

## ADVANCED LEARNERS ONE CREDIT COURSE GUIDELINES

### 1. Eligibility and Registration:

- ❖ Students may register for ALOCC for a minimum of one course per semester, provided it is offered during that semester.
- ❖ Students in their third, fourth and fifth semesters for undergraduate programs and in their second and third semesters for postgraduate programs are eligible to opt for ALOCC.
- ❖ To be eligible, students must have achieved a CGPA for more than 7.5 in completed semesters and must have no arrears.
- ❖ Students can enroll in any ALOCC COURSE offered by any department throughout the college.
- ❖ A maximum of three ALOCCs is allowed for undergraduate students and two ALOCCs for postgraduate students during their entire program of study.

### 2. Course Structure:

- ❖ These courses are purely self-study.
- ❖ Course instructors are available to assist with studying and to address any doubts.

### 3. Credit Requirements:

- ❖ One-credit courses are considered additional to the minimum credit requirements specified in the curriculum.
- ❖ Only one extra credit is awarded for each ALOCC.

### 4. Assessment:

- ❖ The Head of the Department may designate a faculty member as the course coordinator.
- ❖ Each one-credit course is worth 50 marks and will be evaluated through end-semester examination (ESE) assessment only.
- ❖ The question paper pattern and scheme will be determined by the course faculty and approved by the Board of Studies (BoS).
- ❖ The examination format (online or offline) will be decided by the concerned BoS based on the nature of the course.
- ❖ Students who fail in an ALOCC are not permitted to reappear for that course.
- ❖ Students who fail in an ALOCC are also not allowed to choose the ALOCC in the succeeding semester.
- ❖ Marks and grades will be included in the mark statement, in addition to the regular curriculum marks.
- ❖ The marks obtained will be converted into corresponding letter grade

<b>O</b> =90% & above	<b>A</b> =80-89%	<b>B</b> =70-79%
<b>C</b> =60-69%	<b>D</b> =50-59%	<b>E</b> =40-49%

- ❖ After completion of evaluation of the students the course teacher/co-coordinator must send a copy of grade to COE office through principal on or before the last working day of the semester. All the details pertaining to the course, like Registration, Attendance, Evaluation etc. must be maintained by the course teacher/coordinator for the future reference.

<b>ADVANCED LEARNER COURSES</b>		
<b>S. No.</b>	<b>Course Name</b>	<b>Page No.</b>
1.	5G Technology	3
2.	Approaches to research and advanced learning	5
3.	Artificial Intelligence	6
4.	Big data analytics	8
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6.	Creative writing in English	12
7.	Cyber security	14
8.	Design thinking for leaders	15
9.	Digital marketing (Commerce)	17
10.	Digital marketing (commerce PA)	19
11.	Econometrics	21
12.	Entrepreneurship	22
13.	Financial technology	24
14.	Forensic science	26
15.	Fundamentals of Fin Tech	28
16.	Goods and services tax	30
17.	,yf;fzKk; jkpo; fw;gpj;jy; KiwfSk;	31
18.	Innovation and IPR	33
19.	MongoDB	35
20.	PC Hardware and servicing	38
21.	Physics aptitude, text for JAM and JEST	40
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**GOBI ARTS & SCIENCE COLLEGE (Autonomous),  
GOBICHETTIPALAYAM.**

**DEPARTMENT OF INTERNET OF THINGS**

**ADVANCED LEARNERS COURSE**

**5G TECHNOLOGY**

**24ALOT01**

**Course Objective**

The course aims

- To provide a comprehensive understanding of the technical, business, and regulatory aspects of 5G mobile networks.
- To understand transition from 4G mobile technology towards the 5G network.
- To learn about mobile broadband Internet after 4G, the impact of IPv6 on 5G mobile networks, and the emergence of Internet of Things (IoT) services.
- To covers spectrum management for IMT (International Mobile Telecommunications).
- To develop the skills necessary to design, plan, and deploy 5G networks,

**Course Outcomes (CO)**

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

Knowledge Level	CO Number	Course Outcome
<b>K1, K2, K3 &amp; K4</b>	<b>CO1</b>	Understand the differences between 5G and previous generations of mobile networks
	<b>CO2</b>	Learn the basic concepts of 5G technology, including its architecture, protocols, and key components.
	<b>CO3</b>	Explore the underlying technologies powering 5G
	<b>CO4</b>	Learn about the ultra-low latency capabilities of 5G and its implications for applications
	<b>CO5</b>	Investigate the potential use cases and applications of 5G across various industries

**K1** – Remember; **K2** – Understanding; **K3** – Apply; **K4** – Analyze; **K5** – Evaluate

<b>SYLLABUS</b>		
Unit	Content	No. of Hours
<b>I</b>	<b>Overview of 5G Broadband Wireless Communications:</b> Evaluation of mobile technologies 1G to 4G (LTE, LTEA, LTEA Pro) , An Overview of 5G requirements, Regulations for 5G, Spectrum Analysis and Sharing for 5G.	
<b>II</b>	<b>The 5G wireless Propagation Channels:</b> Channel modeling requirements, propagation scenarios and challenges in the 5G modeling, Channel Models for mmWave MIMO Systems.	
<b>III</b>	<b>Transmission and Design Techniques for 5G:</b> Basic requirements of transmission over 5G, Modulation Techniques – Orthogonal frequency division multiplexing (OFDM), generalized frequency division multiplexing (GFDM), filter bank multi-carriers (FBMC) and universal filtered multi-carrier (UFMC), Multiple Accesses Techniques – orthogonal frequency division multiple accesses (OFDMA), generalized frequency division multiple accesses (GFDMA), non-orthogonal multiple accesses (NOMA).	

<b>IV</b>	Device-to-device (D2D) and machine-to-machine (M2M) type communications – Extension of 4G D2D standardization to 5G, radio resource management for mobile broadband D2D, multi-hop and multi-operator D2D communications.	
<b>V</b>	Millimeter-wave Communications – spectrum regulations, deployment scenarios, beam-forming, physical layer techniques, interference and mobility management, Massive MIMO propagation channel models, Channel Estimation in Massive MIMO, Massive MIMO with Imperfect CSI, Multi-Cell Massive MIMO, Pilot Contamination, Spatial Modulation (SM).	

### Text Book

1. Saro Velrajan, *An Introduction to 5G Wireless Networks : Technology, Concepts and Use-cases*, Notion Press, Edition 1, 2020.
2. Rajaneesh Sudhakar Shetty, *5G Mobile Core Network: Design, Deployment, Automation, and Testing Strategies*, Springer India, Edition 1, 2022.

### Reference Books:

1. Martin Sauter , *From GSM From GSM to LTE–Advanced Pro and 5G: An Introduction to Mobile Networks and Mobile Broadband*, Wiley-Blackwell, Edition 1, 2017
2. Afif Osseiran, Jose.F.Monserrat, Patrick Marsch, *Fundamentals of 5G Mobile Networks*, Cambridge University Press, Edition 1, 2016.
3. Athanasios G.Kanatos, Konstantina S.Nikita, Panagiotis Mathiopoulos, *New Directions in Wireless Communication Systems from Mobile to 5G*, CRC Press, Edition 1, 2017.

### E-references:

1. [https://sist.sathyabama.ac.in/sist\\_coursematerial/uploads/SECA3020.pdf](https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SECA3020.pdf)
2. [5G-Technology-in-India-A5-4.pdf \(nishithdesai.com\)](#)
3. [3g4g.co.uk/5G/5Gtech\\_0004\\_Beginners\\_5GforAbsoluteBeginnersCombined.pdf](#)

### Mapping with Programme Specific Outcomes

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	S	S	S	S	S
<b>CO2</b>	S	S	M	S	S
<b>CO3</b>	S	H	H	S	H
<b>CO4</b>	S	S	S	S	H
<b>CO5</b>	H	S	M	S	H

S - Strong; H - High; M - Medium; L - Low

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),  
GOBICHETTIPALAYAM.  
ADVANCED LEARNERS COURSE**

**DEPARTMENT Of BOTANY**

**APPROACHES TO RESEARCH AND ADVANCED LEARNING**

**24ALBO01**

**Course Objectives:**

To understand the fundamental of research

To strengthen the research aptitude of the students

To understand the importance of systematic approaches in research

**Course Outcomes:**

On the successful completion of the Course, the students will be able to

Comprehend the basics of research methodology

Choose method appropriate to research objectives

Demonstrate skills in data analysis and presentation

<b>Unit</b>	<b>Content</b>
<b>I</b>	Research Methods versus Methodology; Meaning, Objectives and Types of Research.
<b>II</b>	Identification of research problem; Broad literature survey; Identifying research gap; Hypothesis formulation.
<b>III</b>	Preparation of research design; Determining sample design; Data collection; Analysis of data.
<b>IV</b>	Hypothesis testing; Generalizations and interpretation.
<b>V</b>	Preparation of the report or presentation of the results (Outline only), Research ethics, plagiarism and impact of research.

**Reference Books:**

1. Sundar Rao P.S.S and Richard J (2011) Introduction to Biostatistics and Research Methods, PHI learning private Ltd, New Delhi.
2. Kothari C. R. (2004) Research methodology – Methods and Techniques, New Age International (P) Limited, Publishers, New Delhi
3. Dr. Shanti Bhushan Mishra and Dr. Shashi Alok, Handbook of Research Methodology - A Compendium for Scholars & Researchers (2017) Educreation Publishing.

**GOBI ARTS & SCIENCE COLLEGE (AUTONOMOUS)**  
**GOBICHETTIPALAYAM**  
**DEPARTMENT OF COMPUTER TECHNOLOGY**  
**ADVANCED LEARNERS COURSE**  
**ARTIFICIAL INTELLIGENCE**  
**24ALCT01**

The course aims to

- Understand the fundamentals of artificial intelligence and working of problem – solving agents.
- Understand the logical agents and knowledge representation using First Order Logic.
- Understand the concept of uncertainty and building principles of decision – making agents.

**Course Outcomes (CO)**

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

Knowledge Level	CO Number	Course Outcome
K1,K2,K3,K4	CO1	Demonstrate fundamentals of artificial intelligence (AI) and problem solving using different search methods
K1,K2,K3,K4	CO2	Describe about adversarial search and constraint satisfaction Problem solving.
K1,K2,K3,K4	CO3	Develop knowledge about logic representations for making inferences.
K1,K2,K3,K4	CO4	Demonstrate the decision-making techniques to handle uncertainty.
K1,K2,K3,K4	CO5	Apply AI principles to develop solutions and applications to Solve problems.

K1- Remember; K2-Understanding; K3- Apply; K4- Analyze; K5-Evaluate

**SYLLABUS**

Unit	Content	No. of Hours
I	Definitions of AI - Intelligent Agents: Agents and Environments – Structure of agents-Solving Problem by searching: Problem – solving agents – Heuristic Functions.	15
II	Adversarial search: Games – Optimal decisions in games – Alpha – beta pruning –Imperfect real time decisions. Constraint Satisfaction Problems (CSP): Defining CSP problems – Constraint Propagation: Inference in CSPs-Backtracking search for CSPs.	15
III	Logical agents: Knowledge - based agents – The Wumpus world. Logic – Propositional logic: A very simple logic-Propositional the reprovig. First order logic: Representation – Syntax and semantics of first order logic.	15
IV	Making Simple Decisions: Combining beliefs and desire under Uncertainty - Utility Theory - Utility Functions – Multi attribute utility functions-Quantifying uncertainty: Acting under uncertainty – Probability basics*– Bayes’ Rule and its use –Decision networks- The value of information –Decision the oretic expert systems.	15

V	<b>AIAPPLICATIONS: Natural Language Processing: Introduction –Speech Recognition – Expert Systems- AI Application*.</b>	15
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<\*-Self study>

**Text Books:**

1. Stuart Russell, Peter Norvig, “Artificial Intelligence – A Modern Approach”, 3rd Edition, Pearson Education /PrenticeHallofIndia,2015. [UNITI–IV].
2. ElaineRich,KevinKnight,Shivashankar.B.Nair,“ArtificialIntelligence”, Tata McGraw Hill, Third Edition, 2009. [UNIT- V].

**Reference Books:**

1. Nils J.Nilsson, “Artificial Intelligence: Anew Synthesis”, Harcourt Asia Pvt. Ltd., 2000.
2. George F.Luger, “Artificial Intelligence- Structures and Strategies For Complex Problem Solving”, Pearson Education/PHI, 2002.
3. David L.Poole, Alan K.Mackworth, “Artificia lIntelligence: Foundations of Computational Agents”, Cambridge University Press, 2010.

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),  
GOBICHETTIPALAYAM.  
DEPARTMENT OF INFORMATION TECHNOLOGY  
ADVANCED LEARNERS COURSE  
BIG DATA ANALYTICS  
24ALIT01**

**Course Objective**

This course aims to

- Learn the types of big data and the importance of Big Data Analytics
- Understand the concepts included in Hadoop and MongoDB.
- Understand the concepts included in Cassandra and Hive.

**Course Outcomes (CO)**

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

Knowledge Level	CO Number	Course Outcome
K1, K2,K3,K4	CO1	Get good knowledge types of digital data.
K1, K2,K3,K4	CO2	Understand about uses of Hadoop in Big Data Analytics
K1, K2,K3,K4	CO3	Understand about uses of MongoDB in Big Data Analytics
K1, K2,K3,K4	CO4	Understand about uses of Cassandra in Big Data Analytics
K1, K2,K3,K4	CO5	Understand about uses of Hive in Big Data Analytics

<b>SYLLABUS</b>		
Unit	Content	No. of Hours
I	TYPES OF DIGITAL DATA: Classification of Digital Data – Introduction To Big Data – Big Data Analytics	6
II	INTRODUCTION TO HADOOP: Why Hadoop? – RDBMS versus Hadoop. HISTORY OF HADOOP: The Name “Hadoop”. HADOOP OVERVIEW : Key Aspects of Hadoop - Hadoop Components - Hadoop Conceptual Layer - High-Level Architecture of Hadoop. HDFS (Hadoop Distributed File System): HDFS Daemons - Anatomy of File Read - Anatomy of File Write - Replica Placement Strategy - Working with HDFS commands - Special Features of HDFS. Processing Data with Hadoop – MapReduce Daemons - How does MapReduce Work? - MapReduce Example. INTERACTING WITH HADOOP ECOSYSTEM : Pig - Hive - Sqoop - HBase	6
III	INTRODUCTION TO MongoDB: What is MongoDB? - Why MongoDB? - TERMS USED in RDBMS and MongoDB: Create Database - Drop Database. DATA TYPES IN MongoDB. MongoDB QUERY LANGUAGE: Insert Method - Save() Method - Adding a New Field to an Existing Document - Update Method - Removing an Existing Field from an Existing Document - Remove Method - Finding Documents based on	6

	Search Criteria - Find Method - Dealing with NULL Values - Count, Limit, Sort and Skip - Arrays - Aggregate Function - Java Script Programming - Cursors in MongoDB - Indexes - MongoImport - MongoExport - Automatic Generation of Unique Numbers for the “_id” Field.	
IV	INTRODUCTION TO CASSANDRA: Apache Cassandra - An Introduction. Features of Cassandra: Peer - to Peer Network - Gossip and Failure Detection - Partitioner - Replication Factor - Anti- Entropy and Read Repair - Writes in Cassandra - Hinted Handoffs - Tunable Consistency - CQLSH. COLLECTIONS: Set Collection - List Collection - Map Collection - More Practice on Collections (SET and LIST) - Using Map: Key, Value, Pair. ALTER COMMANDS: Alter Table to Change the Data Types of Column - Alter Table to Delete a Column - Drop a Table - Drop a Database. IMPORT AND EXPORT: Export to CSV - Import from CSV - IMPORT from STDIN - Export to STDOUT. QUERYING SYSTEM TABLES.	6
V	INTRODUCTION TO HIVE: WHAT IS HIVE?: History of Hive and Recent Releases of Hive - Hive features - Hive Integrations and Work Flow - Hive Data Units. HIVE DATA TYPES: Primitive Data Types - Collection Data Types. HIVE FILE FORMAT: Text File - Sequential File - RCFile (Record Columnar File). HIVE QUERY LANGUAGE(HQL): DDL( Data Definition Language) Statements - DML( Data MANipulation Language) Statements - Starting Hive Shell - Database - Tables - Partitions - Bucketing - Views - Sub-Query - Joins - Aggregation - Group By and HAVING. RCFile IMPLEMENTATION. USER DEFINED FUNCTION (UDF)	6

**Text Book:**

1. Seema Acharya, Subhashini Chellappan, “*Big Data and Analytics*”, Wiley, First Edition, 2015. (Unit-I - V)

**Reference Books:**

1. DT Editorial Services, “*Big Data [Hadoop 2, Map Reduce, Hive, YARN, Pig, R and Data Visualization] – Black Book*”, Dreamtech Press, Second Edition, 2016.
2. Frank J.Ohlorst, “*Big Data Analytics -Turning Big Data Into Big Money*”, Wiley India Pvt. Ltd, Second Edition, 2015.
3. Nathan Marz, James Warren, “*Big Data -Principles and best practices of scable real-time data systems*”, Dreamtech Press, First Edition, 2015.
4. Thomas Erl, Wajid Khattak, and Paul Buhler, “*Big Data Fundamentals -Concepts, Drivers & Techniques*”, Pearson India Education Services Pvt. Ltd , First Edition, 2016.
5. V. Bhuvaneshwari, T.Devi, “*Big Data Analytics - A Practitioner’s Approach*”, Department of Computer Applications, Bharathiar University, Third Edition, 2016.

**Web References:**

1. <https://www.techtarget.com/searchbusinessanalytics/definition/big-data-analytics>
2. <https://www.coursera.org/in/articles/big-data-analytics>
3. <https://www.geeksforgeeks.org/what-is-big-data-analytics>
4. <https://www.simplilearn.com/what-is-big-data-analytics-article>

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),**

**GOBICHETTIPALAYAM.**

**DEPARTMENT OF MANAGEMENT**

**ADVANCED LEARNERS COURSE**

**MANAGERIAL APTITUDE**

**24ALBA01**

Objective type Questions from the Question Bank. Course includes the following area

- General Management
- Human Resource Management
- Marketing Management
- Operations Management
- Financial Management

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DEPARTMENT OF MANAGEMENT  
ADVANCED LEARNERS COURSE  
CASE ANALYSIS**

**24ALBA02**

Cases and case lets includes

- General Management
- Human Resource Management
- Marketing Management
- Operations Management
- Financial Management

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),  
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**DEPARTMENT OF ENGLISH LITERATURE**

**ADVANCED LEARNERS COURSE**

**Creative writing in English**

**24ALEL01**

**Course Objective**

**The course aims**

To develop a keen sense of observation, lateral thinking, creative imagination and effective communication. The course material would help demonstrate the flexibility of the English language and show how language can accommodate diverse cultural elements. The students would do individual and group exercises with the teacher as facilitator. They would attempt creative writing based on each kind of writing as part of the course requirement.

**Course Outcome (CO)**

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

<b>Knowledge Level</b>	<b>CO Number</b>	<b>Course Outcome</b>
<b>K1</b>	<b>CO1</b>	Analyse the concept of creativity and techniques in writing
<b>K2</b>	<b>CO2</b>	Distinguish different forms of poetry and prose
<b>K3</b>	<b>CO3</b>	Consider plot and differentiate it from story and characters for both drama and fiction
<b>K4</b>	<b>CO4</b>	Correlate the role of observation in feature and travel writings
<b>K5</b>	<b>CO5</b>	Integrate editing and revising skills for better readability of work of art

**K1**-Remember; **K2**-Understanding; **K3**-Apply; **K4**-Analyze; **K5** -Evaluate

**SYLLABUS**

<b>Unit</b>	<b>Content</b>	<b>No. of Hours</b>
<b>I</b>	<b>The Art and Craft of Writing</b> Inspiration, Imagination, Creativity, Figures of Speech	
<b>II</b>	<b>Poetry &amp; Prose</b> Lyrics, songs, free verse, memoir, diary writing and literary prose	
<b>III</b>	<b>Drama &amp; Fiction</b> Character, Plot, Point of View, Milieu, Verbal and Non-Verbal Elements, Screenplay	
<b>IV</b>	<b>Feature &amp; Travel Writings</b> Concepts, Elements and Characteristics	
<b>V</b>	<b>Substantive Content Editing</b> Revising and Rewriting, Proof Reading, and Editing	

**Reference Books:**

1. Dev, Anjana Neira, Anuradha Marwah, Swati Pal. *Creative Writing: A Beginner's Manual*. New Delhi: Pearson Longman, 2009.
2. Brooks, Cleanth and Robert Penn Warren. *Modern Rhetoric*. New York: Harcourt Brace Jovancvich, 1979.
3. Simms, Norman. *Creative Writing*. Allahabad: New Horizon Publications, 1986

**Mapping with Programme Specific Outcomes**

<b>CO \ PSO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
<b>CO1</b>	H	H	M	M	M
<b>CO2</b>	H	M	M	H	H
<b>CO3</b>	M	H	M	M	M
<b>CO4</b>	M	M	H	H	H
<b>CO5</b>	M	M	H	M	M

**S**- Strong; **H** -High; **M**-Medium; **L**-Low

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),**

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**DEPARTMENT OF COMPUTER SCIENCE**

**ADVANCED LEARNERS COURSE**

**CYBER SECURITY**

**24ALCS01**

<b>SYLLABUS</b>		
<b>Unit</b>	<b>Contents</b>	<b>No. of Hours</b>
<b>I</b>	<b>INFORMATION SYSTEM:</b> Data and Information – Information Systems – Introduction to Information System – Development of Information System – History of Information System–Characteristics of Information System– Information System Development – Introduction to Information Security – Information Assurance – Cyber Security–Security Risk Analysis	6
<b>II</b>	<b>APPLICATION SECURITY:</b> Introduction to Application Security – Security Testing for Applications – Data Security – Database Security – Introduction to E- mail Security – Internet Security – Network Security Policy – <b>SECURITY TECHNOLOGIES</b> –Introduction–Firewalls–VirtualPrivateNetwork-Intrusion Detection System (IDS)– Access Control	6
<b>III</b>	<b>SECURITY THREATS:</b> Security Threats–Virus Attacks–E-mail Viruses– Worms – Trojan – Logic Bomb – Phishing and Spoofing Attacks – Malware (Malicious Software) – Denial of Service – <b>SECURITY THREATS OF E-COMMERCE:</b> Security Threats of E-Commerce– Electronic Payment System– Credit Card– Debit Card– Digital Signature- Cryptography	6
<b>IV</b>	<b>DEVELOPING SECURE IN FORMATION SYSTEM:</b> Security at Various Phase Of Information System Development – Physical Security of Information Assets – Application Information Security – Information Security Governance and Risk Management – Security Architecture and Design – Security Issues with Downloadable Devices – Physical Security of its Assets – Information Security – CCTV and Intrusion Detection– Backup Security Measures	6
<b>V</b>	<b>SECURITY POLICIES, STANDARDS and LAWS:</b> Security Policies – Security Policy Scope – Enforcement and Auditing – Policy, Standard and Practices – Procedure – The Information Security Policy Framework – Need for Policy – The Bull’s Eye Model – Guidelines for Policy Development – WWW Policy – E-mail Security Policy – Policy Review Process – Sample Security Policy – Information Security Standards– Intellectual Property Law–Cyber Crime and Cyber Laws– IT Act 2000–Software License–Semiconductor Law	6

**Text Book:**

Avantika Yadav, “Cyber Security”, Narosa Publishing House Pvt. Ltd, 2017

**Reference Book:**

Mayank Bhushan, Rajkumar Singh Rathore, Aatif Jamshed, “Fundamentals of Cyber Security”, BPB Publications, First Edition, 2017.

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),**

**GOBICHETTIPALAYAM.**

**DEPARTMENT OF MANAGEMENT STUDIES**

**ADVANCED LEARNERS COURSE**

**DESIGN THINKING FOR LEADERS**

**24ALMS01**

**Course objectives:**

- To expose with state-of-the-art perspectives, ideas, concepts, and solutions related to the design thinking for advanced learners.
- To propose a concrete, feasible, viable and relevant innovation project / challenge.

**Course Outcome**

On the successful completion of the course, students will be able to learn design thinking concepts, methods and techniques that are used to bring about innovation in business and in the social sector.

**SYLLABUS**

**Unit I**

**Introduction:** 6 Hours

Introduction to Design Thinking- Design Thinking Skills- Principles of Design Thinking

**Unit II**

**Design Thinking Team:** 6 Hours

Design Thinking Team-Design thinking Workshops and Meetings

**Unit III**

**Design Thinking Techniques:** 6 Hours

Listening and Empathizing Techniques -Observation - Structured Open-ended approach

**Unit IV**

**Tools of Design thinking:** 6 Hours

Ideation tools–Brainstorming- Innovation heuristics- Behavior model-Story telling

**Unit V** 6 Hours

**Maps in Design thinking:**

Use of Diagrams and Maps in Design Thinking- Empathy Map- Affinity diagram-Mindmap- Journey map.

## **E-References:**

1. <https://www.interaction-design.org/literature/topics/design-thinking>
2. <https://www.worldofinsights.co/2020/10/infographic-8-design-thinking-skills-for-leadership-development/>
3. <https://www.icoderzsolutions.com/blog/principles-of-design-thinking-process/>
4. <https://makeiterate.com/how-to-empathize-in-design-thinking-practical-tools-and-techniques/>
5. <https://hbr.org/2019/03/the-right-way-to-lead-design-thinking>
6. <https://careerfoundry.com/en/blog/ux-design/design-thinking-workshop>
7. <https://www.geeksforgeeks.org/best-design-thinking-frameworks/>
8. <https://www.betterup.com/blog/how-to-be-a-good-storyteller>
9. <https://www.simplilearn.com/mind-mapping-in-design-thinking-article>
10. <https://bootcamp.uxdesign.cc/design-thinking-empathy-maps-journey-maps-and-how-they-are-interconnected-b145aafccdd1>

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),**

**GOBICHETTIPALAYAM.**

**DEPARTMENT OF COMMERCE**

**ADVANCED LEARNERS COURSE FOR B.COM**

**DIGITAL MARKETING**

**24ALCO01**

**Course Objectives**

**The course aims**

- To impart the students on digital marketing components
- To develop the students to know the advanced digital marketing strategies.
- To inculcate the students to acquire knowledge relating to digital advertising and mobile marketing.

**Course Outcomes**

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

<b>Knowledge Level</b>	<b>CO Number</b>	<b>Course Outcome</b>
<b>K1</b>	<b>CO1</b>	Know digital marketing concepts and components.
<b>K2</b>	<b>CO2</b>	Acquire knowledge on various digital marketing strategies.
<b>K3</b>	<b>CO3</b>	Frame an idea about digital advertising and its legal aspects.
<b>K4</b>	<b>CO4</b>	Analyse mobile marketing and its design.
<b>K5</b>	<b>CO5</b>	Evaluate digital marketing campaign and projects.

**K1**-Remember;**K2**- Understanding;**K3**-Apply;**K4**-Analyze; **K5**– Evaluate

**SYLLABUS**

<b>Unit</b>	<b>Content</b>	<b>No. of Hours</b>
<b>I</b>	Digital Marketing Fundamentals: Evolution and significance of digital marketing - Key concepts and components - Digital marketing vs traditional marketing - Web Design and Optimization Basics - Understanding website structure - User experience (UX) and user interface (UI) principles - Basics of HTML and CSS - Introduction to Search Engine Optimization (SEO)	<b>18</b>
<b>II</b>	Advanced Digital Marketing Strategies : Social Media Marketing (SMM) : Overview of major social media platforms - Social media strategy and content planning - Paid advertising on social media Content Marketing and Blogging: Importance of content in digital marketing - Content creation and curation - Blogging and storytelling Email Marketing and Campaigns: Building and maintaining email lists - Email campaign planning and execution - Analytics and performance tracking	<b>18</b>

<b>III</b>	Digital Advertising and Legal Aspects : Pay-Per-Click (PPC) Advertising - Basics of paid advertising - Google Ads and other PPC platforms - Campaign optimization and budgeting Influencer Marketing and Legal Considerations : Understanding influencers and their impact - Influencer marketing strategies - Legal aspects of digital marketing, including privacy laws, intellectual property rights, and advertising standards.	<b>18</b>
<b>IV</b>	Mobile Marketing and Responsive Design: Mobile app marketing - SMS and in-app advertising Responsive Design : Importance of responsive design in mobile marketing - Techniques for optimizing content across devices	<b>18</b>
<b>V</b>	Digital Marketing Campaign : Project Planning - Defining project goals and objectives - Identifying target audience and market Implementation : Executing digital marketing strategies - Monitoring and adjusting campaigns based on analytics. Evaluation and Presentation : Analyzing project outcomes and performance - Presenting results and recommendations	<b>18</b>

### Text Books:

1. Philip Kotler and Kevin Lane Keller, *Marketing Management* (Pearson Education).
2. Dave Chaffey and Fiona Ellis-Chadwick, *Digital Marketing: Strategy, Implementation, and Practice* (Pearson Education).
3. Jon Duckett, *HTML and CSS: Design and Build Websites* (Wiley).
4. Tracy L. Tuten and Michael R. Solomon, *Social Media Marketing* (Sage Publications).
5. Ann Handley, *Everybody Writes: Your Go-To Guide to Creating Ridiculously Good Content* (Wiley).

### E-references:

1. [www.investopedia.com.com](http://www.investopedia.com.com)
2. [www.digitalmarketer.com](http://www.digitalmarketer.com)
3. [www.slideshare.net](http://www.slideshare.net)

### Mapping with Programme Specific Outcomes

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	S	H	H	S	H
<b>CO2</b>	M	S	H	S	M
<b>CO3</b>	H	S	H	M	M
<b>CO4</b>	S	H	H	M	S
<b>CO5</b>	M	S	H	S	M

**S**-Strong;**H** - High; **M**-Medium;**L**-Low

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),  
GOBICHETTIPALAYAM.**

**DEPARTMENT OF PROFESSIONAL ACCOUNTING**

**ADVANCED LEARNERS COURSE**

**DIGITAL MARKETING**

**25ALPA02**

**Course Objectives**

The Course aims to make the Students

- To understand about the basics of Digital Marketing and Differences between Traditional and Digital Marketing.
- To understand about the SEO, SEM, Google Ads and PPC Advertising.
- To evaluate the Different types of Social Media Marketing and Content Marketing.
- To have a better knowledge about e-mail Marketing and Affiliate Marketing.
- To know about the Google Analytics, AI in Digital Marketing and Future Trends in Digital Marketing.

**Course Outcome**

On the successful completion of this course, the students would be able to:

<b>Knowledge Level</b>	<b>CO Number</b>	<b>Course Outcome</b>
<b>K1</b>	<b>CO1</b>	Understand about the basics of Digital Marketing and Differences between Traditional and Digital Marketing.
<b>K2</b>	<b>CO2</b>	Understand about the SEO, SEM, Google Ads and PPC Advertising.
<b>K3</b>	<b>CO3</b>	Evaluate the Different types of Social Media Marketing and Content Marketing.
<b>K4</b>	<b>CO4</b>	Have a better knowledge about e-mail Marketing and Affiliate Marketing.
<b>K5</b>	<b>CO5</b>	Know about the Google Analytics, AI in Digital Marketing and Future Trends in Digital Marketing.

K1- Remember, K2- Understanding, K3-Apply, K4-Analyze;K5-Evaluate

**SYLLABUS**

<b>Unit</b>	<b>Content</b>	<b>No. of Hours</b>
I	Introduction to Digital Marketing -Overview of Digital Marketing-Traditional vs. Digital Marketing-Key Components of Digital Marketing (SEO, SEM, Social Media, Email, Content, Analytics)-Customer Behavior and Digital Journey-Current Trends in Digital Marketing.	
II	Search Engine Optimization (SEO) and Search Engine Marketing (SEM)-Basics of SEO: On-page and Off-page SEO-Keyword Research and Content Optimization-Link Building and Technical SEO-Google Ads and Pay-Per-Click (PPC) Advertising- SEM Strategies and Budget Management.	

III	Social Media and Content Marketing-Role of Social Media in Marketing-Platforms: Facebook, Instagram, LinkedIn, Twitter, YouTube, TikTok-Social Media Advertising and Campaign Strategies-Content Marketing: Blog Writing, Video Marketing, Infographics-Influencer Marketing and Brand Engagement.	
IV	Email and Affiliate Marketing-Introduction to Email Marketing-Email Campaign Strategies and Automation-Measuring Email Marketing Performance (CTR, Open Rate, Conversions)-Basics of Affiliate Marketing-Lead Generation and Conversion Optimization.	
V	Analytics, Trends, and Future of Digital Marketing-Introduction to Google Analytics and Data Interpretation-Key Performance Indicators (KPIs) in Digital Marketing-Conversion Rate Optimization (CRO)-Artificial Intelligence in Digital Marketing-Future Trends: Voice Search, AI-driven Marketing, Metaverse Marketing.	

### Text Books:

1. Puneet Bhatia., Fundamentals of Digital Marketing, Pearson Education, New Delhi, 2023.
2. Rashi Bhutada & Rohan Gupta Dr. Arpita Baijal, Preet M. Jain, Purav Shah., Basics of Marketing and Digital Marketing: An Introduction for Beginners, Bharti Publications, Chennai, 2023.

### Reference Books:

1. Dr. D. Ravinder, Dr. Srikrishna. Gade., Dr. Shathaboina Raju., Fundamentals of Digital Marketing, Book Rivers, New Delhi, 2022.
2. Durgesh\_Vishwakarma \_\_, Digital Marketing Zero to Hero: Ultimate Digital Marketing Guide, Kindle Edition, New Delhi, 2024.

### E-references:

1. <https://www.geeksforgeeks.org/difference-between-traditional-marketing-and-digital-marketing/>
2. <https://developers.google.com/search/docs/fundamentals/seo-starter-guide>
3. <https://www.digitalvidya.com/blog/fundamental-components-of-social-media-marketing/>
4. <https://www.dypatilonline.com/blogs/top-digital-marketing-trends-shaping-the-future>

### Mapping with Programme Specific Outcomes

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	M
CO2	M	H	H	H	H
CO3	H	H	H	H	M
CO4	H	H	H	M	H
CO5	M	M	H	M	M

H-High, M- Medium, L- Low

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),  
GOBICHETTIPALAYAM.  
DEPARTMENT OF ECONOMICS  
ADVANCED LEARNERS COURSE**

**ECONOMETRICS**

**24ALEC01**

*The course econometrics aims to measure economic relationship. Using economic data and applying mathematical and statistical tools, it provides empirical validity of abstract economic theory.*

*After successful completion of the course, students would be able to formulate econometric model to analyze data and then would be able to establish any cause-effect relationship in their preferred areas of interest like economics, finance, management, engineering and science. An expertise in econometrics increases the job prospect of the students significantly.*

- Introduction to Econometrics and Econometric Analysis, Steps involved in Econometric Analysis.
- Introduction to Classical Linear Regression Model-Two variable classical linear regression model, Assumptions of Classical Linear Regression Model.
- Classical Linear Regression Model assumptions, Estimation of the regression model, Properties of Ordinary Least Square estimators.
- Regression analysis: Objective, Statistical Analysis and Interpretation of results, Hypothesis testing-Types of Hypothesis, Test statistic, Critical Region.
- Hypothesis testing: Level of significance and confidence interval approach; Goodness of Fit( $R^2$ ): Concepts of Explained Sum of Squares (ESS)-Residual Sum of Squares – Total Sum of Squares.
- Multiple Linear Regression Model: Interpretation of the model, Statistical Analysis, Interpretation of the results.

**Books and References:**

1. Damodar N Gujarati, Dawn C. Porter and Sangeetha (2017), Basic Econometrics, 5<sup>th</sup> edition, McGraw Hill Education.
2. Jeffrey M. Wooldridge (2022), Introductory Econometrics: A Modern Approach, Cengage, 7<sup>th</sup> edition Learning India Pvt. Ltd.

**Pattern of Examination:**

Mark – 50

Duration of Examination: Two Hours

Multiple Choice Questions (MCQs)

*Each question has four choices with one correct answer.*

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**GOBI ARTS & SCIENCE COLLEGE (Autonomous),  
GOBICHETTIPALAYAM.  
DEPARTMENT OF COMMERCE (PA)  
ADVANCED LEARNERS COURSE  
ENTREPRENEURSHIP  
24ALPA01**

**Course Objectives**

The Course aims to make the Students

- To understand about the basics of entrepreneurship, Characteristics and Qualities of an Entrepreneur.
- To understand about the methods of generating innovative ideas and market research.
- To evaluate the different types of business models and design thinking.
- To have a better knowledge in marketing strategies and digital marketing techniques.
- To know about the financial management and sources of funding.

**Course Outcome**

On successful completion of this course, the students would be able to:

Knowledge Level	CO Number	Course Outcome
<b>K1</b>	<b>CO</b>	Understand about the basics of entrepreneurship, Characteristics and Qualities of an Entrepreneur.
<b>K2</b>	<b>CO2</b>	Understand about the methods of generating innovative ideas and market research.
<b>K3</b>	<b>CO3</b>	Evaluate the different types of business models and design thinking.
<b>K4</b>	<b>CO4</b>	Have a better knowledge in marketing strategies and digital marketing techniques.
<b>K5</b>	<b>CO5</b>	Know about the financial management and sources of funding.

K1- Remember, K2- Understanding, K3-Apply, K4-Analyze;K5-Evaluate

<b>SYLLABUS</b>		
Unit	Content	No. of Hours
<b>I</b>	Introduction to Entrepreneurship: Definition and characteristics of entrepreneurship -Importance of entrepreneurship in the economy-Types of entrepreneurs-Entrepreneurial mindset and qualities.	
<b>II</b>	Opportunity Recognition and Idea Generation: Identifying problems and opportunities in the market-Techniques for generating innovative ideas-Market research and validation methods-Understanding customer needs and preferences.	
<b>III</b>	Business Model Development: Basics of business models and value propositions-Different types of business models (e.g., subscription, freemium, e-commerce)-Design thinking and lean startup principles-Creating a business canvas or plan.	

<b>IV</b>	Marketing and Sales Strategies: Marketing fundamentals and strategies-Branding and positioning-Digital marketing techniques (SEO, social media, content marketing)-Sales techniques and strategies.	
<b>V</b>	Financial Management and Funding: Basics of financial management (budgeting, cash flow, financial statements)-Pricing strategies and revenue models-Sources of funding (bootstrapping, loans, investors) - Pitching and presenting to investors.	

**Text Books:**

1. Khanka. S.S., Entrepreneurial Development, S.Chand Publishing, New Delhi.
2. Radha., Entrepreneurial Development, Prasanna Publishers, Chennai.

**Reference Books:**

1. Gupta. C.B., and Srinivasan. N.P., Entrepreneurship Development in India, Sultan Chand & Sons, New Delhi.
2. Gauri Shankar., Business, Entrepreneurship and Management, Ane Books Pvt. Ltd., New Delhi.

**E-references:**

1. <https://www.ictacademy.in/pages/Entrepreneurship-development.aspx>
2. <https://www.startupindia.gov.in/content/sih/en/government-schemes.html>
3. <https://www.msde.gov.in/>

**Mapping with Programme Specific Outcomes**

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	H	H	H	M	M
<b>CO2</b>	M	H	H	H	H
<b>CO3</b>	H	H	H	H	M
<b>CO4</b>	H	H	H	M	H
<b>CO5</b>	M	M	H	M	M

H-High, M-Medium, L-Low

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),**

**GOBICHETTIPALAYAM.**

**DEPARTMENT OF COMMERCE**

**ADVANCED LEARNERS COURSE FOR M.COM**

**FINANCIAL TECHNOLOGY**

**24ALCO02**

**Course Objective**

**The course aims**

- To impart the students on scope and key components of Fintech.
- To develop the students to know the applications of Fintech.
- To inculcate students to acquire knowledge relating to risk and ethical considerations in fintech.

**Course Outcome**

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

<b>Knowledge Level</b>	<b>CO Number</b>	<b>Course Outcome</b>
<b>K1</b> <b>K2</b> <b>K3</b> <b>K4</b> <b>K5</b>	<b>CO1</b>	Assess the scope and Key components of Fintech.
	<b>CO2</b>	Acquire knowledge on mobile payments and digital wallets.
	<b>CO3</b>	Analyse the role of Fintech in lending and crowd funding.
	<b>CO4</b>	Analyse Insurtech and Regtech in the present scenario.
	<b>CO5</b>	Evaluate the risk and ethical considerations in Fintech.

**K1**-Remember;**K2**- Understanding;**K3**-Apply;**K4**-Analyze; **K5**– Evaluate

**SYLLABUS**

<b>Unit</b>	<b>Content</b>	<b>No. of Hours</b>
<b>I</b>	Overview of FinTech - Definition, scope, and evolution - Key components: Payments, lending, crowd funding, robo-advisors - Regulatory landscape and challenges. Technological Foundations in FinTech: Block chain and distributed ledger technology - Crypto currencies and digital assets - Smart contracts and applications	<b>18</b>
<b>II</b>	Mobile Payments and Digital Wallets - Mobile payment technologies - Digital wallets and their functionalities : Peer-to-Peer (P2P) Payments and Contactless Payments - P2P payment platforms - Contactless payments and NFC technology	<b>18</b>
<b>III</b>	FinTech in Lending and Crowd funding - Peer-to-peer lending - Crowd funding and crowd-lending - Robo-Advisory and Wealth Tech - Automated investment platforms - Algorithmic trading and portfolio management	<b>18</b>

<b>IV</b>	InsurTech and RegTech - Technology in insurance (InsurTech) - Regulatory Technology (RegTech) and compliance solutions. FinTech Ecosystem and Startups: FinTech ecosystems and hubs - Collaboration and competition among traditional banks and FinTech startups	<b>18</b>
<b>V</b>	Risks and Ethical Considerations in FinTech - Cyber security in FinTech - Ethical considerations in FinTech innovation. Future Trends and Emerging Technologies in FinTech : Open banking and APIs - Quantum computing and its potential impact	<b>18</b>

### Reference Books:

1. Sharma, P., & Arora, P. (Year). *FinTech: The Impact and Future of Financial Technology*. Bloomsbury India.
2. Drescher, D. (Year). *Blockchain Basics: A Non-Technical Introduction in 25 Steps*. Wiley India.
3. Sironi, P. (Year). *FinTech Innovation: From Robo-Advisors to Goal Based Investing and Gamification*. Wiley India.
4. Kumar, M., & Kumar, P. (Year). *Digital Payments and FinTech: A Catalyst for Financial Inclusion*. Springer.
5. Bajaj, A. S. (Year). *FinTech - Innovation in Financial Services*. McGraw Hill Education.

### E-references:

1. [www.investopedia.com](http://www.investopedia.com)
2. [www.en.m.wikipedia.org](http://www.en.m.wikipedia.org)
3. [www.startupindia.gov.in](http://www.startupindia.gov.in)

### Mapping with Programme Specific Outcomes

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	H	S	H
CO2	M	S	H	S	M
CO3	H	S	H	M	M
CO4	S	H	H	M	S
CO5	M	S	H	S	M

S-Strong; H - High; M-Medium; L-Low

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),  
GOBICHETTIPALAYAM.**

**DEPARTMENT OF CHEMISTRY  
ADVANCED LEARNERS COURSE**

**FORENSIC SCIENCE**

**24ALCH01**

**Course Objective**

**The course aims**

- Crime detection through analytical instruments
- Forgery and its detection
- Medical aspects involved

**Course Outcome**

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

Knowledge Level	CO Number	Course Outcome
<b>K1</b>	<b>CO1</b>	Learn about the Poisons- types and classification of poisons in the living and the dead organisms and also get in form at ion about Postmortem.
<b>K2</b>	<b>CO2</b>	Get awareness on Human bombs, possible explosives (gelatin sticks and RDX) and metal defect or devices and other security measures for VVIP- composition of bullets and detecting powder burns.
<b>K3</b>	<b>CO3</b>	Detect the forgery documents, different types of forged signatures
<b>K4</b>	<b>CO4</b>	Have an idea about how to tracks and trace using police dogs, foot prints identification and gain the knowledge in analyzing biological substances- blood, semen, saliva, urine and hair- DNA Finger printing for tissue identification in dismembered bodies
<b>K5</b>	<b>CO5</b>	Get the awareness on Aids- causes and prevention and also have an exposure on handling fire explodes.

**K1-Remember;K2 -Understanding; K3- Apply;K4-Analyze;K5-Evaluate**

**SYLLABUS**

Unit	Content	No. of Hours
<b>I</b>	<b>Poisons:</b> Poisons – types and classification – diagnosis of poisons in the living and the dead – clinical symptoms – postmortem appearances. Heavy metal contamination (Hg,Pb,Cd) of sea foods – use of neutron activation analysis in detecting arsenic in human hair. Treatment in cases of poisoning – use of antidotes for common poisons.	<b>6</b>
<b>II</b>	<b>Crime Detection:</b> Accidental explosion during manufacture of matches and fireworks (as in Sivakasi). Human bombs - possible explosives (gelatin sticks and RDX) –metal detector devices and other security measures for VVIP – composition of bullets and detecting powder burns.	<b>6</b>
<b>III</b>	<b>Forgery and Counterfeiting</b> Documents – different types of forged signatures - simulated and traced forgeries – inherent signs of forgery methods – writing deliberately modified uses of ultraviolet rays – comparison of type written letters – checking silver line watermark in currency notes – alloy analysis using AAS to detect counterfeit coins – detection of gold purity in 22 carat ornaments – detecting gold plated jewels-authenticity of diamond.	<b>6</b>

<b>IV</b>	<b>Tracks and Traces</b> Tracks and traces – small tracks and police dogs – foot prints – costing of foot prints - residue prints, walking pattern or tyre marks – miscellaneous traces and tracks – glass fracture - tool marks - paints - fibres - Analysis of biological substances - blood, semen, saliva, urine and hair- Cranial analysis (head and teeth) DNA Finger printing for tissue identification in dismembered bodies-detecting steroid consumption in athletes and racehorses.	<b>6</b>
<b>V</b>	<b>Medical Aspects</b> Aids - causes and prevention - misuse of scheduled drugs - burns and their treatment by plastic surgery. Metabolite analysis using mass spectrum – Gas chromatography – Arson –natural fire sand arson – burning characteristics and chemistry of combustible materials -nature of combustion. Ballistics – classification – internal and terminal ballistics - small arms-laboratory examination of barrel washing and detection of powder residue by chemical tests.	<b>6</b>

<\*-Self study: Hardness of water, disadvantages of using hard water in industrial boilers>.

#### Text Books:

1. SAIqbal, MLiviu, Text book of forensic chemistry, Discovery publishing house private limited, 2011.
2. Kelly M.Elkins, Introduction to Forensic Chemistry, CRC Press, Taylor & Francis Group, 2019.
3. Javed I.Khan, Thomas J. Kennedy, Donnell R. Christian, Jr., Basic principles of Forensic chemistry, Humana Press, first edition, 2012.
4. Bapuly AK, (2006) Forensic Science – Its application in crime investigation, Paras Medical Publisher, Hyderabad.
5. Sharma B.R., (2006) Scientific Criminal Investigation, Universal Law Publishing Co. Pvt. Ltd, New Delhi.

#### Reference Books:

1. Richard Safertin and Criminalistics – An Introduction to Forensic Science (College Version), Sopsfestein, Printicehall, eighth edition, 2003
2. Suzanne Bell, Forensic Chemistry, Pearson, second international edition, 2014.
3. Jay Siegel, Forensic chemistry: Fundamentals and applications, Wiley-Blackwell, first edition, 2015.
4. Max M.Houck & Jay A.Segal, (2006) Fundamentals of Forensic Science, Elsevier Academic press.
5. Henry C.Lee, Timothy Palmbach, Marilyn T.Miller, (2006) Henry Lee's Crime Scene Book Elsevier Academic press.

#### E-references:

1. <http://www.library.ucsb.edu/ist/03-spring/internet.html>
2. <http://www.wonderhowto.com/topic/forensic-science/>

#### Mapping with Programme Specific Outcomes

CO \ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	S	S	S	S	S
CO 2	M	S	S	S	M
CO 3	S	S	S	M	S
CO 4	S	S	S	S	S
CO 5	S	M	S	S	S

S - Strong; H - High; M - Medium; L – Low

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),  
GOBICHETTIPALAYAM.**

**DEPARTMENT OF PROFESSIONAL ACCOUNTING**

**ADVANCED LEARNERS COURSE**

**Fundamentals of Fin Tech**

**25ALPA03**

**Course Objectives**

The Course aims to make the Students

- To understand about the basics of FinTech and FinTech Ecosystem.
- To understand about the Digital Payments, Digital Banking and Neo banks.
- To have a better knowledge about the basics of Blockchain Technology and Cryptocurrencies.
- To have a better knowledge about the InsurTech, RegTech and Roll of AI & IoT in Insurance.
- To know about the FinTech Innovations and Future Trends in FinTech.

**Course Outcome**

On the successful completion of this course, the students would be able to:

<b>Knowledge Level</b>	<b>CO Number</b>	<b>Course Outcome</b>
<b>K1</b>	<b>CO1</b>	Understand about the basics of FinTech and FinTech Ecosystem.
<b>K2</b>	<b>CO2</b>	Understand about the Digital Payments, Digital Banking and Neo banks.
<b>K3</b>	<b>CO3</b>	Have a better knowledge about the basics of Blockchain Technology and Cryptocurrencies.
<b>K4</b>	<b>CO4</b>	Have a better knowledge about the InsurTech, RegTech and Roll of AI &IoT in Insurance.
<b>K5</b>	<b>CO5</b>	Know about the FinTech Innovations and Future Trends in FinTech.

K1- Remember, K2- Understanding, K3-Apply, K4-Analyze;K5-Evaluate

**SYLLABUS**

<b>Unit</b>	<b>Content</b>	<b>No. of Hours</b>
<b>I</b>	Introduction to FinTech: Definition and Evolution of FinTech-Traditional Financial Systems vs. FinTech-Key Technologies Driving FinTech (Blockchain, AI, Big Data, Cloud Computing)-FinTech Ecosystem: Startups, Banks, Regulators, and Customers-Global and Indian FinTech Landscape.	
<b>II</b>	Digital Payments and Banking: Evolution of Digital Payments (UPI, Wallets, QR Codes, Cryptocurrencies)-Payment Gateways and Processors (Razorpay, Stripe, PayPal)-Digital Banking and Neo banks-Role of AI &Chatbots in Banking- Cybersecurityand Fraud Prevention in Digital Payments.	

<b>III</b>	Blockchain and Cryptocurrencies: Basics of Blockchain Technology-How Cryptocurrencies Work (Bitcoin, Ethereum)-Smart Contracts and Decentralized Finance (DeFi)-Central Bank Digital Currencies (CBDCs)-Risks and Regulations in Crypto and Blockchain.	
<b>IV</b>	InsurTech and RegTech: Introduction to InsurTech: Technology in Insurance-AI and IoT in Insurance (Risk Assessment, Claims Processing)-RegTech: Compliance Automation and Fraud Detection-Legal and Ethical Issues in FinTech-Case Studies on FinTech Regulations.	
<b>V</b>	FinTech Innovations and Future Trends: AI in Wealth Management (Robo-Advisors)-Peer-to-Peer (P2P) Lending and Crowdfunding-Open Banking and APIs-Future Trends in FinTech (Metaverse Finance, Embedded Finance)-Case Studies on Successful FinTech Startups.	

**Text Books:**

1. Chandrahauns Chavan., Introduction to Fintech, Ist Edition | Technology In Specific Financial Process | Cutting-Edge Technology, Pearson Education, New Delhi, 2024.
2. David Lee Chuen Kuo ., Foundations for Fintech,world scientific, Chennai,2024.

**Reference Books:**

1. Dr. Nakul Sharma, Gitanjali Bhimrao Yadav, Mandar Diwakar, Monali Borade, Prema Kadam., Fintech Ecosystems: Integrating Ai And Emerging Technologies, Redshine Publication, New Delhi, 2024.
2. Jaspal Kaur Singh , Financial Technology (FinTech) and Digital Banking in India , Kindle Edition, New Delhi, 2024.

**E-references:**

1. <https://www.investopedia.com/terms/f/fintech.asp>
2. <https://blog.branks.com/fintech-ecosystem>
3. <https://guides.loc.gov/fintech/21st-century/cryptocurrency-blockchain>
4. <https://www.linkedin.com/pulse/everythingtech-explained-fintech-insurtech-regtech-1-tha%C3%ADs>
5. <https://www.investopedia.com/the-future-of-fintech-4770491>

**Mapping with Programme Specific Outcomes**

\ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	M
CO2	M	H	H	H	H
CO3	H	H	H	H	M
CO4	H	H	H	M	H
CO5	M	M	H	M	M

H-High, M- Medium, L- Low

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),  
GOBICHETTIPALAYAM.**

**DEPARTMENT OF COMMERCE (CA)**

**ADVANCED LEARNERS COURSE**

**GOODS AND SERVICES TAX**

**24ALCC01**

<b>Syllabus</b>		
<b>Unit</b>	<b>Contents</b>	<b>No. of hours</b>
I	Goods and Services Tax: Meaning-Scope-GST Council-Function and Role-Impact of GST on the Indian Economy.	
II	GST: Types of GST in India- CGST, SGST, IGST and UTGST- GST impact on Central and State Government.	
III	GST Exemption from Registration: Service exemption from GST-Supply under GST.	
IV	Levy and Collection of GST: Provision- Input tax credit- Exports-Import-Goods and Services.	
V	GST Registration: Procedure- Cancellation-Electronic Ledger.	

<\*Self study>

**Text Books:**

1. Parameswaran. R. and CA. Viswanathan. P., Indirect Taxes, GST and Customs Laws, Kavin Publications, Coimbatore.
2. Mehrotra. H.C. and Agarwal. V.P., Goods and Services Tax and Customs Duty, Sahitya Bhawan Publications, Agra.
3. Reddy. T.S. and Hari Prasad Reddy. Y, Business Taxation(Good & Services Tax-GST).

**Reference Books:**

1. Gupta. S.S. Taxmann's GST – Laws and Practice, Taxmanns Publications, New Delhi.
2. Ca Vivek Kr Agrawal, GST Guide for Students: Making GST – Good & Simple Tax.

**E-references:**

1. [https://www.icai.org/post.html?post\\_id=16966](https://www.icai.org/post.html?post_id=16966)
2. <https://cleartax.in/s/gst-law-goods-and-services-tax>

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),**

**GOBICHETTIPALAYAM.**

**DEPARTMENT OF TAMIL LITERATURE**

**ADVANCED LEARNERS COURSE**

**இலக்கணமும் தமிழ் கற்பித்தல் முறைகளும்**

**24ALTL01**

**பாடத்தின் நோக்கம்**

- இலக்கணத்தைப் பிழையின்றிப் பேசவும், எழுதவும் செய்தல்
- தமிழ் கற்பிக்கும் முறைகளை அறிந்து கொள்ளுதல்.
- மேடையில் பேசப் பயம், தயக்கம் இவற்றைப் போக்கி சிறந்த முறையில் பேசப் பயிற்சி.
- ஓர் ஆசிரியராகத் தன்னை மேம்படுத்திக் கொள்ள செயல்முறைப் பயிற்சி

**பாடத்தின் பயனாக்கம்(CO)**

K2	CO1	வல்லினம் மிகும் இடம், மிகா இடங்கள் குறித்துத் தெளிவு பெறுதல்
K4	CO2	தான் கற்ற கல்வியை மற்றவர்களுக்கு எடுத்துச் சொல்லும் விதத்தை மேம்படுத்துதல்.
K5	CO3	தவறின்றித் தமிழ் எழுதப் பயிற்சி
K2	CO4	பிறமொழிச் சொற்களுக்கு இணையான தமிழ்ச் சொற்கள் அறிதல்
K5	CO5	தன் தகுதியை மேம்படுத்திக் கொள்ள செயல்முறைப் பயிற்சி

**பாடத்திட்டம்**

அலகு	உள்ளடக்கம்	பாட வேளை நேரங்கள்
1	தமிழில் எது சரி? எது தவறு? சில முக்கியமான சொற்களும் அவற்றைச் சரியாகப் பயன்படுத்தும் முறைகளும்	
2	வலி மிகும் இடங்களும் வலி மிகா இடங்களும் பிழையான சொற்களும் திருத்தங்களும்	
3	பிறமொழிச் சொற்களும் அவற்றுக்கு இணையான தமிழ்ச் சொற்களும் சில ஆங்கிலச் சொற்களும் அவற்றுக்கு நிகரான தமிழ்ச் சொற்களும்	
4	கடிதம் எழுதப் பயிற்சி - சொற்றொடர்களைப் பிரிக்கும்போது ஏற்படும் தவறுகள் - வாக்கியங்களில் ஏற்படும் பிழைகளும் திருத்தங்களும்	
5	தமிழ் கற்பித்தல் பயிற்சி*	

\* மாணவர்கள் அவர்கள் ஊரில் அல்லது அருகாமையில் உள்ள தனியார் பள்ளிகளுக்குச் சென்று 10 நாட்கள் அங்குள்ள மாணவர்களுக்குத் தமிழ்ப் பாடத்தைக் கற்பித்து, பயிற்சி பெற்றதற்கான ஒப்புதலை பள்ளித் தலைமை ஆசிரியரிடமிருந்து பெற்று வந்து ஒப்படைக்க வேண்டும்.

**பாடநூல்:**

தவறின்றித் தமிழ் எழுதுவோம் - தமிழ்ப்பிரியன், அருணா பப்ளிகே'ன்ஸ், சென்னை

**திட்டவரைவு**

PS CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	S	M	H
CO2	M	S	S	H	S
CO3	H	M	S	S	H
CO4	H	M	S	S	H
CO5	M	H	S	H	S

S-Strong; H-High; M-Medium; L-Low

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**GOBI ARTS & SCIENCE COLLEGE (Autonomous),  
GOBICHETTIPALAYAM.  
DEPARTMENT OF COMMERCE (BANKING & INSURANCE)  
ADVANCED LEARNERS COURSE**

**INNOVATION AND INTELLECTUAL PROPERTY RIGHTS**

**24ALBI01**

**Course Objectives**

**The course aims**

- To Gain knowledge about fundamentals aspects of Intellectual property Rights
- To understand about patents and trademarks
- To learn about Geographical Indication
- To aware about current trends in IPR

**Course Outcome (CO)**

On successful completion of this course, the students would be able to:

<b>Knowledge Level</b>	<b>CO Number</b>	<b>Course Outcome</b>
<b>K1</b>	<b>CO1</b>	Understand the concept of Creativity, Invention and Innovations.
<b>K2</b>	<b>CO2</b>	Know the value, Purpose and process of patent
<b>K3</b>	<b>CO3</b>	Understand the basics of trademarks and industrial designs.
<b>K4</b>	<b>CO4</b>	Acquire knowledge about copyright and copyright law
<b>K5</b>	<b>CO5</b>	Identify Geographical Indications

**K1** – Remember; **K2** – Understanding; **K3** – Apply; **K4** – Analyze; **K5** – Evaluate

<b>Unit</b>	<b>Content</b>
<b>I</b>	Introduction – Meaning of creativity, Invention and innovation – Types of Innovation- Relevance of Technology for Innovation – Introduction and need for Intellectual Property Rights (IPR) – Kinds of IPR – National IPR Policy.
<b>II</b>	Patents – Introduction and origin of Patent System in India – Conceptual Principles of Patent law in India – Process for obtaining patent - Rights granted to a patentee.
<b>III</b>	Trademarks: Origin of Trade Marks – Types – Functions – Distinctiveness and Trademarks – Meaning of Good Trademark – Rights granted by Registration of Trademarks – Infringement of Trademark.
<b>IV</b>	Copyright: Introduction and Evolution of copyright – Objectives and fundamentals of copyright law – Requirements for copyrights – Works protectable under copyrights – Authorship and ownership – Rights of Authors and copyright owners – Infringement of copyright.
<b>V</b>	Geographical Indications: Introduction and concept of Geographical Indications – History - Administrative Mechanism – Benefits of Geographical Indications – Infringement of registered Geographical Indication. Case study: The story of the Tirupati Laddu.

<\*-Self Study>

**Text Books:**

1. Nithyananda, K V. (2019). Intellectual Property Rights: Protection and Management. India, IN:Cengage Learning India Private Limited.
2. Neeraj, P., & Khusdeep, D. (2014). Intellectual Property Rights. India, IN: PHI learning Private Limited.

**Reference Books:**

1. Ahuja, V K. (2017). Law relating to Intellectual Property Rights. India, IN: Lexis Nexis.

**E-references:**

1. <https://blog.ipleaders.in/ipr-description>
2. <https://www.studocu.com/in/document/vaikunta-baliga-college-of-law/intellectual-property-1/principles-underlying-the-patent-law-in-india/69170267>
3. <https://bytescare.com/blog/objectives-of-copyright-act-1957>
4. <https://blog.ipleaders.in/geographic-indication-law-in-india/>

**Mapping with Programme Specific Outcomes**

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO 5
CO1	H	M	M	M	M
CO2	H	M	M	M	M
CO3	H	M	M	M	M
CO4	H	M	M	M	M
CO5	H	M	M	M	M

**H**-High, **M**- Medium, **L**- Low

# GOBI ARTS & SCIENCE COLLEGE (Autonomous),

## GOBICHETTIPALAYAM.

### DEPARTMENT OF COMPUTER SCIENCE (AI&DS)

#### ADVANCED LEARNERS COURSE

### MongoDB

### 24ALAI01

#### Course Objective

The course aims

1. List and identify the fundamental concepts of MongoDB.
2. Describe and apply advanced MongoDB querying techniques.
3. Demonstrate the ability to design and implement complex MongoDB database structures.
4. Execute and evaluate performance optimization strategies for MongoDB databases.

#### Course Outcomes (CO)

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

Knowledge Level	CO Number	Course Outcome
K1,K2	CO1	Define the key features of MongoDB and distinguish between SQL and NoSQL databases.
K1,K2	CO2	Demonstrate proficiency in creating and managing MongoDB databases and collections.
K1,K2,K3	CO3	Implement data modeling best practices and analyze data using aggregation pipelines.
K1,K2,K4	CO4	Evaluate and optimize MongoDB performance through indexing, sharding, and replication strategies.
K1,K2,K4	CO5	Analyze case studies and real-world examples to understand how MongoDB can be applied to solve complex data storage challenges.

K1–Remember; K2–Understanding; K3–Apply; K4–Analyze; K5–Evaluate

#### SYLLABUS

Unit	Content	No. of Hours
I	Introduction to MongoDB-Overview of NoSQL databases, <b>Introduction to MongoDB:</b> What it is and its features-Installation and setup of MongoDB-CRUD operations (Create, Read, Update, Delete) in MongoDB, <b>Data modeling basics:</b> Collections and documents	12
II	MongoDB Querying-Querying documents using the find() method, <b>Query operators:</b> \$eq, \$gt, \$lt, \$in, \$and, \$or, etc., <b>Projection:</b> Specifying fields to return-Sorting and limiting results-Indexing for query performance	12

<b>III</b>	<b>Data Modeling in MongoDB</b> -Schema design considerations-Embedded vs. referenced documents-One-to-one, one-to-many, and many-to-many relationships-Normalization vs. denormalization-Techniques for optimizing data models	<b>12</b>
<b>IV</b>	<b>Advanced MongoDB Concepts</b> -Aggregation framework: \$group, \$match, \$project, etc.-MapReduce for complex data processing-Transactions and atomicity-Geospatial queries and indexes-Full-text search with text indexes	<b>12</b>
<b>V</b>	MongoDB Administration and Scaling, <b>Replica sets:</b> Setup and configuration, <b>Sharding:</b> Horizontal scaling for large datasets-Monitoring and performance tuning-Backup and disaster recovery strategies, <b>Security best practices:</b> Authentication, authorization, encryption	<b>12</b>

**Text Book:**

1. Rick Copeland, "MongoDB Applied Design Patterns", O'Reilly Media 1st Edition, 2013.

**Reference Books:**

1. Kristina Chodorow and Shannon Bradshaw, "MongoDB: The Definitive Guide", O'Reilly Media 3rd Edition, 2019.
2. Kyle Banker, "MongoDB in Action", Manning Publications, 2nd Edition, 2016.
3. Kristina Chodorow and Shashank Tiwari, "Scaling MongoDB", Packt Publishing 1st Edition, 2020.
4. Cyrus Dasadia and Amol Nayak, "MongoDB Cookbook", Packt Publishing 2nd Edition, 2019.

**E-references:**

**1. MongoDB Official Documentation:**

The most authoritative source of information on MongoDB, covering everything from basic concepts to advanced features.

URL: <https://docs.mongodb.com/>

**2. MongoDB University:**

Offers free online courses on MongoDB, from basics for beginners to advanced topics for experienced developers and DBAs.

URL: <https://university.mongodb.com/>

**3. MongoDB Blog:**

Features articles, tips, and the latest news from MongoDB engineers and users. A great resource for staying up-to-date with MongoDB developments.

URL: <https://www.mongodb.com/blog>

**4. Stack Overflow:**

A vast community of developers, including many MongoDB experts. Great for getting answers to specific questions or problems you might encounter.

URL: <https://stackoverflow.com/questions/tagged/mongodb>

**5. GitHub MongoDB Repository:**

Access MongoDB's source code, contribute to the project, or explore the codebase to understand its internal workings.

URL: <https://github.com/mongodb/mongo>

**6. MongoDB's Official YouTube Channel:**

Contains a variety of tutorials, webinars, and presentations on MongoDB's features and best practices.

URL: <https://www.youtube.com/user/MongoDB>

**7. MongoDB Developer Center:**

A hub for developers with guides, articles, and tutorials on developing applications with MongoDB.

URL: <https://developer.mongodb.com/>

**8. MongoDB API Documentation:**

Detailed documentation of MongoDB's various APIs, including querying, aggregation, and database commands.

URL: <https://docs.mongodb.com/manual/reference/>

**9. Reddit MongoDB Community:**

A community where you can discuss topics related to MongoDB, share resources, and get help from other MongoDB users.

URL: <https://www.reddit.com/r/mongodb/>

**10. MongoDB Atlas Documentation:**

If you're using MongoDB Atlas, MongoDB's cloud service, this documentation covers everything from setup to advanced configurations.

URL: <https://docs.atlas.mongodb.com/>

Mapping with Programme Specific  
Outcomes

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	L
CO2	S	M	S	H	H
CO3	S	S	M	S	S
CO4	M	H	H	S	S
CO5	L	H	S	S	S

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),  
GOBICHETTIPALAYAM.**

**DEPARTMENT OF COMPUTER APPLICATIONS (UA)**

**ADVANCED LEARNERS COURSE**

**PC Hardware and Servicing**

**24ALCA01**

**Course Objective**

**The course aims**

- To make students aware of the interior components of a computer.
- To let the students know the basic signs of troubles in a PC.
- To provide the students with the knowledge on troubleshooting and servicing.
- To Assemble and repair Desktop Computer with all its hardware components
- To Install different Operating System and all other application software
- To Install Printer, Scanner and troubleshoot their faults.

**Course Outcomes (CO)**

- CO 1** Understanding Various Peripherals of a PC.  
**CO 2** Gaining knowledge to install operating system software.  
**CO 3** Providing knowledge to install various application and antivirus software's  
**CO 4** Providing practical ideas to install a printer and knowing the options.  
**CO 5** Making student to know the basic networking techniques

<b>SYLLABUS</b>		
<b>UNIT</b>	<b>CONTENT</b>	<b>HOURS</b>
<b>I</b>	PC cabinet components and various motherboards components, slots, ports (USB, VGA, DVI, and HDMI), cables and Connectors. CMOS BIOS set up, DDR3 and DDR4 RAM's FSB, Processor Installation POST: Definition – IPL hardware – POST Test sequence – beep codes.	
<b>II</b>	Boot the PC through a BOOTABLE Disc of OS. Partition the disk, Format the drive. Install Windows 7/10 from Disk.	
<b>III</b>	Install various application software programs in windows. Install Firefox and chrome browse Install any popular antivirus software. <b>*Online and offline updating of antivirus.</b> View its various options. On and off Firewall option inside antivirus software.	
<b>IV</b>	Installing a printer and carrying self-test, Replacement of toner cartridge of laser printers.	
<b>V</b>	Create simple VLAN and understand the concepts. Practice IP Addressing technique (IPv4/IPv6) and Sub netting and Super netting the network Practice to set up and use SMTP, TELNET, FTP, HTTP, SNMP, LDAP, SSH, NTP, IPP, HTTPS etc	

**\*-SELF STUDY**

**TEXT BOOK:**

1. Mark Edward Sooper, *“PC Troubleshooting and Repair Guide”*, BPB Publications, First Edition, 2017. (Unit I - V)

**Mapping with Programme Specific Outcomes**

<b>CO \ PSO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
<b>CO1</b>	S	S	M	S	S
<b>CO2</b>	S	M	H	H	M
<b>CO3</b>	H	S	H	S	H
<b>CO4</b>	M	H	S	H	M
<b>CO5</b>	M	S	H	H	M

S - Strong; H - High; M - Medium; L – Low

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),**

**GOBICHETTIPALAYAM.**

**DEPARTMENT OF PHYSICS**

**ADVANCED LEARNERS COURSE**

**PHYSICS APTITUDE, TEXT FOR JAM AND JEST**

**24ALPH01**

**Course Objectives:**

- Review and reinforce fundamental concepts in physics.
- Practice solving problems similar to those found in the JAM exam.
- Develop effective study strategies and time management skills for exam preparation.
- Familiarize with the exam format, making scheme, and question types.
- Gain confidence and readiness to excel in the Physics JAM exam.

**Classical Mechanics**

- Kinematics and dynamics
- Newton's laws of motion
- Work, energy, and power
- Conservation laws (momentum, energy)

**Electromagnetism**

- Electrostatics: Coulomb's law, electric field, Gauss's law
- Magnetostatics: Biot-Savart law, Ampere's law, magnetic field
- Electromagnetic induction and Faraday's law
- Maxwell's equations and electromagnetic waves

**Quantum Mechanics**

- Wave-particle duality
- Schroedinger equation
- Quantum states and operators
- Atomic structure and spectral lines

**Thermodynamics and Statistical Mechanics**

- Laws of thermodynamics
- Heat engines and refrigerators
- Ideal gas laws and kinetic theory
- Statistical distributions and partition functions

**Mathematical Methods in Physics**

- Vector calculus: gradient, divergence, curl
- Ordinary and partial differential equations
- Complex numbers and functions
- Fourier series and transforms

## **Optics and Waves**

- Geometrical optics: reflection, refraction, lenses
- Interference and diffraction
- Wave properties of light
- Polarization and optical instruments

## **Atomic and Nuclear Physics**

- Atomic spectra and Bohr model
- Quantum theory of hydrogen atom
- Radioactivity and nuclear reactions
- Elementary particles and accelerators

## **Special Relativity**

- Postulates of special relativity
- Lorentz transformations
- Time dilation and length contraction
- Relativistic kinematics and dynamics

## **Practice Tests and Problem Solving**

- Review of previous topics through practice tests
- Solving problems similar to JAM exam questions
- Time management strategies for exam day

## **Revision and Final Exam Preparation**

- Review of key concepts and problem-solving techniques
- Mock exam under timed conditions
- Final tips and strategies for exam success

## **References**

- “Concepts of Physics” by H.C. Verma
- “Introduction to Electrodynamics” by David J. Griffiths
- “Principles of Quantum Mechanics” by R. Shankar
- Previous years’ JAM exam papers and practice question banks

## **Course outcomes**

1. Mastery of fundamental physics concepts and principles relevant to the JAM exam.
2. Proficiency in problem-solving techniques specific to the types of question typically found in the JAM exam.
3. Ability to apply theoretical knowledge to practical scenarios and experimental setups
4. Development of critical thinking skills necessary for analyzing complex physics problems.
5. Enhancement of time management skills to effectively tackle timed exam situations.

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**GOBI ARTS & SCIENCE COLLEGE (Autonomous),  
GOBICHETTIPALAYAM.**

**DEPARTMENT OF PHYSICS (UA)  
ADVANCED LEARNERS COURSE**

**PROBLEM SOLVING IN PHYSICS (UA)**

**24ALPH02**

**Course Objective**

The course aims

- To encourage students to develop the problem-solving skills.
- To enable them appearing for competitive exams confidently.
- To help the students aspiring for higher studies.

**Course Outcomes (CO)**

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

Knowledge Level	CO Number	Course Outcome
<b>K1-K4</b>	<b>CO1</b>	Acquire the basic concepts of classical mechanics
	<b>CO2</b>	Get in-depth knowledge and solve problems in classical mechanics
	<b>CO3</b>	Learn various mathematical methods applied in physics.
	<b>CO4</b>	Obtain the knowledge of mathematical analysis in physics.
	<b>CO5</b>	Solve problems using the mathematical techniques.

**K1** - Remember; **K2** - Understanding; **K3** - Apply; **K4** – Analyze

**SYLLABUS**

Unit	Content	No. of Hours
<b>I</b>	<b>Classical Mechanics:</b> Newton's laws - Phase space dynamics, stability analysis - Central force motions - Two body Collisions, Scattering in laboratory and Centre of mass frames - Rigid body dynamics, moment of inertia tensor, non-inertial frames and pseudo forces - Variational principle, Lagrangian and Hamiltonian formalism and equations of motion.	
<b>II</b>	<b>Classical Mechanics:</b> Poisson brackets and canonical transformations - Symmetry, invariance and conservation laws and cyclic coordinates -Periodic motion: small oscillations, normal modes - Special theory of relativity, Lorentz transformations, relativistic kinematics and mass–energy equivalence.	

<b>III</b>	<b>Mathematical Methods in Physics:</b> Dimensional analysis - Vector algebra and vector calculus - Linear algebra – matrices – Cayley Hamilton Theorem – Eigen values problems - Linear ordinary differential equations – Special functions (Hermite, Bessel, Laguerre and Legendre functions).
<b>IV</b>	<b>Mathematical Methods in Physics:</b> Fourier series - Fourier and Laplace transforms - Elements of complex analysis - Laurent series; poles, residues and evaluation of integrals – Elementary ideas about tensors - Introductory group theory – SU (2), O (3).
<b>V</b>	<b>Mathematical Methods in Physics:</b> Elements of computational techniques - root of functions, interpolation, extrapolation, integration by trapezoid and Simpson’s rule, Solution of first order differential equation using Runge- Kutta method - Finite difference methods - Elementary probability theory, random variables, binomial, Poisson and normal distributions.

**Books for Study:**

1. Dr. Surekha Tomar, CSIR-UGC NET/JRF/SET Physical Science , 4<sup>th</sup> edition,
2. Upkar Prakashan, Agra-2 (NOTE: Problems only from Book for Study)  
 Unit I & II : Pages: 148 – 168 and Pages: 185 – 205  
 Unit III, IV & II : Pages: 38 –55 and Pages : 101 – 122

**E-references:**

1. <https://youtu.be/GOkZs2RZMQY?si=OotPqvDxUHOgqP0c>
2. <https://youtu.be/sVDqnMD-ja4?si=nF6icWQAR5LcfNhK>
3. <https://youtu.be/XIXQ38JnF0k?si=Kcd9u3ofrSJrDMX1>
4. <https://youtu.be/sCZ80l6UarM?si=Up9F2S3H-qHfjVQT>
5. [https://youtu.be/gUF42BiUFL0?si=jDmjvW2wEvn\\_HhS](https://youtu.be/gUF42BiUFL0?si=jDmjvW2wEvn_HhS)
6. [https://www.youtube.com/watch?v=0znQzdm4vU&list=PLvyl1YgaAepLZpteZ7rs0SQ87\\_MBIIJ6x&index=10&pp=iAQB](https://www.youtube.com/watch?v=0znQzdm4vU&list=PLvyl1YgaAepLZpteZ7rs0SQ87_MBIIJ6x&index=10&pp=iAQB)
7. [https://youtu.be/Q-62beQ\\_O9g?si=yFOysR4IMG2XFHhy](https://youtu.be/Q-62beQ_O9g?si=yFOysR4IMG2XFHhy)
8. <https://youtu.be/THUEM0wv5OI?si=pCzwkA60YOyOFZ0n>
9. <https://youtu.be/jocgxxtwFvk?si=5CPksId486veJjip>
10. <https://youtu.be/dxHUIuu07rc?si=WUTFBlk0GSAmRCBb>
11. <https://youtu.be/-tP-cxErI-A?si=D0C5nI6gS2gpOagP>
12. [https://youtu.be/c06FZ2Yq9rk?si=Dqb\\_TvTrAdIQcOmQ](https://youtu.be/c06FZ2Yq9rk?si=Dqb_TvTrAdIQcOmQ)

**Mapping with Programme Specific Outcomes**

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	H	H	S	H	S
<b>CO2</b>	S	H	S	M	H
<b>CO3</b>	H	H	M	S	M
<b>CO4</b>	S	S	H	H	M
<b>CO5</b>	H	H	S	M	H

S - Strong; H - High; M - Medium

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),  
GOBICHETTIPALAYAM.  
DEPARTMENT OF CHEMISTRY (UNAIDED)  
ADVANCED LEARNERS COURSE**

**PROBLEM SOLVING IN SPECTROSCOPY  
24ALCH02**

**Course Objective**

**The course aims**

- To acquire a clear idea about the identification of unknown compounds.
- To understand the basic knowledge of advanced spectroscopic techniques.
- To understand the problem solving techniques of organic spectroscopy.
- To develop the analytical skills and explain the various spectroscopic patterns for organic molecules.

Unit	Content
<b>I</b>	Ultraviolet and Visible Spectroscopy – Applications of Woodward-Fieser rules for calculation of $\lambda_{\max}$ for the following systems: $\alpha, \beta$ unsaturated aldehydes, ketones, carboxylic acids, esters and conjugated dienes.
<b>II</b>	NMR - chemical shift and factors influencing. Anisotropic effects in alkenes, alkynes, aldehydes and aromatics. Interpretation of NMR spectra of organic compounds.
<b>III</b>	$^{13}\text{C}$ NMR, introduction to FT technique, relaxation phenomena, NOE effects, $^1\text{H}$ and $^{13}\text{C}$ chemical shifts to structure correlations.
<b>IV</b>	Recent advances in NMR techniques: Introduction - basic principles of $^{31}\text{P}$ - NMR and $^{19}\text{F}$ - NMR.
<b>V</b>	Data interpretation and structural characterization - IR, Raman & Mass spectra of organic compounds.

**Text Books:**

1. C. N. Banwell, Fundamentals of Molecular spectroscopy, Mc Graw Hill, New York, 3<sup>rd</sup> Edition, (1972).
2. William Kemp, Organic spectroscopy, Macmillan London, 3<sup>rd</sup> Edition, (2016).
3. S. K Dewan, Organic spectroscopy, NMR, IR, UV and Mass, CBS publishers & Distributors, 1<sup>st</sup> Edition, (2010).
4. J. R. Dyer, Applications of Absorption spectroscopy of organic compounds, Prentice Hall of India Pvt. Ltd, 1<sup>st</sup> Edition, (1929).
5. Donald L. Pavia, Gary M. Lampman and Georges. Kriz, Introduction to spectroscopy, Cengage publisher, 5<sup>th</sup> Edition, (2015).
6. Y. R. Sharma, Elementary Organic Absorption Spectroscopy, S. Chand, (2013).

## Reference Books:

1. R. M. Silverstein and G. C. Basler, Spectroscopic identification of organic compounds, John Wiley and Sons, New York, 6<sup>th</sup> Edition, (1967).
2. R. S. Drago, Physical Methods in Inorganic Chemistry, Wiley Eastern, 4<sup>th</sup> and 5<sup>th</sup> Editions, (1992).
3. M. L. Martin, J. J. Depeuch and G. J. Martin, Practical NMR spectroscopy, Heyden London, (1980).
4. R. J. Abraham, J. Fisher and P. Loftus, Introduction to NMR spectroscopy - Wiley - Blackwell, Reprint edition, (1988).

**GOBI ARTS & SCIENCE COLLEGE (Autonomous),  
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**DEPARTMENT OF MATHEMATICS  
ADVANCED LEARNERS COURSE**

**VEDIC MATHEMATICS**

**24ALMA01**

<b>SYLLABUS</b>		
<b>Unit</b>	<b>Content</b>	<b>No.of Hours</b>
<b>I</b>	Miscellaneous Simple Method	
<b>II</b>	Criss-Cross System of Multiplication	
<b>III</b>	Squaring Numbers	
<b>IV</b>	Cube Roots of Perfect Cubes	
<b>V</b>	Square Roots of Perfect Squares	

**Text Book:**

DHAVAL BATHIA, Vedic Mathematics Made Easy, JAICO Publishing house,  
2005.