

ಸ್ಥಾಪನೆ: ೨೦೧೭

Centenary Celebrated Sharnbasveshwar Vidya Vardhaka Sangha's

Estd. : 2017



ಶರಣಬಸವ  
SHARNBASVA  
ಕಲಬುರಗಿ - ೫೮೫ ೧೦೩



ವಿಶ್ವವಿದ್ಯಾಲಯ  
UNIVERSITY  
KALABURAGI-585 103



A State Private University approved by Govt. of Karnataka vide Notification No. ED 144 URC 2016 dated 29-07-2017  
Recognised by UGC under Section 2f vide No. F.8-29/2017 (CPP-I/PU), dated 20-12-2017 & AICTE, CoA, PCI New Delhi

# CURRICULUM

## Outcome Based Education

### 2021 - 2022

## ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

**V & VI SEMESTER B. Tech.**

**FACULTY OF ENGINEERING ANF TECHNOLOGY  
(EXCLUSIVELY FOR WOMEN)**

**SHARNBASVA UNIVERSITY, KALABURAGI**

## About Sharnbasva University

Sharnbasva University established in the year 2017, is the first private multi-disciplinary university in the entire North Karnataka providing avenues for students to pursue higher education in almost all fields of education such as Engineering, Management, Science, commerce, Architecture, Pharmaceutical Sciences, Humanities, and Social Sciences. Providing quality education at an affordable cost has been the hallmark of the university. The university has set itself on the path to one of the emerging centres of excellence and a world-class University, which is the dream of Poojya Dr. Sharnbaswappa Appa, the visionary chancellor of the youngest private university in the entire state.

The Sharnbasva University is backed by the rich legacy of more than 100 years of providing quality education to the deprived sections of the people in the educationally backward Kalaburagi and neighbouring districts. The Sharnabasaveshwar Vidya Vardak Sangha, under whose aegis the Sharnbasva University is functioning, has the honor of starting the first school exclusively for girls way back in 1934 opening doors of learning to the girls. The legacy of providing optimum importance to girl education has continued to this day and the Sangha was the first to start an exclusive engineering college for women in the entire North Karnataka and the second in the entire Karnataka. This College is now part of Sharnbasva University. The university houses five Center of Excellence (CoE) in Artificial Intelligence, Machine Learning, the Internet of Things, Drone Technology, 5G and 6G Technology Lab.

### The institution offers:

- 4-year undergraduate program - Bachelor of Technology (in Artificial Intelligence & Data Science, Civil, Computer Science, Computer System Design, Energy Engineering, Electronics & Communication, Electrical & Electronics, Mechanical).
- 4-year undergraduate program (Exclusively for Women) - Bachelor of Technology (in Artificial Intelligence & Machine Learning, Civil, Computer Science, Electronics & Communication, Electrical & Electronics, Mechanical).
- 2-Year Post Graduate Programs - Master of Technology (Structural Engineering, VLSI Design & Embedded Systems, Machine Design, Computer Science and Engineering, Computer Network Engineering, Artificial Intelligence and Data Science, Digital Electronics) and Ph. D Programs
- 2-Year Post Graduate Programs - Master of Technology (Exclusively for Women) (Computer Science and Engineering, Digital Communication and Networking) and Ph. D Programs
- 5 Years Under program – Bachelor of Architecture (B. Arch.)
- 3-Year undergraduate programs – Bachelor of Computer Applications (BCA), – Co-Education and Exclusively for Women, Bachelor of Business Administration (BBA) BBA (HR, Finance and Marketing)– Co-Education and Exclusively for Women, BBA (Logistics), BBA (Tourism & Travel Mgmt.), BBA (Aviation and Air cargo) for Exclusively for Women.

- 2-Year Post Graduate programs - Master of Computer Application (MCA) and Ph. D Programs.
- 2-Year Post Graduate programs - Master of Business Administration (MBA) – Co-Education and Exclusively for Women, MBA (Tourism), MBA (Hospital Administration). Master of Commerce and Ph. D programs.
- 2-Year Post Graduate Programs – Master of Arts (MA) – MA (Kannada, English), MA (Fine Arts), MA (Journalism and Mass Comm.), MA (Music), MA (Visual Arts) and Ph. D Programs.
- 2 Year Post Graduate Programs – Master of Science (M. Sc.) – M. Sc. (Physics), M. Sc. (Mathematics), M. Sc. (Botany), M. Sc. (Zoology) and Ph. D Programs.

### **University Vision:**

- Enhancing the horizon of world knowledge by promoting international understanding through imparting quality education and creating value added skill based human resource.
- We aspire to become top ranking National and International Centre of Excellence producing high caliber leaders and captains of Industry.
- Inculcating the spirit of "Vasudaiva Kudumbakam" (The world is one family).
- "Sakala Jeevathmarige Lesane Bayasuva" (Wishing the worldly good and betterment of all the living beings) is our moto.

### **University Mission**

- Achieving academic excellence through innovatively designed, research intensive, industry-oriented education.
- Imbibing the culture of independent thinking, independent writing, independent speaking and independent living among the students in all the activities.
- Foster the spirit of National development and develop global competencies. Nurture creativity and encourage entrepreneurship and provide an education with rigor and relevance.
- Provide academically excellent, time efficient, and cost-effective higher education. Provide an education which enhances the ability of students to learn throughout the life.
- Ensure freedom of thought and expression and a campus without discrimination. Encourage the spirit of questioning and ensure close inter-relationship between Teaching, Scholarship and Research.
- Develop and deliver distinctive and value driven academic programme that are flexible and responsible to Local, National and International needs.
- Cultivate academic, business and community driven partnership that positions the University as a leading choice for adult learners.
- To work effectively with other institutions and organisations, where such partnerships can lead to understanding research and teaching.

## **About Faculty of Engineering and Technology (Exclusively for Women):**

The Faculty of Engineering and Technology (Exclusively for Women) (FETW), formerly known as Godutai Engineering College for Women, was established in 2017. It is the only women's engineering college in the entire northern backward part of Karnataka state, meeting the rapidly growing need for women professionals in technology. Nurturing young minds in an innovative and progressive learning environment, we are committed to promoting technical education as a catalyst for the country's and society's growth and development, a dream of our Chancellor and President, Poojya Dr. Sharnbaswappa Appa. With world-class infrastructure and experienced faculty, the Faculty of Engineering and Technology is the preferred destination for technocrats shaping the future.

FETW offers the following B.Tech. (Undergraduate) programs:

- Artificial Intelligence and Machine Learning (AI & ML) – 60 seats
- Civil Engineering (CV) – 60 seats
- Computer Science and Engineering (CSE) – 150 seats
- Electrical and Electronics Engineering (EEE) – 60 seats
- Electronics and Communication Engineering (ECE) – 120 seats

M. Tech. (Postgraduate) programs:

- Computer Science and Engineering (CSE) – 18 seats
- Digital Communication and Networking (DCN) – 18 seats

Research Programs (Ph.D.):

- Computer Science and Engineering
- Electronics and Communication Engineering
- Electrical and Electronics Engineering
- Basic Sciences (Physics, Chemistry, Mathematics)

### **Vision of the Institute**

**We aspire to become global model for women professional through quality education and ethical values in the field of engineering and technology.**

### **Mission of the Institute**

- **To inspire a research culture, encourage entrepreneurial efforts and empower globally to be great leaders.**
- **To create technical women's power to meet the current and future demand of the industry.**
- **To develop women professionals with good academic knowledge, technical skills, strong ethics and above all good human being.**

## **About the Department:**

The Department of B. Tech. in Artificial Intelligence and Machine Learning (AI and ML) at the Faculty of Engineering and Technology (Exclusively for Women) was established in the year 2021 with an intake of 60 students. It is a four-year full-time undergraduate program recognized by the All-India Council for Technical Education (AICTE). Artificial Intelligence and Machine Learning aim to develop a strong foundation by using principles and technologies that consist of many facets of Artificial Intelligence, including logic, knowledge representation, probabilistic models, and machine learning.

To nourish the young minds, the department has a team of dedicated and experienced faculty with good infrastructure, curriculum, comprehensive hands-on experience, and conducting research in the field of Artificial Intelligence & Machine Learning.

The department has well-equipped laboratories with higher configuration systems along with a smartboard available in the laboratory to provide the best to the students. The department has a wide technical spectrum through the centre of excellence, special labs, industrial tie-ups, collaborations, MOUs, and online forums.

## **Vision**

To train women professionals to create sustainable, intelligent solutions that work with natural intelligence to empower future generations digitally while protecting social ethics.

## **Mission**

1. To provide female students with the necessary foundational skills to pursue a successful career in the field of computer science and engineering, with a focus on artificial intelligence and machine learning.
2. To Improve academic outcomes through location-based education and relationships with established research laboratories and enterprises.
3. To Inspire young women to pursue entrepreneurial endeavours and help them grow into influential leaders.

## **Program Educational Outcomes (PEOs)**

After a few years of graduation with a B. Tech. in Artificial Intelligence and Machine Learning, the girl graduates will be able:

- PEO-1: To analyse the problems by applying the principles of computer science, mathematics, and scientific investigation to build intelligent machines, software, or applications using the latest technologies to solve problems of the real world.
- PEO-2: To start an enterprise to improve the economy of the country by providing support to the customer for a lifelong learning attitude.

- PEO-3: To Pursue higher studies with research potential in the field of Artificial intelligence, Engineering in allied areas and continue to learn by participating in conferences, and seminars, etc.

## Program Outcomes (POs)

On successful completion of the program, the graduates of the B. Tech. in Artificial Intelligence and Machine Learning program will be able to:

- **PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, and engineering fundamentals for the solution of complex problems in Artificial Intelligence and Machine Learning.
- **PO2: Problem analysis:** Identify, formulate, research literature, and analyze engineering problems to arrive at substantiated conclusions using the first principles of mathematics, nature, and engineering sciences.
- **PO3: Design/development of solution:** Design solutions for complex engineering problems and design system components, and processes to meet the specifications with consideration for public health and safety, and cultural, societal, and environmental considerations.
- **PO4: Conduct Investigation of a complex problem:** Use research-based knowledge including design of experiments, analysis, and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO6: Engineering and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO7: Environment and sustainability:** Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
- **PO9: Individual and Teamwork:** Function effectively as an individual, and as a member or leader in teams, and multidisciplinary settings.
- **PO10: Communication:** Communicate effectively with the engineering community and with society at large. Be able to comprehend and write effective report documentation. Make effective presentations and give and receive clear instructions.
- **PO11: Project management and finance:** Demonstrate knowledge and understanding of engineering and management principles and apply these to

one's work, as a member and leader in a team. Manage projects in multidisciplinary environments.

- **PO12: Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### **Program-Specific Outcomes (PSOs)**

Upon successful completion of the B. Tech. in Artificial Intelligence and Machine Learning (AI and ML) program, graduates will possess the following abilities:

**PSO1:** Understand, analyze, and develop vital skills in areas related to computer science and artificial intelligence, with a focus on underlying statistical and computational principles. Apply this knowledge to solve practical problems.

**PSO2:** Demonstrate the ability to implement AI and ML techniques, including search algorithms, neural networks, machine learning, and data analytics, for solving problems and designing novel algorithms. Develop skills essential for a successful career and entrepreneurship.

**PSO3:** Utilize modern tools and techniques in computer science, artificial intelligence, and data science.

**Semester wise Credit Breakdown for B. Tech. Degree Curriculum Batch 2021-24**

	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eight	Total Credits
<b>Basic Sciences (BSC)</b>	7	7	3	3	-	-	-	-	20
<b>Engineering Sciences (ESC)</b>	10	10	-	-	-	-	-	-	20
<b>Humanities, Social Sciences and Management (HSMC)</b>	1	1	1	1	-	4	1	-	9
<b>Ability Enhancement Course (AEC)</b>	1	1	1	1	1	1	-	-	6
<b>Professional Core Courses(PCC)</b>	-	-	15	15	12	5	12	-	59
<b>Professional Elective Courses (PEC)</b>	-	-	-	-	3	6	3	-	12
<b>Institutional Open Elective Courses(IOE)</b>	-	-	-	-	4	4	4	-	12
<b>Internship (INT)</b>	-	-	-	-	-	-	-	7	7
<b>Mini Project / Project Work (PW)</b>	1	1	1	1	1	1	1	8	15
<b>Total Credits</b>	<b>20</b>	<b>20</b>	<b>21</b>	<b>21</b>	<b>21</b>	<b>21</b>	<b>21</b>	<b>15</b>	<b>160</b>

**Sharnbasva University, Kalaburagi Scheme of Teaching and Examination 2021-22**  
**Outcome Based Education (OBE) and Choice Based Credit System (CBCS)**  
**(Effective from the academic year 2021-22)**

**Programme: B. Tech.: Artificial Intelligence and Machine Learning**

**VII SEMESTER**

Sl. No.	Course Code		Course Title	Teaching Department	Teaching Hours/week			Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in Hours	CIE Marks	SEE Marks	Total Marks	
1.	PCC	21CS71	Big Data Analytics	CSE/ AIML	2	1		3	50	50	100	03
2.	PCC	21AM72	Natural Language Processing	CSE/ AIML	2	1		3	50	50	100	03
3.	PCC	21AM73	Blockchain Technology	CSE/ AIML	2	1		3	50	50	100	03
4.	PEC	21AM74X	Professional Elective Course-IV	CSE/ AIML	2	1		3	50	50	100	03
5.	OEC	21AM75X	Open Elective Course-III	CSE/ AIML	2	1		3	50	50	100	04
6.	PCC	21AML76	Big Data Analytics Lab	CSE/ AIML			2	3	50	50	100	01
7.	PEC	21AML77	Natural Language Processing Lab	CSE/ AIML			2	3	50	50	100	01
8.	PCC	21AML78	Blockchain Technology Lab	CSE/ AIML			2	3	50	50	100	02
9.	PW	21PRJ79	Project-VII	Humanities	1			2	50	50	100	01
10.	HSS	21HSM710	Industrial Psychology and Organizational Behavior									
11.	Internship	--	Internship	To be carried out during vacation *								
<b>Total</b>					<b>11</b>	<b>5</b>	<b>6</b>	<b>26</b>	<b>450</b>	<b>450</b>	<b>900</b>	<b>21</b>

Note: PCC-Professional Core Course, PEC-Professional Elective Course, OEC-Open Elective Course, PW-Project Work, HSS-Humanity and Social Science, AEC- Ability Enhancement Course. Internship-To be carried out during the vacat-ion/s of VI and VII semesters or VII and VIII semesters

Project (PRJ): Based on the ability /abilities of the student/s and recommendations of the mentor, a single discipline or multidisciplinary mini project can be Assigned to an individual student or to a group having not more than 4 students.

**Open Elective Course-III (offered by the Department to other Department students)**

<b>Course code under 21XX75X</b>	<b>Course Title</b>
21AM751	Applications of Artificial Intelligence in Healthcare
21AM752	Deep Learning

**AICTE Activity Points:** In case students fail to earn the prescribed activity points, Eighth semester Grade Card shall be issued only after earning the required activity points. Student shall be admitted for the award of the degree only after the release of the Eighth semester Grade Card.

<b>Course code under 21XX75X</b>	<b>Course Title</b>
21AM741	Data Visualization
21AM742	Applications of Artificial Intelligence in Industry
21AM743	Robotics Process Automation Design and Development
21AM744	Mobile Application Development

Sharnbasva University, Kalaburagi  
 Scheme of Teaching and Examination 2021-22  
 Outcome Based Education (OBE) and Choice Based Credit System (CBCS)  
 (Effective from the academic year 2021-22)

Programme: B. Tech.: Artificial Intelligence and Machine Learning

VIII SEMESTER

Sl. No.	Course Code		Course Title	Teaching Department	Teaching Hours/week			Examination			Credits	
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in Hours	CIE Marks	SEE Marks		Total Marks
					L	T	P					
1	Project	21PRJ81	Research Project / Field Project - VIII			06	3	50	50	100	07	
2	Internship	21AMI82	Internship			12	3	50	50	100	08	
<b>Total</b>						<b>18</b>	<b>06</b>	<b>100</b>	<b>100</b>	<b>200</b>	<b>15</b>	

Note: PCC-Professional Core Course, PEC-Professional Elective Course, OEC-Open Elective Course, PW-Project Work, HSS-Humanity and Social Science, AEC- Ability Enhancement Course. Internship-To be carried out during the vacation/s of VI and VII semesters or VII and VIII semesters

Project (PRJ): Based on the ability /abilities of the student/s and recommendations of the mentor, a single discipline or multidisciplinary mini project can be assigned to an individual student or to a group having not more than 4 students.

**Note: Project-8 Manufacturable and marketable project / Research project/Field Project.**

Sharnbasva University, Kalaburagi  
Scheme of Teaching and Examination 2021-

22

**Outcome Based Education(OBE) and Choice Based Credit System (CBCS)  
(Effective from the academic year 2021-22)**

**Programme: B. Tech.: Artificial Intelligence and Machine Learning**

**List of Professional Electives**

<b>Group1 Artificial Intelligence And Machine Learning</b>		<b>Group2 Data Analytics</b>		<b>Group3 Emerging Technologies</b>	
<b>Subject Code</b>	<b>Subject Name</b>	<b>Subject Code</b>	<b>Subject Name</b>	<b>Subject Code</b>	<b>Subject Name</b>
21AM634	Augmented Reality	21AM632	Business Intelligence	21AM541	IoT Technology & Applications
21AM642	Multiagent Systems	21AM633	Social Network Analysis	21AM542	Computer Graphics & Visualization
21AM643	Predictive Analytics	21AM731	Pattern Recognition	21AM543	Oops with Java
21AM742	Applications of Artificial Intelligence in Industry	21AM743	Robotics Process Automation Design & Development	21AM631	Cryptography & Network Security
		21AM741	Data Visual Analytics	21AM641	Distributed & Cloud Computing
		21AM733	Data Warehousing & Multi-Dimensional Modeling	21AM644	Multimedia Computing
		21AM744	Statistical Technique for Data Science	21AM741	Cyber Security
				21AM734	Mobile Application Development



<b>B.Tech. in Artificial Intelligence &amp; Machine Learning (2021-Scheme)</b> Outcome Based Education (OBE) and Choice Based Credit System (CBCS) VII Semester, w.e.f (2024-25)			
<b>Big Data Analytics</b>			
Subject Code	21CS71	CIE Marks	<b>50</b>
Number of Lecture Hours/Week	3	SEE Marks	<b>50</b>
Total Number of Lecture Hours	40	Exam Hours	<b>03</b>
<b>CREDITS - 03</b>			
<b>Course objectives:</b>			
<ul style="list-style-type: none"> <li>• Understand Hadoop Distributed File system and examine MapReduce Programming</li> <li>• Explore big data programming to manipulate, store, and analyze the data.</li> <li>• Explore Hadoop tools and manage Hadoop with Ambari &amp; Appraise the role of Business intelligence and its applications across industries.</li> <li>• Assess core data mining techniques &amp; data visualization for data analytics.</li> <li>• Identify various Text Mining techniques, clustering models.</li> </ul>			
Module I			Teaching Hours
Hadoop Distributed File System Basics, Running Example Programs and Benchmarks, Hadoop MapReduce Framework, MapReduce Programming.			8 Hours
Module II			
<b>INTRODUCTION TO MongoDB</b> : What is Mongo DB?, Why Mongo DB?, Using Java Script Object Notation(JSON), Creating or generation a unique key, support for dynamic queries, storing binary data, replication, sharding, updating information in-place, 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 search criteria-find method, dealing with NULL values, count, Limit, Sort, and skip, Arrays , Aggregate Function, MapReduce Function, Java Script Programming, Cursors in MongoDB, Indexes, Mongo Import, Mongo Export, Automatic Generation of unique numbers for the "- id" field.			8 Hours
Module III			
Essential Hadoop Tools, Business Intelligence Concepts and Application, Data Warehousing, Data Mining.			8 Hours
Module IV			
Data Visualization, Decision Trees, Regression, Artificial Neural Networks.			8 Hours
Module V			
Cluster Analysis, Association Rule Mining, Text Mining, Naïve-Bayes Analysis, Social Network Analysis			8 Hours
<b>Course Outcomes:</b> After studying this course, students will be able to: CO1: Apply HDFS architecture and MapReduce programming to process large datasets. CO2: Analyze big data programming techniques to manipulate, store, and interpret data. CO3: Examine Hadoop ecosystem tools and evaluate their role in Business Intelligence and Data Warehousing. CO4: Evaluate data visualization methods and apply decision tree models for decision-making. CO5: Analyze clustering, association rule mining, and text-mining techniques for data analytics.			

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SEE Questionpaperpattern:

- The question paper will have ten questions.
- There will be 2 questions from each module.
- Each question will have questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

TextBooks:

1. Douglas Eadline, "Hadoop 2 Quick-Start Guide: Learn the Essentials of Big Data Computing in the Apache Hadoop 2 Ecosystem", 1st Edition, Pearson Education, 2016. ISBN-13: 978-9332570351
2. Anil Maheshwari, "Data Analytics", 1st Edition, McGraw Hill Education, 2017. ISBN-13: 978-9352604180
3. Big data and Analytics: Seema Acharya (Infosys Ltd.), Subhashini Hellappan (Infosys Ltd.)

**Reference Books:**

1. Douglas Eadline, "Hadoop 2 Quick-Start Guide: Learn the Essentials of Big Data Computing in the Apache Hadoop 2 Ecosystem", 1st Edition, Pearson Education, 2016. ISBN-13: 978-9332570351
2. Tom White, "Hadoop: The Definitive Guide", 4th Edition, O'Reilly Media, 2015. ISBN-13: 978-9352130672
3. Boris Lublinsky, Kevin T Smith, Alexey Yakubovich, "Professional Hadoop Solutions", 1st Edition, Wrox Press,

E-books and Online course materials

1. Noreen Burlingame, The little book on Big Data, New Street publisher (eBook)  
<http://www.prlog.org/11800911-just-published-the-little-book-of-big-data-2012-edition.html>
2. [http://www.johndcook.com/R\\_language\\_for\\_programmers.html](http://www.johndcook.com/R_language_for_programmers.html)
3. [http://bigdatauniversity.com/.](http://bigdatauniversity.com/)

Online Courses and Video Lectures

1. [https://onlinecourses.nptel.ac.in/noc20\\_cs92/preview](https://onlinecourses.nptel.ac.in/noc20_cs92/preview)
2. <https://www.youtube.com/watch?v=Uv96qQ3uC6Y&list=PLWPirh4EWFpENnR0p1JvhJkyTK1M0sOLR>
3. <https://youtu.be/r5k-RLIpuA>
4. <https://www.youtube.com/watch?v=fUPV776pY2M>
5. [https://www.youtube.com/watch?v=sQ4ZOjPD9wE&list=PLT4WSVLdb6zoyNJt7W6LYSZyp\\_hXPPn8-v](https://www.youtube.com/watch?v=sQ4ZOjPD9wE&list=PLT4WSVLdb6zoyNJt7W6LYSZyp_hXPPn8-v)

**B.Tech. in Artificial Intelligence & Machine Learning (2021-Scheme)**  
 Outcome Based Education (OBE) and Choice Based Credit System (CBCS)  
 VII Semester, w.e.f (2024-25)

**Natural Language Processing**

<b>Subject Code</b>	<b>21AM72</b>	<b>CIE Marks</b>	<b>50</b>
<b>Number Lecture Hour/Week</b>	<b>03</b>	<b>SEE Marks</b>	<b>50</b>
<b>Number of Lecture Hours</b>	<b>40</b>	<b>Exam Hours</b>	<b>03</b>

**CREDITS-03**

**Course Objectives:** The objectives of the course isto enable students to:

1. Analyze the Natural Language Text.
2. Define the importance of natural language.
3. Understand the concept of Text Mining.
4. Illustrate information retrieval techniques

**Module I**

**Teaching Hours**

**Overview and language modeling:** Overview: Origins and challenges of NLP-Language and Grammar-Processing Indian Languages- NLP Applications-Information Retrieval. Language Modeling: Various Grammar- based Language Models-Statistical Language Model.

08 Hours

**Module II**

**Word level and syntactic analysis:** Word Level Analysis: Regular Expressions-Finite State Automata-Morphological Parsing-Spelling Error Detection and correction-Words and Word classes-Part-of Speech Tagging. Syntactic Analysis: Context-free Grammar Constituency-Parsing-Probabilistic Parsing.

08 Hours

**Module III**

**Extracting Relations from Text: From Word Sequences to Dependency Paths:**Introduction, Subsequence Kernels for Relation Extraction, A Dependency-Path Kernel for Relation Extraction and Experimental Evaluation.

**Mining Diagnostic Text Reports by Learning to Annotate Knowledge Roles:** Introduction, Domain Knowledge and Knowledge Roles, Frame Semantics and Semantic Role Labeling, Learning to Annotate Cases with Knowledge Roles and Evaluations.

**A Case Study in Natural Language Based Web Search:** InFact System Overview, The GlobalSecurity.org Experience.

08 Hours

**Module IV**

**Evaluating Self-Explanations in iSTART:**Word Matching, Latent Semantic Analysis, and Topic Models: Introduction, iSTART: Feedback Systems, iSTART: Evaluation of Feedback Systems,

**Textual Signatures: Identifying Text-Types Using Latent Semantic Analysis to Measure the Cohesion of Text Structures:** Introduction, Cohesion, Coh-Matrix, Approaches to Analyzing Texts, Latent Semantic Analysis, Predictions, Results of Experiments.

**Automatic Document Separation: A Combination of Probabilistic Classification and Finite-State Sequence Modeling:** Introduction, Related Work, Data Preparation, Document Separation as a Sequence Mapping Problem, Results.

**Evolving Explanatory Novel Patterns for Semantically-Based Text Mining:** Related Work, A Semantically Guided Model for Effective Text Mining.

08 Hours

**Module V**

<b>Information Retrieval:</b> Design features of Information Retrieval Systems-Classical,non classical, Alternative Models of Information Retrieval – valuation Lexical Resources: World Net-Frame NetStemmers-POS Tagger- Research Corpora.	08 Hours
<b>Course Outcomes:</b> After studying this course, students will be able to: <b>CO1:</b> Analyze language processing techniques for Indian languages and identify associated challenges. <b>CO2:</b> Apply POS tagging and syntactic parsing methods using grammar-based and statistical approaches. <b>CO3:</b> Examine relation extraction methods using dependency paths and kernel techniques. <b>CO4:</b> Evaluate semantic text-mining models and derive meaningful linguistic patterns. <b>CO5:</b> Compare and evaluate classical and non-classical models of information retrieval systems.	
<b>Question Paper Pattern:</b> <ul style="list-style-type: none"> <li>➤ The question paper will have ten questions.</li> <li>➤ Each full question consisting of 20 marks.</li> <li>➤ There will be 2 full questions (with a maximum of four sub questions) from each module.</li> <li>➤ The students will have to answer 5 full questions, selecting one full question from each module.</li> </ul>	
<b>Text Books:</b> <ol style="list-style-type: none"> <li>1. Tanveer Siddiqui, U.S. Tiwary, “Natural Language Processing and Information Retrieval”, Oxford University Press, 2008.</li> <li>2. Anne Kao and Stephen R. Poteet (Eds), “Natural Language Processing and Text Mining”, Springer-Verlag London Limited 2007</li> </ol>	
<b>Reference Books:</b> <ol style="list-style-type: none"> <li>1. Daniel Jurafsky and James H Martin, “Speech and Language Processing: An introduction to Natural Language Processing, Computational Linguistics and Speech Recognition”, 2nd Edition, Prentice Hall, 2008.</li> <li>2. James Allen, “Natural Language Understanding”, 2nd edition, Benjamin/Cummings publishing company, 1995.</li> <li>3. Gerald J. Kowalski and Mark.T. Maybury, “Information Storage and Retrieval systems”, Kluwer academic Publishers, 2000.</li> </ol>	
<b>E-books and Online course materials</b> <ol style="list-style-type: none"> <li>1. <a href="https://www.geeksforgeeks.org/top-natural-language-processing-nlp-books/">https://www.geeksforgeeks.org/top-natural-language-processing-nlp-books/</a></li> <li>2. <a href="https://shorturl.at/jlkkH">https://shorturl.at/jlkkH</a> (Handbook Of Natural Language Processing, Second Edition Chapman &amp; Hall Crc Machine Learning &amp; Pattern Recognition 2010).</li> </ol>	
<b>Online Courses and Video Lectures</b> <ol style="list-style-type: none"> <li>1. <a href="https://www.coursera.org/specializations/natural-language-processing">https://www.coursera.org/specializations/natural-language-processing</a>.</li> <li>2. <a href="https://onlinecourses.nptel.ac.in/noc23_cs45/preview">https://onlinecourses.nptel.ac.in/noc23_cs45/preview</a></li> </ol>	

<b>B.Tech. in Artificial Intelligence &amp; Machine Learning (2021-Scheme)</b> Outcome Based Education (OBE) and Choice Based Credit System (CBCS) VII Semester, w.e.f (2024-25)			
Blockchain Technology			
Subject Code	21AM73	CIE Marks	50
Number Lecture Hour/Week	03	SEE Marks	50
Number of Lecture Hours	40	Exam Hours	03
CREDITS-03			
Course objectives:			
<ul style="list-style-type: none"> <li>• Define and explain the fundamentals of Blockchain</li> <li>• Illustrate the technologies of blockchain</li> <li>• Describe the models of blockchain.</li> <li>• Analyze and demonstrate the Ethereum</li> </ul>			
Modules			Teaching Hours
Module I			
Blockchain101: Distributed systems, History of blockchain, Introduction to blockchain, Types of blockchain, CAP theorem and blockchain, Benefits and limitations of blockchain.			08 Hours
Module II			
Decentralization and Cryptography: Decentralization using blockchain, Methods of decentralization, Routes to decentralization, Decentralized organizations. Cryptography and Technical Foundations: Cryptographic primitives, Asymmetric cryptography, Public and private keys			08 Hours
Module III			
Bitcoin and Alternative Coins A: Bitcoin, Transactions, Blockchain, Bitcoin payments B: Alternative Coins Theoretical foundations, Bitcoin limitations, Name coin, Litecoin, Primecoin, Zcash			08 Hours
Module IV			
Smart Contracts and Ethereum 101: Smart Contracts: Definition, Ricardian contracts. Ethereum 101: Introduction, Ethereum blockchain, Elements of the Ethereum blockchain, Precompiled contracts.			08 Hours
Module V			
Alternative Blockchains: Blockchains Outside of Currencies: Internet of Things, Government, Health, Finance, Media			08 Hours
Course outcomes			
At the end of the course the student will be able to:			
<b>CO1:</b> Explain the concepts, components, and limitations of blockchain technology.			
<b>CO2:</b> Apply decentralization principles and cryptographic mechanisms in blockchain applications.			
<b>CO3:</b> Analyze the structure, features, and challenges of Bitcoin and alternative cryptocurrencies.			
<b>CO4:</b> Analyze smart contracts and illustrate the functioning of the Ethereum ecosystem.			
<b>CO5:</b> Evaluate blockchain-based applications in diverse domains beyond digital currencies.			
Text Books:			
1. Mastering Blockchain - Distributed ledgers, decentralization and smart contracts explained, Imran Bashir, Packt Publishing Ltd, Second Edition, ISBN 978-1-78712-544-5, 2017.			
Reference Books:			
<ol style="list-style-type: none"> <li>1. Bitcoin and Cryptocurrency Technologies, Arvind Narayanan, Joseph Bonneau, Edward Felten, 2016.</li> <li>2. Blockchain Basics: A Non-Technical Introduction in 25 Steps, Daniel Drescher, Apress, First Edition, 2017.</li> </ol>			

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**3. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, Andreas M. Antonopoulos, O'Reilly Media, First Edition, 2014**

E-books and Online course materials

1. <http://www.digimat.in/nptel/courses/video/106104220/L01.html>
2. <https://github.com/BlockchainBooks/blockchainbooks.github.io?tab=readme-ov-file#mastering-bitcoin-programming-the-open-blockchain-2nd-edition-2017-download>
3. <https://www.youtube.com/watch?v=9aXHQ98TMRY>

Online Courses and Video Lectures

1. [https://onlinecourses.nptel.ac.in/noc22\\_cs44/preview](https://onlinecourses.nptel.ac.in/noc22_cs44/preview)

<b>Data Visualization</b> [As per NEP, Outcome Based Education, and Choice Based Credit System (CBCS) Scheme] SEMESTER-VII			
Subject Code	21AM741	CIE Marks	50
Number Lecture Hour/Week	03	SEE Marks	50
Number of Lecture Hours	40	Exam Hours	03
<b>CREDITS-03</b>			
<p><b>Course Objectives</b> The objectives of the course is to enable students to:</p> <ul style="list-style-type: none"> <li>• Understand the role and importance of data visualization in communication.</li> <li>• Apply core design principles to create clear and impactful visualizations.</li> <li>• Identify and select appropriate visualization techniques for different data types and goals.</li> <li>• Gain practical experience using popular data visualization tools like Excel, Power BI, Tableau, and Python libraries.</li> <li>• Develop the ability to critique and evaluate existing visualizations.</li> </ul>			
<b>Module -1</b>			<b>Teaching Hours</b>
<p><b>Introduction to Data Visualization: The Power of Data Visualization:</b> Understanding the role of data visualization in communication, storytelling with data. <b>Human Perception and Visual Design:</b> Exploring how humans perceive visual information and applying design principles for effective visualizations. <b>Data Types and Visualizations:</b> Matching visualization techniques to different data types (nominal, ordinal, quantitative) and exploring common chart types (bar charts, line charts, pie charts, scatter plots, etc.).</p>			08 Hours
<b>Module -2</b>			
<p><b>Data Preparation and Exploration:</b>  <b>Data Cleaning and Transformation:</b> Preparing data for visualization by identifying and addressing missing values, outliers, and inconsistencies. <b>Data Exploration Techniques:</b> Learning exploratory data analysis (EDA) methods to uncover patterns and trends in data. <b>Color Theory and Visual Encoding:</b> Understanding color theory and applying effective color palettes for clear communication.</p>			08 Hours
<b>Module -3</b>			
<p><b>Data Visualization using Excel Introduction to Excel Charts:</b> Creating basic and advanced charts in Excel (bar charts, line charts, pie charts, scatter plots). <b>Chart Customization and Formatting:</b> Fine-tuning chart elements (axes, labels, legends, titles) for optimal presentation. <b>Interactive Dashboards in Excel:</b> Building simple dashboards with charts and tables to present key findings.</p>			08 Hours
<b>Module -4</b>			
<p><b>Introduction to Advanced Visualization Tools</b>  <b>Microsoft Power BI:</b> Exploring Power BI for data analysis and creating interactive visualizations. <b>Tableau Desktop:</b> Introduction to Tableau's interface and building basic visualizations with its drag-and-drop functionality. <b>Python for Data Visualization:</b> Learning the basics of Python libraries like Matplotlib and Seaborn for creating customized visualizations. (<b>Note:</b> Basic programming experience is recommended)</p>			08 Hours
<b>Module -5</b>			
<b>Design for Impact and Evaluation</b>			

<p><b>Design Principles for Effective Visualizations:</b> Applying design principles (clarity, hierarchy, simplicity, etc.) to create impactful presentations. <b>Data Visualization Best Practices:</b> Understanding common pitfalls and best practices for creating effective data visualizations. <b>Evaluating Visualizations:</b> Learning how to critique and evaluate existing visualizations for clarity, accuracy, and effectiveness.</p>	<p>08 Hours</p>
<p><b>Course Outcomes:</b> After studying this course, students will be able to:  CO1: Understand Principles of Data Visualization  CO2: Master Visualization Tools and Techniques  CO3: Data Preparation and Preprocessing  CO4: Interactive and Dynamic Visualizations  CO5: Hands-on Project Experience</p>	
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. "Visualize This: The Flowing Data Guide to Design, Visualization, and Statistics" by Nathan Yau</li> <li>2. "Data Visualization in Excel: A Guide for Beginners, Intermediates, and Wonks" by Jon Schwabish.</li> </ol>	
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. "The Functional Art: An Introduction to Information Graphics and Visualization" by Alberto Cairo</li> <li>2. "Show Me the Numbers: Designing Tables and Graphs That Communicate Effectively" by Stephen Few</li> </ol>	

<b>B.Tech. in Artificial Intelligence &amp; Machine Learning (2021-Scheme)</b> Outcome Based Education (OBE) and Choice Based Credit System (CBCS) VII Semester, w.e.f (2024-25)			
<b>Applications of Artificial Intelligence In Industry</b>			
Subject Code	21AM742	CIE Marks	50
Number Lecture Hour/Week	03	SEE Marks	50
Number of Lecture Hours	40	Exam Hours	03
CREDITS-03			
Course Objectives:			
<ul style="list-style-type: none"> <li>To introduce Artificial Intelligence in detail from its basics to future applications and tools of Industry 4.0</li> <li>To provide insights on technological advancements and focuses on preparing students and researchers for Industry 5.0</li> <li>To impart the importance of AI technologies in assistive technology</li> <li>To discuss the available applications of AI for promoting early diagnosis of diseases</li> <li>To understand the various AI technologies.</li> </ul>			
Modules			TeachingHours
Module I			
Artificial Intelligence Insight: Artificial Intelligence: What and Why? History of AI? What is AI? The Basics, AI Environment, Challenges in AI, Current work in AI for environment, Customer Experience (CX) and the use of AI, Future of AI, Future challenges in AI.			08 Hours
Module II			
Influence of AI in Machine Learning: Definition What is Machine Learning, Importance of Machine Learning, Types of Machine Learning, Approaches of Machine Learning Machine Learning Algorithm, Programming Languages, Frameworks, Databases, Deployment tools, Methodology for Model Building, Machine learning methods, Statistical Measures, Application areas of Machine Learning, Medical Machine Learning, Influence of AI and ML in Clinical and Genomic Diagnostics.			08 Hours
Module III			
Artificial Intelligence in Healthcare sector & Assistive Technology (AT): AI in diagnosis of Genetic Diseases, Cancer, Diabetes, AI in Diagnosis of Syndrome, AI in diagnosis of Psychiatric Disorders, Depression, Alzheimer's Disease, Autism Spectrum Disorder, Anxiety, Parkinson's Disease, AI in other Diagnosis, Infectious Disease, Lung and Brain Disease, Case studies on AI in systems Biology, AI technologies in Systems Biology towards Pharmacogenomics, AI in Systems Biology for Cancer Cure, Applications of AI for COVID-19 Pandemic, Transformative impact of AI on AT, AI experience and AT for disables people in India, AI Powered technology for an inclusive world.			08 Hours
Module IV			
Artificial Intelligence in Agriculture: Need of AI in Agriculture, Emerging Agricultural Technologies, Soil and water sensors, Weather Tracking, Satellite Imaging Agriculture, Automation Systems, RFID Technology, Potential Agricultural Domain for Modernization, AI transformation in Agricultural Scenarios.			08 Hours
Module V			
Artificial Intelligence in Radiotherapy: Importance of Artificial Intelligence in Radiotherapy, AI tools for automated treatment planning (ATP), Present ATP techniques, AI applications, Advancements and Research Guidance in ATP, AI challenges in ATP, AI in Intensity modulated Radiotherapy (IMRT), AI for IMRT Dose Estimation, AI for IMRT Planning Support, AI for Modeling IMRT outcome			08 Hours

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and plan deliverability, AI for AUTO-Segmentation of OAR in IMRT, AI in Brachytherapy, AI in Radiotherapy Quality Assurance, Challenges associate with AI for Quality Assurance in RT, Future directions to improve AI-based Quality Assurance in RT, AI in Radiation Biology, AI in Radiation Protection/Safety, Motivations to develop AI-Based systems for Radiation protection.	
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Course outcomes: At the end of the course the student will be able to: <b>CO1:</b> Explain foundational concepts and methodologies of Artificial Intelligence and Machine Learning. <b>CO2:</b> Apply machine learning algorithms and tools to domain-specific industrial problems. <b>CO3:</b> Evaluate AI-enabled diagnostic and assistive technologies in healthcare applications. <b>CO4:</b> Analyze AI-driven solutions that enhance agricultural productivity and crop management. <b>CO5:</b> Assess advancements and challenges in AI-assisted radiotherapy automation and quality assurance.
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Text Books: 1.Kaliraj, P., & Devi, T. (Eds.). (2021). Artificial Intelligence Theory, Models, and Applications (1st ed.). CRC Press, Taylor & Francis Group, Boca Raton, e-book ISBN: 9781032008097 Auerbach Publications. <a href="https://doi.org/10.1201/9781003175865">https://doi.org/10.1201/9781003175865</a> .
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E-Books <ul style="list-style-type: none"><li>• <a href="https://www.riverpublishers.com/research_details.php?book_id=1024">https://www.riverpublishers.com/research_details.php?book_id=1024</a></li><li>• <a href="https://link.springer.com/book/10.1007/978-3-658-43843-2">https://link.springer.com/book/10.1007/978-3-658-43843-2</a></li><li>• <a href="https://link.springer.com/book/10.1007/978-3-030-85383-9">https://link.springer.com/book/10.1007/978-3-030-85383-9</a></li><li>• <a href="https://www.futurelearn.com/courses/artificial-intelligence-technology-application">https://www.futurelearn.com/courses/artificial-intelligence-technology-application</a></li></ul>
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<b>ROBOTICS PROCESS AUTOMATION DESIGN &amp; DEVELOPMENT</b> [As per NEP, Outcome Based Education, and Choice Based Credit System (CBCS) Scheme] SEMESTER-VII			
Subject Code	<b>21AM743</b>	CIE Marks	50
Number Lecture Hour/Week	03	SEE Marks	50
Number of Lecture Hours	40	Exam Hours	03
<b>CREDITS-03</b>			
<b>Course Objectives</b> The objectives of the course is to enable students to:			
<ul style="list-style-type: none"> <li>• To understand basic concepts of RPA.</li> <li>• To Describe IIPA, where it can be applied and how it implemented.</li> <li>• To describe the different types of variables, Control Flow and data manipulation techniques.</li> <li>• To Understand Image,Text and Data Tables Automation.</li> <li>• To Describe various types of Exceptions and strategies to handle</li> </ul>			
<b>Module -1</b>			<b>Teaching Hours</b>
What is RPA - Irlavors of RPA- History of RPA- The Benefits of RPA- The downsides of RPA- RPA Compared to BPO, BPM and BPA- Consumer Willingness for Automation- The Workforce of the Future- RPASkills-On-Premise Vs. the Cloud- Web Technology- Programming Languagesand Low Code- 0CR-Databases-APIs- AI- Cognitive Automation-Agile, Scrum, Kanban and Waterfall0 Devops- Flowcharts.			08 Hours
<b>Module -2</b>			
RPA Platforms- Components of I{PA- IIPA Platforms-About Ui Path- About UiPath - The future of automation - Iecord and Play - Downloading and installing UiPath Studio -Learning Ui Path Studio- - Task recorder - Step-by step examples using the recorder.			08 Hours
<b>Module -3</b>			
Sequence, Flowchart, and Control Flow-sequencing the workflow- Activities-Control flow, various types of loops, and decision making-Step-bystep example using Sequence and Flowchart-Step-by-step example using Sequence and Control flow-Data Manipulation-Variables and Scope-Collections-Arguments - Purpose and use-Data table usage with examples-Clipboard management-File operation with step-by-step example-CSV/Excel to data table and vice versa (with a step-by-step example).			08 Hours
<b>Module -4</b>			
Taking Control of the Controls- Finding and attaching windows- Finding the control- Techniques for waiting for a control- Act on controls - mouse and keyboard activities- Working with UiHxplorer- Handling events- Revisit recorder- Screen Scraping- When to use OCR- Types of 0CR available- How to use 0CR- Avoiding typical failure points			08 Hours
<b>Module -5</b>			
Exception Handling, Debugging, and Logging- Exception handling- Common exceptions and ways to handle them- Logging and taking screenshots-Debugging techniques- Collecting crash dumps- Error reporting- Future of RPA			08 Hours
<b>Course Outcomes:</b> After studying this course, students will be able to:			
CO-1- To Understand the basic concepts of RPA.			
CO-2- To Describe various components and platforms of RPA.			
CO-3- To Describe the different types of variables, control flow and data manipulation techniques			
CO-4- To Understand various control techniques and OCR in RPA.			
CO-5- To Describe various types and strategies to handle exception.			
<b>Question Paper Pattern:</b>			

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- The question paper will have ten questions.
  - Each full question consisting of 20 marks.
  - There will be 2 full questions (with a maximum of four sub questions) from each module.
  - The students will have to answer 5 full questions, selecting one full question from each module.

**Text Books:**

1. Tom I'auli, The Robotic Process Automation Handbook : A Guide to Implementing RPA Systems, 2020, ISBN-13 (electronic): 978-7-4842-5729-6, Publisher : A press

2. Alok Mani Tripathi, Learning Robotic Process Automation, Publisher: Packet Publishing Release Date: March 2018 ISBN: 9787788470940

**Reference Books:**

1. Frank Casale, Rebecca Dilla, Iieidi Jaynes, Lauren Livingston, "Introduction to Robotic Process Automation: a Primer", Institute of Robotic Process Automation.
2. Richard Murdoch, Robotic Process Automation: Guide'Io Building Software Robots, Automate Repetitive Tasks & Become An RPA Consultant
3. Srikanth Merianda, Robotic Process Automation Tools, Process Automation and their benefits: Understanding RPA and Intelligent Automation

<b>MOBILE APPLICATION DEVELOPMENT</b>			
[As per NEP, Outcome Based Education, and Choice Based Credit System (CBCS) Scheme]			
SEMESTER-VII			
Subject Code	21AM744	CIE Marks	50
Number Lecture Hour/Week	3	SEE Marks	50
Number of Lecture Hours	40	Exam Hours	03
CREDITS-03			
<b>Course Objectives</b> The objectives of the course is to enable students to:			
5. Learn to setup Android application development environment			
6. Illustrate user interfaces for interacting with apps and triggering actions			
7. Interpret tasks used in handling multiple activities			
8. Identify options to save persistent application data			
9. Appraise the role of security and performance in Android applications			
Module -1			Teaching Hours
Get started, Build your first app, Activities, Testing, debugging and using support libraries			08 Hours
Module -2			
User Interaction, Delightful user experience, Testing your UI			08 Hours
Module -3			
Background Tasks, Triggering, scheduling and optimizing background tasks			08 Hours
Module -4			
All about data, Preferences and Settings, Storing data using SQLite, Sharing data with content providers, Loading data using Loaders			08 Hours
Module -5			
Permissions, Performance and Security, Firebase and AdMob, Publish			08 Hours
<b>Course Outcomes:</b> After studying this course, students will be able to:			
CO1 Create, test and debug Android application by setting up Android development environment			
CO2 Implement adaptive, responsive user interfaces that work across a wide range of devices.			
CO3 Infer long running tasks and background work in Android applications			
CO4 Demonstrate methods in storing, sharing and retrieving data in Android applications			
CO5 Analyze performance of android applications and understand the role of permissions and security			
<b>Text Books:</b>			
1. Google Developer Training, "Android Developer Fundamentals Course – Concept Reference", Google Developer Training Team, 2017. <a href="https://www.gitbook.com/book/google-developer-training/android-developerfundamentals-course-concepts/details">https://www.gitbook.com/book/google-developer-training/android-developerfundamentals-course-concepts/details</a> (Download pdf file from the above link)			
<b>Reference Books:</b>			
1. Erik Hellman, "Android Programming – Pushing the Limits", 1st Edition, Wiley India Pvt Ltd, 2014.			
2. Dawn Griffiths and David Griffiths, "Head First Android Development", 1st Edition,			

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O'Reilly SPD Publishers, 2015.

3. J F DiMarzio, "Beginning Android Programming with Android Studio", 4th Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126565580

4. Anubhav Pradhan, Anil V Deshpande, " Composing Mobile Apps" using Android, Wiley 2014, ISBN: 978-81-265-4660-2

<b>OBJECT ORIENTED PROGRAMMING WITH JAVA</b>			
SubjectCode	21CS752	CIEMarks	<b>50</b>
NumberofLecture Hours/Week	04	SEEMarks	<b>50</b>
TotalNumberof LectureHours	48	ExamHours	<b>03</b>
<b>CREDITS - 04</b>			
<b>Courseobjectives:</b>			
<ul style="list-style-type: none"> <li>• To Learn the principles of object-oriented programming.</li> <li>• To Understand programming features of Java.</li> <li>• To gain knowledge on: Inheritance, exception handling, Packages&amp; interface</li> <li>• To Understand multithreading concept and event handling in java.</li> <li>• To understand event driven Graphical User Interface (GUI) programming using applets.</li> </ul>			
Module-I			Teaching Hours
Introduction to Object Oriented Concepts: Procedure-Oriented and Object Oriented Programming System, Principles of Object Oriented Programming, Differences between C , C++ and Java, Console I/O, variables and reference variables, Function Prototyping, Function Overloading. Class and Objects: Introduction, member functions and data, objects and functions. Text book 1: Ch 1: 1.2 to 1.9 Ch 2: 2.1 to 2.3			10 Hours
Module-II			
Introduction to Java: Bytecode, Features of Java, Java Applications, Building and Running Java Program, Java Tokens, Data Types, Variables, Operators, Type Conversion and Casting, Arrays, Access Specifiers, Control Statements. Classes: Classes fundamentals, Declaring objects, Constructors, this keyword, garbage collection. Text book 2: Ch:1 Ch: 2 Ch:3 Ch:4 Ch:5 Ch:6			10 Hours
ModuleIII			
Inheritance & Exception Handling: Inheritance: inheritance basics, using super, creating multi level hierarchy, method overriding. Exception Handling: Exception handling in Java. Packages & Interfaces: Defining Package, Access Protection, and Importing Packages;Interfaces:Defining and Implementing Interfaces, Nested Interfaces. Text book 2:Ch: 8 CH: 9 Ch:10			10 Hours
ModuleIV			
Multi Threaded Programming:Multi Threaded Programming: What are threads? How to make the classes threadable ; Extending threads; Implementing runnable; Synchronization; Changing state of the thread; Bounded buffer problems, producer consumer problems. Event Handling: Two event handling mechanisms; The delegation event			10 Hours

model; Event classes; Sources of events; Event listener interfaces; Using the delegation event model; Text book 2: Ch 11 Ch 22	
Module V	
Applets: Applet basics, Applet Skeleton, Simple Applet Display Methods, Repaint method, Simple Banner Applet, HTML Applet Tag, Passing Parameters to Applet, get Document Base and get Code Base methods, Applet Context Interface. Java Input/Output: Stream classes, Byte Streams: InputStream, Output Stream, FileInputStream, FileOutputStream, PrintStream, DataInputStream, DataOutputStream; Text book 2: Ch 21 Ch 19	8 Hours
SEE Question paper pattern: <ul style="list-style-type: none"> <li>• The question paper will have ten questions.</li> <li>• There will be 2 questions from each module.</li> <li>• Each question will have questions covering all the topics under a module.</li> </ul> The students will have to answer 5 full questions, selecting one full question from each module.	
<b>Course Outcomes</b> CO1: Use the concepts of object-oriented programming. CO2: Use java programming concepts for program development. CO3: Apply the concepts of inheritance and exceptions for solving in real world problems CO4: Apply the concepts of Multi Threaded Programming and event handling CO5: Use the concepts of Applet to create Simple web applications.	
TextBooks: <ol style="list-style-type: none"> <li>1. Sourav Sahay, Object Oriented Programming with C++ , 2nd Ed, Oxford University Press, New Delhi, 2012.</li> <li>2. Herbert Schildt, Java the Complete Reference, 7th Edition, Tata McGraw Hill, 2007.</li> </ol>	
<b>Reference Books:</b> <ol style="list-style-type: none"> <li>1. Mahesh Bhavde and Sunil Patekar, "Programming with Java", First Edition, Pearson Education, 2008, ISBN:9788131720806.</li> <li>2. Rajkumar Buyya, S Thamaraiselvi, Xingchen Chu, Object oriented Programming with java, Tata McGraw Hill education private limited.</li> <li>3. E Balagurusamy, Programming with Java A primer, Tata McGraw Hill companies.</li> <li>1. Anita Seth and B L Juneja, JAVA One step Ahead, Oxford University Press, 2017.</li> </ol>	
E-books and Online course materials <ul style="list-style-type: none"> <li>• <a href="https://www.geeksforgeeks.org/object-oriented-programming-oops-concept-in-java/">https://www.geeksforgeeks.org/object-oriented-programming-oops-concept-in-java/</a>.</li> <li>• <a href="https://freecomputerbooks.com/OOP-Learn-Object-Oriented-Thinking-and-Programming.html">https://freecomputerbooks.com/OOP-Learn-Object-Oriented-Thinking-and-Programming.html</a></li> <li>• <a href="https://freecomputerbooks.com/javaBasicBooks.html">https://freecomputerbooks.com/javaBasicBooks.html</a></li> <li>• <a href="https://archive.nptel.ac.in/courses/106/105/106105191/">https://archive.nptel.ac.in/courses/106/105/106105191/</a></li> </ul>	

**B.Tech. in Artificial Intelligence & Machine Learning (2021-Scheme)**  
 Outcome Based Education (OBE) and Choice Based Credit System (CBCS)  
 VII Semester, w.e.f (2024-25)

**BIG DATA ANALYTICS LAB**

<b>Course Code</b>	21AML76	<b>CIE Marks</b>	50
<b>Number of Lecture Hours/Week</b>	02	<b>SEE Marks</b>	50
<b>Total Number of Lecture Hours</b>	30	<b>Exam Hours</b>	3

**CREDITS - 01**

**Course Learning objectives:** This course will enable students to:

- To implement MapReduce programs for processing big data.
- To understand the data manipulations using hadoop tools
- To analyze big data using machine learning techniques such as Decision tree classification and clustering

**PART-A**

1.	Hadoop Programming: Word Count MapReduce Program
2.	Implementing Matrix Multiplication Using Map-Reduce.
3.	Implementing Relational Algorithm on Pig.
4.	Implementing database operations on Hive.
5.	Implementing Frequent Item set algorithm using Map-Reduce.
6.	Implementing Clustering algorithm using Map-Reduce
7.	Implementing Page Rank algorithm using Map-Reduce
8.	Develop a MapReduce to find the maximum electrical consumption in each year given electrical consumption for each month in each year.
9.	Develop a MapReduce to analyze weather data set and print whether the day is shinny or cool day.

**Course Outcomes:** After studying this course, students will be able to:

- CO1:** Apply Hadoop and MapReduce programming concepts in implementing big-data tasks.  
**CO2:** Use Hadoop ecosystem tools such as Pig, Hive, and Sqoop for data processing.  
**CO3:** Debug and optimize big-data workflows for efficient execution.  
**CO4:** Analyze the results of clustering, classification, and pattern-extraction experiments.  
**CO5:** Prepare structured documentation of experiments, observations, and outcomes.

**Conduct of Practical Examination:**

- Experiment distribution
  - a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
  - b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.
- Marks Distribution
  - a) For laboratories having only one part - Procedure + Execution + Viva-Voce:  $8+35+7 = 50$  Marks
  - b) For laboratories having PART A and PART B
    - i. Part A - Procedure + Execution + Viva =  $3 + 14+ 3 = 20$  Marks
    - ii. Part B - Procedure + Execution + Viva =  $5 + 21 + 4 = 30$  Marks



<b>B.Tech. in Artificial Intelligence &amp; Machine Learning (2021-Scheme)</b> Outcome Based Education (OBE) and Choice Based Credit System (CBCS) VII Semester, w.e.f (2024-25)			
<b>NATURAL LANGUAGE PROCESSING LAB</b>			
Subject Code	21AML77	CIE Marks	50
Number Lecture Hour/Week	02	SEE Marks	50
Number of Lecture Hours		Exam Hours	03
<b>CREDITS-01</b>			
<b>Course Objectives</b> The objectives of the course is to enable students to: <ol style="list-style-type: none"> <li>1. Be able to discuss the current and likely future performance of several NLP applications.</li> <li>2. Be able to describe briefly a fundamental technique for processing language for several subtasks, such as morphological processing.</li> <li>3. Implement parsing, word sense disambiguation and etc.</li> <li>4. Understand how these techniques draw on and relate to other areas of AI and ML.</li> <li>5. Understand the basic principles of designing and running an NLP experiment.</li> </ol>			
<b>Programs List:</b>			
<b>Practicing Problems in Python(Students can be encouraged to practice good number of practice problems , some practice problems are listed here )</b>			
<b>PART-A</b>			
1	a. Write a python program to perform tokenization by word and sentence using nltk. b. Write a python program to eliminate stopwords using nltk. c. Write a python program to perform stemming using nltk.		
2	a. Write a python program to perform Parts of Speech tagging using nltk. b. Write a python program to perform lemmatization using nltk.		
3	a. Write a python program for chunking using nltk. b. Write a python program to perform Named Entity Recognition using nltk.		
4	a. Write a python program to find Term Frequency and Inverse Document Frequency (TF-IDF). b. Write a python program for CYK parsing (Cocke Younger-Kasami Parsing) or Chart Parsing.		
5	a. Write a python program to find all unigrams, bigrams and trigrams present in the given corpus. b. Write a python program to find the probability of the given 31 statement "This is my cat" by taking the an example corpus into consideration		
6	Write a python program to Implement Probabilistic Context Free Grammar & Find the inside probability of a word.		
7	Write a python program to demonstrate Information Extraction.		
8	Write the python code to perform sentiment analysis using NLP.		
9	Write the python code to develop Spam Filter using NLP.		
10	Write the python code to detect Fake News using NLP.		
<b>Course Outcomes:</b> After studying this course, students will be able to: <b>CO1:</b> Apply preprocessing techniques such as tokenization, stemming, lemmatization, and POS tagging.			

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**CO2:** Implement NER, chunking, and parsing algorithms for linguistic analysis.  
**CO3:** Analyze text using TF-IDF, n-gram models, and probabilistic grammar-based approaches.  
**CO4:** Evaluate information extraction and text-classification techniques on real datasets.  
**CO5:** Develop NLP applications such as sentiment analysis, spam detection, and fake-news identification.

**B.Tech. in Artificial Intelligence & Machine Learning (2021-Scheme)**  
 Outcome Based Education (OBE) and Choice Based Credit System (CBCS)  
 VII Semester, w.e.f (2024-25)

**BLOCKCHAIN TECHNOLOGY LAB**

<b>Course Code</b>	21AML78	<b>CIE Marks</b>	50
<b>Number of Lecture Hours/Week</b>	02	<b>SEE Marks</b>	50
<b>Total Number of Lecture Hours</b>	30	<b>Exam Hours</b>	3

**CREDITS - 01**

**Course Learning objectives:** This course will enable students to:

- UnderstandingBlockchainFundamentalsandcreatingbasicblocks.
- AbletoDevelopBlockchain Applicationsinastructuredmanner
- Abilitytcreateowncryptocurrencyandgetfamiliarity withfuturecurrencies.
- AbletoEvaluateand AnalyzeBlockchain Systems

**PART-A**

1.	CreatingMerkle tree
2.	CreationofBlock
3.	BlockchainImplementationProgrammingcode
4.	CreatingERC20token
5.	Javacode toimplementblockchaininMerkleTrees.
6.	JavaCode toimplementMiningusingBlockchain
7.	JavaCodetoimplementpeer-to-peerusingBlockchain
8.	Creatinga Crypto-currencyWallet

**Course Outcomes:**After studying this course, students will be able to:

- CO1:** Implement blockchain structures including hashing, blocks, and Merkle trees.  
**CO2:** Develop blockchain functionalities such as mining and peer-to-peer network operations.  
**CO3:** Design and deploy smart contracts using Ethereum or similar platforms.  
**CO4:**Analyze performance, scalability, and security characteristics of blockchain applications.  
**CO5:** Create a basic cryptocurrency or decentralized application demonstrating blockchain principles.

**Conduct of Practical Examination:**

- Experiment distribution
  - c) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
  - d) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.
- Marks Distribution
  - c) For laboratories having only one part - Procedure + Execution + Viva-Voce: 8+35+7 = 50 Marks
  - d) For laboratories having PART A and PART B
    - iii. Part A - Procedure + Execution + Viva = 3 + 14+ 3 = 20 Marks
    - iv. Part B - Procedure + Execution + Viva = 5 + 21 + 4 = 30 Marks

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**Industrial Psychology and Organizational Behavior**

Subject Code	21HSM710	CIE Marks	50
Number of Lecture Hour/Week	1L	SEE Marks	50
Total Number of Lecture Hours	20	Exam Hours	03

CREDITS-01

**Course Objectives:** This course will enable students to:

- Relating human psychology to science
- Understand the human psychology and nature of organization and organization models
- Understand the human social communication and leadership qualities

Modules	Teaching Hours
<b>Module -1</b>	
<b>Introduction to I/O psychology:</b> Major fields of I/O psychology, brief history of I/O psychology, employment of I/O psychology, ethics in I/O psychology.	<b>3 Hours</b>
<b>Module -2</b>	
<b>Organisational communication:</b> Types of organizational communication, interpersonal communication, improving employee communication skills.	<b>3 Hours</b>
<b>Module -3</b>	
<b>Leadership:</b> Introduction, personal characteristics associated with leadership, interaction between the leadership and the situation specific leader skills, leadership where we are today.	<b>5 Hours</b>
<b>Module -4</b>	
<b>Group behaviour-</b> teams and conflicts Group dynamics, factors affecting group performance, individual versus group performance, group conflicts.	<b>5 Hours</b>
<b>Module-5</b>	
<b>Stress management:</b> Dealing with the demands of life and work, stress defined, predisposition to stress, sources of stress, consequences of stress, stress reduction intervention related to life /work issues.	<b>4 Hours</b>
<b>Course Outcomes:</b> <b>CO1:</b> Explain the foundations, evolution, and ethical aspects of industrial and organizational psychology. <b>CO2:</b> Apply effective communication strategies in individual and organizational contexts. <b>CO3:</b> Analyze leadership theories and interpret leadership behaviors within organizations. <b>CO4:</b> Examine team dynamics, group behavior, and conflict-resolution models. <b>CO5:</b> Evaluate workplace stress factors and recommend appropriate stress-management strategies.	

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**Text Book:**Michael G.Aamodt, Industrial/Organizational Psychology: An Applied Approach, 6<sup>th</sup> Edition, Wadsworth Cengage Learning, ISBN: 978-0-495-60106-7.

**Reference Books:**

1. Blum M.L. Naylor J.C., Horper& Row, Industrial Psychology, CBS Publisher, 1968
2. Luthans, Organizational Behaviour, McGraw Hill, International, 1997
3. Morgan C.T.,KingR.A.,JohnRweisz&John Schoples, Introduction to Psychology, McHraw Hill, 1966
4. SchermerhornJ.R.Jr., Hunt J.G &Osborn R.N., Managing Organizational Behavior, John Willy