http://msl.cs.uiuc.edu/vr/>

Text & Reference Books:

1. George Mather, Foundations of Sensation and Perception: Psychology Press; 2 edition, 2009.
2. The VR Book: Human-Centered Design for Virtual Reality, by Jason Jerald
3. Learning Virtual Reality by Tony Parisi, O'Reilly
4. Burdea, G. C. and P. Coffet. Virtual Reality Technology, Second Edition. Wiley-IEEE Press, 2003/2006.
5. Alan B. Craig, Understanding Augmented Reality, Concepts and Applications, Morgan Kaufmann, 2013.
6. Alan Craig, William Sherman and Jeffrey Will, Developing Virtual Reality Applications, Foundations of Effective Design, Morgan Kaufmann, 2009.

**‘Open Elective 2-2’
ROBOTICS**

Course Code:	516001
Course Title	Robotics
No. of Credits	6 (TH:6,T:0,P:0)

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

1. Understand the fundamentals of robotics, including the anatomy and working of robots, different robot components and the classification of robots.
2. Gain knowledge about robotic drive systems and controllers, learn how to program controllers for point-to-point and continuous path control.
3. Familiarize with machine vision principles & applications, including different types of sensors and use of cameras for inspection, identification, navigation, and serving.
4. Acquire proficiency in robot kinematics including forward and inverse kinematics & understand the differences between them. Learn to solve problems related to manipulators with two degrees of freedom in 2-dimensional space.
5. Gain practical skills in robot programming, including teach pendant programming, lead - through programming, and the use of robot programming languages. Learn to execute motion commands, sensor commands, end effector commands, and create simple programs.
6. Explore industrial applications of robots in machining, welding, assembly, and material handling, understanding their role & significance in modern manufacturing processes.

COURSE CONTENTS

Unit - 1: Fundamentals of Robotics

- Introduction; Definition; Robot anatomy (parts) and its working;
- Robot Components: Manipulator, End effectors; Construction of links, Types of joints;
- Classification of robots;
- Structural Characteristics of robots; Mechanical rigidity; Effects of structure on control work envelope and work Volume;
- Robot work Volumes, comparison; Advantages and disadvantages of robots;

Unit - 2 : Robotic Drive System and Controller

- Conversion between linear and rotary motion;
- Feedback devices; Potentiometers; Optical encoders; DC tachometers; Robot controller;
- Microprocessor based control system;
- Robot path control: Point to point, Continuous path control and Sensor based path control (Basic overview);
- Fundamentals of controller programming;

Unit - 3 : Machine Vision

- Principles and Applications of the following types of sensors related to robots: Position sensors (Encoders, Resolvers, Piezo Electric);
- Range sensors (Triangulation Principle, Structured lighting approach); Proximity sensing;
- Introduction to Machine Vision: Robot vision system (scanning and digitizing image data);

- Image processing and analysis; Cameras (Acquisition of images); Videocon camera (Working principle & construction);
- Applications of Robot vision system: Inspection, Identification, Navigation & serving.

Unit- 4 : Robot Kinematics and Robot Programming

- Forward Kinematics; Inverse Kinematics and Differences;
- Basics of Robot programming; Motion Commands;
- Sensor Commands; End effector commands; and Simple programs

Unit - 5 : Industrial Application Of Robots

- Application of robots in machining; welding; assembly and material handling.

Reference Books:

1. Introduction to Robotics: Analysis, Systems, Applications – Saeed B. Niku, Pearson Education Inc. New Delhi 2006.
2. Industrial Robotics: Technology, Programming and Applications – M.P. Groover, Tata McGraw Hill Co, 2001.
3. Robotics Control, Sensing, Vision and Intelligence – Fu.K.S. Gonzalz.R.C and Lee C.S.G, McGraw Hill Book Co, 1987.
3. Robotics for Engineers – Yoram Koren, McGraw Hill Book Co, 1992.
4. A Text book on Industrial Robotics – Ganesh S. Hedge, Laxmi Publications Pvt. Ltd., New Delhi, 2008.
5. Robotics Technology and Flexible Automation – S.R. Deb & Sankha Deb, Tata McGraw-Hill, 2010.
6. Elements of Robotics Process Automation, Mukherjee, Khanna Publishing House, Delhi, 2018

**‘Program Elective 1-1’
CLOUD SECURITY**

Course Code:	516002
Course Title	Cloud Security
No. of Credits	6 (TH:6,T:0,P:0)

Course Outcomes: Upon completion of the course students will be able to:

1. Understand the security challenges in cloud computing.
2. Learn techniques for securing cloud infrastructure, data, and applications.
3. Implement security measures to protect cloud - based systems from unauthorized access and attacks.
4. Evaluate and select appropriate security controls and solutions for different cloud deployments.
5. Get appropriate knowledge of configuring and managing security tools for cloud environments.
6. Apply best practices for cloud security governance and compliance.

COURSE CONTENTS

Unit -1: Introduction to Cloud Computing and Security

- Overview of cloud computing architecture & service models, Cloud security challenges and risks.
- Cloud service provider's responsibilities.
- Security as a service.

Unit -2: Cloud Security Concepts and Threats

- Identity and access management (IAM) in the cloud.
- Data security and encryption techniques.
- Network security in cloud environments.
- Virtualization security, Web application security.

Unit 3: Cloud Security Controls and Solutions

- Introduction of Cloud firewall & intrusion detection/prevention systems.
- Security information and event management (SIEM) for cloud monitoring.
- Cloud access security brokers (CASBs).
- Cloud encryption and tokenization techniques.

Unit -4: Cloud Security Governance

- Cloud security policies and standards.
- Legal and regulatory considerations in cloud security.

Unit -5: Incident Response and Cloud Forensics

- Incident response in cloud environments.
- Forensic challenges and techniques in the cloud.
- Digital evidence preservation and collection in the cloud.
- Cloud incident management and reporting.

Reference Books:

1. "Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance" by Tim Mather, Subra Kumaraswamy, and Shahed Latif
2. "CCSP (ISC)2 Certified Cloud Security Professional Official Study Guide" by Ben Malisow and Dan Hubbard
3. "Cloud Security and Governance: Who's on Your Cloud?" by Christophe Veltsos
4. "Cloud Computing Security: Foundations and Challenges" by John Vacca
5. "Cloud Security and Management: An Enterprise Risk Approach" by Kavian N. Irani and Behzad Behtash
6. "Cloud Security: A Comprehensive Guide to Secure Cloud Computing" by Ronald L. Krutz and Russell Dean Vines
7. "Cloud Computing and Security: Second International Conference, ICCCS 2016, Nanjing, China" by Fugang Li, Dongqing Xie, and Wei Zhou (Eds.)
8. "Cloud Computing Security: Issues and Solutions" by Steven Furnell and Natalie Janicke

**‘Program Elective 1-2’
NETWORK FORENSICS**

Course Code:	496004
Course Title	Network Forensics
No. of Credits	6 (TH:6,T:0,P:0)

COURSE OUTCOMES: Upon completion of the course students will be able to:

1. Understand the fundamentals of network forensics and its role in investigating cyber incidents.
2. Familiarize with various network forensic tools and techniques for capturing and analyzing network traffic.
3. Gain proficiency in using tools like Wireshark, TCP Dump, Syslog, NMS, etc., for network data examination.
4. Learn to interpret and analyze data link and network layer logs to identify suspicious activities.
5. Develop skills in auditing server logs, user activities, and application logs for forensic analysis.
6. Identify the limitations and challenges of network forensics, including encryption, spoofing, and privacy laws.
7. Apply knowledge gained in real-world scenarios to investigate and solve network security incidents.
8. Improve critical thinking and problem-solving abilities related to network forensics investigations.

COURSE CONTENTS

Unit - 1 : Introduction to Network Forensics

- 1.1 Review of Networking Concepts and Protocols
- 1.2 Introduction to Network Forensics
- 1.3 Various Aspects of Network Forensics

Unit - 2 : Network Forensic Tools and Techniques

- 2.1 Introduction to Network Forensic Tools and Techniques
- 2.2 Wireshark
- 2.3 TCP Dump
- 2.4 Syslog
- 2.5 NMS (Network Management System)
- 2.6 Promiscuous Mode
- 2.7 Network Port Mirroring
- 2.8 Snooping
- 2.9 Scanning Tools

Unit - 3 : Data Link Layer Examination

- 3.1 Understanding and Examining Data Link Layer
 - 3.1.1 Physical Layer
 - 3.1.2 Ethernet Switch Logs
 - 3.1.3 MAC Table
 - 3.1.4 ARP Table, etc.

Unit - 4 : Network Layer Examination

- 4.1 Understanding and Examining Network Layer
- 4.2 Router Logs
- 4.3 WiFi Device Logs
- 4.4 Firewall Logs

Unit - 5 : OS and Application Audit

- 5.1 Understanding Audit Features of OS and Applications
- 5.2 Enabling and Examining Server Logs
- 5.3 User Activity Logs
- 5.4 Browser History Analysis
- 5.5 Proxy Server Logs
- 5.6 Antivirus Logs
- 5.7 Email Logs

Unit-6: Limitations and Challenges in Network Forensics

- 6.1 Encryption and its Impact on Network Forensics
- 6.2 Spoofing and its Implications for Network Forensics
- 6.3 Mobility Challenges in Network Forensics
- 6.4 Storage Limitations in Network Forensics
- 6.5 Privacy Laws and Their Impact on Network Forensics

Reference Books :

1. Manuals of OS, application software, network devices
2. RFCs of various networking protocols (<https://www.ietf.org/>)
3. <https://www.sans.org/>
4. <https://www.cert-in.org.in/>
5. Handbook of Digital Forensics and Investigation, Eoghan Casey, Elsevier Academic Press
6. Cyber Forensics, Albert Marcella and Doug Menendez, CRC Press
7. Computer Forensics (5 volume Set) mapping to CHFI (Certified Hacking Forensics Investigator), by EC-Council

**‘AUDIT COURSE’
INDIAN CONSTITUTION**

Course Code:	AS601
Course Title	Indian Constitution (Audit Course)
No. of Credits	0 (TH:2,T:0,P:0)

COURSE OUTCOMES: After completion of the course the students are able to:

1. Understand the historical background and significance of the Indian Constitution, including the process of its making and the principles enshrined in it.
2. Analyze and interpret key elements of the Constitution.
3. Describe the structure and functioning of the Union Government.
4. Explain the roles and powers of the State Government.
5. Examine the structure and responsibilities of local administration, such as District Administration, Municipal Corporations, and Zila Panchayats.
6. Understand the role and functioning of the Election Commission.

COURSE CONTENTS

1. The Constitution :

- 1.1 Introduction
- 1.2 The History of the Making of the Indian Constitution
- 1.3 Preamble & the Basic Structure.
- 1.4 Fundamental Rights & Duties.
- 1.5 Directive Principles of State Policy (DPSP).

2. Union Government :

- 2.1 Structure of the Indian Union
- 2.2 President– Role and Power
- 2.3 Prime Minister and Council of Ministers
- 2.4 Lok Sabha and Rajya Sabha

3. State Government :

- 3.1 Governor– Role and Power
- 3.2 Chief Minister and Council of Ministers

4. Local Administration :

- 4.1 District Administration
- 4.2 Municipal Corporation
- 4.3 Zila Panchayat

5. Election Commission :

- 5.1 Composition, Role and Functioning of:
 - 5.1.1 Chief Election Commission
 - 5.1.2 State Election Commission

Suggested Learning Resources :

1. Ethics and Politics of the Indian Constitution, Rajeev Bhargava, Oxford University Press, New Delhi,
2. The Constitution of India, B.L. Fadia, Sahitya Bhawan; New edition (2017)
3. Introduction to the Constitution of India, D.D. Basu, Lexis Nexis; Twenty-Third 2018 edition

Suggested Software / Learning Websites :

1. <https://www.constitution.org/cons/india/const.html>
2. <http://www.legislative.gov.in/constitution-of-india>
3. <https://www.sci.gov.in/constitution>
4. <https://www.toppr.com/guides/civics/the-indian-constitution/the-constitution-of-india/>

ENTREPRENEURSHIP AND START-UPS **(Common in all branches of Engineering)**

Course Code:	AS602
Course Title	Entrepreneurship and Start-ups
No. of Credits	4 (TH:4,T:0,P:0)

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

1. Develop an understanding of the concept of entrepreneurship and its relevance in the engineering field, including the importance of creativity, innovation, and problem-solving.
2. Generate and evaluate entrepreneurial ideas, identifying market opportunities and target customers, and assessing the feasibility of a start-up venture.
3. Create a comprehensive business plan and formulate effective strategies for a start-up venture, encompassing marketing, operations, finance, and growth.
4. Comprehend the legal and regulatory considerations involved in establishing and operating a business, ensuring compliance and mitigating legal risks.
5. Design and implement marketing and sales strategies to effectively position and promote the start-up, considering market segmentation, branding, and customer acquisition.
6. Apply financial management principles to plan and manage the financial aspects of a start-up, including budgeting, financial forecasting, and resource allocation.

COURSE CONTENTS

1. Introduction to Entrepreneurship

- Concept of entrepreneurship
- Importance of entrepreneurship in the engineering field
- Traits and characteristics of successful entrepreneurs

2. Ideation and Opportunity Identification

- Generating entrepreneurial ideas
- Evaluating market opportunities
- Conducting market research and feasibility analysis
- Identifying target customers and their needs

3. Business Planning and Strategy

- Business objectives and goals
- Need of Business plan
- Formulating business strategies
- Assessing risk and managing uncertainty

4. Legal and Regulatory Considerations

- Legal forms of business entities
- Compliance with regulations and licenses
- Contracts and agreements in entrepreneurship

5. Marketing and Sales Strategies

- Need of marketing plan
- Methods for marketing
- Pricing strategies
- Sales and distribution

6. Financial Management for Start-ups

- Financial planning and budgeting
- Funding sources and raising capital

7. Operations and Supply Chain Management

- Designing efficient operations processes
- Supply chain management for start-ups
- Quality management and control
- Logistics and inventory management

8. Human Resource Management

- Leadership and organizational culture
- Performance management and motivation

9. Entrepreneurial Mindset and Growth

- Nurturing creativity and innovation
- Overcoming challenges and failures

Reference Books:

1. "The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses" by Eric Ries
2. "The Startup Owner's Manual: The Step-By-Step Guide for Building a Great Company" by Steve Blank and Bob Dorf
3. "Disciplined Entrepreneurship: 24 Steps to a Successful Startup" by Bill Aulet
4. "Zero to One: Notes on Startups, or How to Build the Future" by Peter Thiel and Blake Masters
5. "The Art of Startup Fundraising: Pitching Investors, Negotiating the Deal, and Everything Else Entrepreneurs Need to Know" by Alejandro Cremades
6. "Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers" by Alexander Osterwalder and Yves Pigneur
7. "Venture Deals: Be Smarter Than Your Lawyer and Venture Capitalist" by Brad Feld and Jason Mendelson
8. "The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail" by Clayton M. Christensen
9. "Founders at Work: Stories of Startups' Early Days" by Jessica Livingston.
10. "Start with Why: How Great Leaders Inspire Everyone to Take Action" by Simon Sinek.

MAJOR PROJECT-II

Course Code:	AS603
Course Title	Major Project - II
No. of Credits	3 (TH:0,T:0,P:6)

Introduction : Major Project-II represents the pinnacle of the diploma program, where students demonstrate their acquired knowledge and skills through the execution of a practical project. This capstone experience focuses on project implementation, problem-solving, data analysis, and effective communication. It challenges students to tackle real-world issues and apply their learning to find innovative solutions. Major Project-II nurtures responsibility, autonomy, and professionalism, preparing students for a successful transition into their future careers.

1. Project Execution (20%):

- Successful implementation of the project plan, adhering to the approved methodology.
- Demonstrating practical skills, technical knowledge, and attention to detail during project execution.

2. Regular Monitoring (10%):

- Providing periodic progress updates to project advisors and faculty mentors, showcasing responsibility and timely communication.
- Ability to adapt and make necessary adjustments to the project timeline as needed.

3. Data Analysis (15%):

- Applying appropriate techniques and tools to analyze collected data.
- Deriving meaningful insights and drawing well-supported conclusions.

4. Problem-Solving (15%):

- Identifying and addressing challenges and hurdles encountered during project execution.
- Demonstrating innovative thinking and resourcefulness in problem-solving.

5. Report Writing (15%):

- Preparing a comprehensive project report with a well-structured and organized presentation of the project journey.
- Clearly explaining the methodology, findings, and conclusions in a coherent manner.

6. Presentation (15%):

- Delivering a compelling and engaging project presentation to a panel of faculty members & experts.
- Demonstrating effective communication skills and confidence during the project defense.

7. Final Evaluation (10%):

- Punctuality and adherence to project deadlines.
- Demonstrating initiative and taking ownership of the project.
- Overall professionalism and commitment exhibited throughout the project.

Conclusion: Major Project-II serves as a significant milestone in the academic journey of diploma students. By incorporating marks distribution, the evaluation becomes more transparent, allowing students to understand the weighting of each aspect. Through project execution, problem-solving, data analysis, and effective communication, students will not only showcase their academic prowess but also their readiness to embrace real-world challenges. This capstone experience equips students with the skills and confidence needed to thrive in their chosen professions, paving the way for a successful and rewarding future.

SEMINAR

Course Code:	AS604
Course Title	Seminar
No. of Credits	1 (TH:2,T:0,P:0)

Guidelines for Seminar Presentation:

1. Topic Selection:

Choose a topic that is relevant to the field of gaming and animation, and that interests both the speaker & the audience. Consider emerging trends, technological advancements, or specific areas of expertise within the industry.

2. Research and Information Gathering:

Conduct thorough research on your chosen topic to gather relevant information, statistics, case studies, and examples. Utilize reputable sources such as academic journals, industry publications, and credible websites to ensure the accuracy of information gathered.

3. Presentation Structure:

Organize your seminar presentation into clear sections, including an introduction, main content, and conclusion. Use headings, sub-headings, and bullet points to help the audience follow your presentation easily.

4. Audience Engagement:

Incorporate interactive elements into your presentation to keep the audience engaged. This may include questions, quizzes, demonstrations, or multimedia components such as videos, images, or animations related to your topic.

5. Visual Support:

Create visually appealing slides to support your presentation. Use a clear and readable font, include relevant visuals, and avoid overcrowding slides with excessive texts. Visuals should be used to enhance understanding and highlight key points.

6. Explanation of Technical Concepts:

If your topic involves technical concepts or terminology, explain them in simple and concise terms. Use analogies or real-life examples to help the audience grasp complex ideas.

7. Use of Examples and Case Studies:

Include real-world examples or case studies to illustrate the application of concepts or technologies in the relevant. This will help the audience connect theory to practice and understand the practical implications of your topic.

8. Delivery and Rehearsal:

Practice your presentation multiple times to ensure a smooth and confident delivery. Time yourself to ensure that your presentation fits within the allotted time. Rehearsing will help you become familiar with the content and enhance your overall presentation skills.

9. Q & A and Discussion:

Reserve time at the end of your presentation for questions and discussion. Encourage the audience to ask questions or share their thoughts. Be prepared to answer questions and engage in meaningful dialogue with audience related to the selected topic.

10. Professionalism and Enthusiasm:

Dress appropriately for the occasion and maintain a confident and professional demeanor throughout your presentation. Maintain eye contact with the audience, speak clearly and audibly, and exhibit enthusiasm for your topic.

Evaluation Strategy: The performance of Seminar should be evaluated on the basis of following criteria:

S.N.	Evaluation Parameter	Weightage (%)
1.	Relevance of Topic	10
2.	Content Selection	20
3.	Presentation & Communication Skills	15
4.	Audience Engagement	10
5.	Explanation of Technical Concepts	20
6.	Use of Examples and Case Studies	10
7.	Q&A and Discussion	15
	Total	100

Remember, seminars are not just about sharing information but also about connecting with the audience and creating a memorable experience. Tailor your seminar presentation to cater to the interests and knowledge level of the audience, and aim to inspire and educate them about the concerned technology or topic.
