Fifth Semester

Detailed Contents

Course Code: BTIT501-18	Course Title: Formal Language & Automata Theory	3L:1T:0P	3Credits	42 Hours

Module 1: Introduction

Alphabet, languages and grammars, productions and derivation, Chomsky hierarchy of languages.

[3hrs] (CO1)

Module 2: Regular languages and finite automata:

Regular expressions and languages, deterministic finite automata (DFA) and equivalence with regular expressions, nondeterministic finite automata (NFA) and equivalence with DFA, regular grammars and equivalence with finite automata, properties of regular languages, pumping lemma for regular, languages, minimization of finite automata.

[8hrs] (CO2)

Module 3: Context-free languages and pushdown automata

Context-free grammars (CFG) and languages (CFL), Chomsky and Greibach normal forms, nondeterministic pushdown automata (PDA) and equivalence with CFG, parse trees, ambiguity in CFG, pumping lemma for context-free languages, deterministic pushdown automata, closure properties of CFLs.

[8hrs] (CO3,)

Module 4: Context-sensitive languages

Context-sensitive grammars (CSG) and languages, linear bounded automata and equivalence with CSG.

[5hrs] (CO 4)

Module 5: Turing machines

The basic model for Turing machines (TM), Turing recognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, variants of Turing machines, nondeterministic TMs and equivalence with deterministic TMs, unrestricted grammars and equivalence with Turing machines, TMs as enumerators.

[8hrs] (CO 4)

Module 6: Undecidability & Intractablity:

Church-Turing thesis, universal Turing machine, the universal and diagonalization languages, reduction between languages and Rice s theorem, undecidable problems about languages.

Intractablity: Notion of tractability/feasibility. The classes NP and co-NP, their importance. Polynomial time many-one reduction. Completeness under this reduction. Cook-Levin theorem: NP-completeness of propositional satisfiability, other variants of satisfiability. NP-complete problems from other domains: graphs (clique, vertex cover, independent sets, Hamiltonian cycle), number problem (partition), set cover

[12hrs] (CO5)

Course Outcomes: The student will be able to:

CO1: Understand a formal notation for strings, languages and machines.

CO2: Design finite automata to accept a set of strings of a language.

CO3: Design context free grammars to generate strings of context free language .

CO4: Write the hierarchy of formal languages, grammars and machines.

CO5: Distinguish between computability and non-computability and Decidability and undecidability.

Text Books:

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education Asia.

Reference Books:

1. Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Pearson Education Asia.
2. Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science, Springer.
3. Michael Sipser, Introduction to the Theory of Computation, PWS Publishing.
4. John Martin, Introduction to Languages and The Theory of Computation, Tata McGraw Hill.

Course Code: BTIT502-18	**Course Title:** Database Management Systems	**3L:0T:0P**	**3Credits**	**42 Hours**

Detailed Contents:

Module 1: Database system architecture

Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML). Data models: Entity-relationship model, network model, relational and object oriented Data models, integrity constraints, data manipulation operations.

[7hrs] (CO1,2)

Module 2: Relational query languages

Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server. Relational database design: Domain and data dependency, Armstrong's axioms, Normal forms, Dependency preservation, Lossless design. Query processing and optimization: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms.

[10hrs] (CO2,4)

Module 3:

Storage strategies, Indices, B-trees, hashing. **[3hrs] (CO3)**

Module 4: Transaction processing

Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.

[6hrs] (CO 3)

Module 5: Database Security

Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection.

[8hrs] (CO 4,5)

Module 6: Advanced Topics

Object oriented and object relational databases, Logical databases, Web databases, Distributed databases .

[8hrs] (CO 5)

Course Outcomes: The student will be able to:

CO1: write relational algebra expressions for that query and optimize the Developed expressions

CO2: design the databases using ER method and normalization.

CO3: construct the SQL queries for Open source and Commercial DBMS-MYSQL, ORACLE, and DB2.

CO4:determine the transaction atomicity, consistency, isolation, and durability.

CO5: Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.

Text Books:

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill.

Reference Books:

1. "Principles of Database and Knowledge–Base Systems", Vol1 by J. D. Ullman, Computer Science Press.
2. "Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe, Pearson Education.
3. "Foundations of Databases", Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley.

Detailed Contents:

UNIT1:

Course Code: BTIT503-18	**Course Title: Programming in Java**	**3L:0T:0P**	**3Credits**	**42 Hours**

Overview: Object oriented programming principles, Java essentials, java virtual machine, program structure in java ,Java class libraries, Data types, Variables and Arrays, Data types and casting, automatic type promotion in expressions, arrays.

Operators and Control Statements: Arithmetic operators, bit wise operators, relational operators, Boolean logical operators, the ? Operator, operator precedence, Java's selection statements, iteration statements, jump statements. [12 hrs., CO1]

UNIT 2:

Introduction to Classes: Class fundamentals, declaring class, creating objects, Introducing methods: method declaration, overloading, using objects as parameters, recursion, Constructors, this keyword, garbage collection, the finalization. [9hrs., CO1]

UNIT 3:

Inheritance: Inheritance basics, using super and final, method overriding, dynamic method dispatch, Abstract Class, Interface: variables and extending Interfaces, Package: Creating and importing packages, Package access protection, Exception Handling: Exception handling fundamentals, Exception types, Uncaught Exceptions Using try and catch, multiple catch clauses, nested try statements, throw, Java's built-in exceptions. [12hrs.,CO1,2]

UNIT 4:

Multithreaded Programming: The Java thread model, the main thread, creating thread, creating multiple threads, using isAlive () and join (), Thread priorities, synchronization, Inter thread communications, suspending resuming and stopping threads. [4hrs., CO3]

UNIT5:

I/O : I/O Basics, Reading Console Input, Writing Console Output, Reading and Writing Files , Applets: Applet Fundamentals, Applet Architecture, The HTML Applet tag, Passing parameters to Applets., Networking: Networking basics, Java and the Net, TCP/IP Client Sockets URL, URL Connection, TCP/IP Server Sockets, Database connectivity. [6hrs., CO4]

Course Outcomes: At the end of the course the student should be able to:

CO1. Understand the features of Java such as opeartors, classes, objects, inheritance, packages and exception handling

CO2. Learn latest features of Java like garbage collection,Console class, Network interface, APIs

CO3.Acquire competence in Java through the use of multithreading, applets

CO4. Get exposure to advance concepts like socket and databease connectivity.

Suggested Readings/Books :

1.Herbert Schildt, The Complete Reference Java2, McGraw-Hill.
2.Joyce Farrell, Java for Beginners, Cengage Learning.
3.Deitel and Deitel, Java: How to Program, 6th Edition, Pearson Education.
4.James Edward Keogh, Jim Keogh, J2EE: The complete Reference, McGrawHill
5.Khalid A. Mughal, Torill Hamre, Rolf W. Rasmussen, Java Actually, Cengage Learning.

6. Shirish Chavan, Java for Beginners, 2nd Edition, Shroff Publishers.

Course Code: BTIT504-18	**Course Title:** Software Engineering	**3L:1T:0P**	**3Credits**	**42 Hours**

Detailed Contents:

Module 1:

Evolution and impact of Software engineering, software life cycle models: Waterfall, prototyping, Evolutionary, and Spiral models. Feasibility study, Functional and Non-functional requirements, Requirements gathering, Requirements analysis and specification.

[10hrs] **(CO1,2)**

Module 2:

Basic issues in software design, modularity, cohesion, coupling and layering, function-oriented software design: DFD and Structure chart, object modeling using UML, Object-oriented software development, user interface design. Coding standards and Code review techniques.

[8hrs] **(CO3)**

Module 3:

Fundamentals of testing, White-box, and black-box testing, Test coverage analysis and test case design techniques, mutation testing, Static and dynamic analysis, Software reliability metrics, reliability growth modeling. **[10hrs]** **(CO4)**

Module 4:

Software project management, Project planning and control, cost estimation, project scheduling using PERT and GANTT charts, cost-time relations: Rayleigh-Norden results, quality management **[8hrs]** **(CO 4,5)**

Module 5:

ISO and SEI CMMI, PSP and Six Sigma. Computer aided software engineering, software maintenance, software reuse, Component-based software development. **[6hrs]** **(CO5)**

Text Books:

1. Roger Pressman, "Software Engineering: A Practitioners Approach,(6th Edition), McGraw Hill, 1997.

Reference Books:

1. Sommerville, "Software Engineering, 7th edition", Adison Wesley, 1996.
2. Watts Humphrey, "Managing software process", Pearson education, 2003.
3. James F. Peters and Witold Pedrycz, " Software Engineering – An Engineering Approach", Wiley.
4. Mouratidis and Giorgini. "Integrating Security and Software Engineering–Advances and Future", IGP. ISBN – 1-59904-148-0.
5. Pankaj Jalote, "An integrated approach to Software Engineering", Springer/Narosa.
6. Fundamentals of Software Engineering by Rajib Mall, – PHI-3rd Edition, 2009.

Course Outcomes:

1	Understanding of Software process models such as the waterfall, prototyping and spiral models

2	Understanding of the role of project management including planning, scheduling, risk management, etc.
3	Understanding of object models, data models, context models and behavioral models.
4	Describe implementation issues such as modularity and coding standards.
5	Understanding of software testing approaches such as unit testing, integration testing and system testing

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Course Code: BTIT505-18	**CourseTitle:** Database management System lab	**0L:0T:4P**	**2Credits**	**4 Hours/ week**

List of Experiments:

Task 1: Introduction to SQL and installation of SQL Server / Oracle.
Task 2: Data Types, Creating Tables, Retrieval of Rows using Select Statement, Conditional Retrieval of Rows, Alter and Drop Statements.
Task 3: Working with Null Values, Matching a Pattern from a Table, Ordering the Result of a Query, Aggregate Functions, Grouping the Result of a Query, Update and Delete Statements.
Task 4: Set Operators, Nested Queries, Joins, Sequences.
Task 5: Views, Indexes, Database Security and Privileges: Grant and Revoke Commands, Commit and Rollback Commands.
Task 6: PL/SQL Architecture, Assignments and Expressions, Writing PL/SQL Code, Referencing Non-SQL parameters.
Task 7: Stored Procedures and Exception Handling.
Task 8: Triggers and Cursor Management in PL/SQL.

Suggested Tools – MySQL, DB2, Oracle, SQL Server 2012, Postgre SQL, SQL lite

Course Outcomes:

CO1: This practical will enable students to retrieve data from relational databases using SQL.

CO2: students will be able to implement generation of tables using datatypes

CO3: Students will be able to design and execute the various data manipulation queries.

CO4: Students will also learn to execute triggers, cursors, stored procedures etc.

Course Code: BTIT506-18	**CourseTitle: Prog. In Java** lab	**0L:0T:2P**	**1Credits**	**2 Hours/ week**

To accomplish CO1;

1. WAP in Java to show implementation of classes.

2. WAP in Java to show implementation of inheritance.

3. WAP in Java to show Implementation of packages and interfaces.

To accomplish CO2;

4. WAP in Java to show Implementation of threads.

5. WAP in Java Using exception handling mechanisms.

6. WAP in Java to show Implementation of Applets.

To accomplish CO3;

7. WAP in Java to show Implementation of mouse events, and keyboard events.

8. WAP in Java to show Implementing basic file reading and writing methods.

9. Using basic networking features,WAP in Java

To accomplish CO4;

10. WAP in Java to show Connecting to Database using JDBC.

Project work: A desktop based application project should be designed and implemented in java.

Course Outcomes: At the end of the course the student should be able to:

CO1. Implement the features of Java such as opeartors, classes, objects, inheritance, packages and exception handling

CO2. Design problems using latest features of Java like garbage collection,Console class, Network interface, APIs

CO3. Develop competence in Java through the use of multithreading, Applets etc

CO4. Apply advance concepts like socket and database connectivity, and develop project based on industry orientation.

Suggested Readings/Books

1. Herbert Schildt, The Complete Reference Java2, McGraw-Hill.

2. Deitel and Deitel, Java: How to Program, 6th Edition, Pearson Education.

3. James Edward Keogh, Jim Keogh, J2EE: The complete Reference, McGrawHill

Course Code: BTIT507-18	**Course Title:** Software Engineering Lab	**0L:0T:2P**	**1 Credits**

List of Experiments:

Task 1: Study and usage of OpenProj or similar software to draft a project plan
Task 2: Study and usage of OpenProj or similar software to track the progress of a project
Task 3: Preparation of Software Requirement Specification Document, Design Documents and Testing Phase
Task 4: related documents for some problems
Task 5: Preparation of Software Configuration Management and Risk Management related documents
Task 6: Study and usage of any Design phase CASE tool
Task 7: To perform unit testing and integration testing
Task 8: To perform various white box and black box testing techniques
Task 9: Testing of a web site

Suggested Tools **-** Visual Paradigm, Rational Software Architect. Visio, Argo UML, Rational Application Developer etc. platforms.

Course Outcomes:

SNO	DESCRIPTION
CO1	Select a software engineering process life cycle model.
CO2	Define the requirements of the software.
CO3	Analyze the given specification into a design
CO4	Contrast the various testing and quality assurance techniques.
CO5	Apply modern engineering tools for specification, design, implementation, and testing

ELECTIVE I

Course Code: BTIT509-18	**Course Title:** Cyber laws and IPR	**3L:0T:0P**	**3Credits**

Detailed Contents

UNIT 1:Digital Crimes

From Mainframes to Metaverse: The Origins and Evolution of Cybercrime, Three Categories of Cybercrime, Target Cybercrimes: Hacking, Malware, and Distributed Denial of Service Attacks, Tool Cybercrimes: Fraud, Harassment . . .Murder?, Cyber-CSI: Computer Crime Scene [8 hrs., CO1]

UNIT 2: Digital Law and Cyber Crimes

Who Are the Cybercriminals?, Cyber-Law and Order: Investigating and Prosecuting Cybercrime, Indian Law Enforcement: Agencies and Challenges, Global Law Enforcement: Few Agencies, Even More Challenges, Privacy versus Security: Which Trumps?, New Ways to Fight Cybercrime [6 hrs., CO2]

UNIT3: IT ACT 2000

Aims and Objectives; Overview of the Act; Jurisdiction; Role of Certifying Authority;

Regulators under IT Act; Cyber Crimes-Offences and Contraventions; Grey Areas of IT Act. [4hrs., CO2]

UNIT 4:Understanding of Intellectual Property (IP) and Intellectual Property Rights (IPRs)

Introduction of IPR, An Overview of the IPR Regime, Philosophical Justification: Lockean Justification: Labour Theory, Hegelian Justification: Personality Theory, Utilitarian Theory [3 hrs., CO3]

UNIT 5: Subject Matter of Copyright

Literary works, Derivative Works, Computer Software/ Programs; Ownership of Copyright and Right of Copyright Owner: Author and Joint Author, Presumption of Authorship, Owner of different categories of Copyright, Right of Reproduction, Right of Derivative Works, Right of Broadcasting, Right of Communication of Works to the Public, Right of Paternity, Right to Publish [8hrs., CO3]

UNIT 6: Infringement of Copyright and Permitted Use of Copyright

Meaning of Infringement, Direct Infringement, Indirect (Contributory) Infringement

Reasons for Taking Actions against Infringement, Fair use doctrine [6 hrs., CO4]

Suggested Readings/Books:

1. Nandan Kamath, A Guide to Cyber Laws & IT Act 2000 with Rules & Notification

2. Talat Fatima, Cybercrims, Eastern Book Company

4. Susan W. Brenner, Cybercrime Criminal Threats from Cyberspace, Praegar Publications

3. Vakul Sharma (Mc Millian), Handbook of Cyber Laws

4. B. L. Wadehra, Law Relating to Patents, Trade Marks, Copyright, Design and Geographical Indications, Universal Law Publishing Company, Limited, New Delhi

5. N.S. Gopalakrishnan & T.G. Agitha, "Principles of Intellectual Property", (2nd Edition, 2014).

6. V. K. Ahuja, "Law Relating to Intellectual Property" (3rd Edition 2017)

7. P Narayana, Copyright and Industrial Designs, Third Edition, Eastern Law House, Private Limited, Kolkata

Course Outcomes: At the end the students shall be able to:

CO1. Explain the various digital crimes and comprehend the basic features of these crimes.

CO2. Analyze how laws are enforced in the digital and cyber environment and the challenges that are forced in their enforcement.

CO3. Understand to identify what is a Protectable Subject matter under Copyright Laws and what is the manner of obtaining Copyright protection.

CO4. Gain expert knowledge in application of various provisions of Copyright law to determine the rights to which the IP holder will be entitled.

Detailed Contents:

Course Code: BTIT508-18	**Course Title: E-Commerce**	**3L:0T:0P**	**3Credits**

UNIT I: INTRODUCTION

Introduction to E- Commerce,Generic Framework of E- Commerce, Business Models, Consumer Oriented E- Commerce Applications, Mercantile Process Models

[5hrs, CO1]

UNIT II: NETWORK INFRASTRUCTURE AND MOBILE COMMERCE;

Network Infrastructure for E-Commerce, Market forces behind I Way, Component of I way Access Equipment, Global Information Distribution Network, Broad band Telecommunication (ATM, ISDN, Frame Relay), Mobile Commerce, Mobile Computing Application, Wireless Application Protocols, WAP Technology [9hrs., CO2]

UNIT III: WEB SECURITY :

Security Issues on Web- World Wide Web & Security, Importance of Firewall- Components of Firewall, Factors to consider in Firewall Design, Limitations of Firewalls, Transaction Security- Client Server Network , Emerging Client Server Security Threats-Network Security.

[10hrs., CO3]

UNIT IV: SECURITY :

Encryption Techniques, Symmetric Encryption- Keys and Data Encryption standard, Triple encryption, Asymmetric encryption- Secret Key Encryption, Public and Private pair key encryption, Digital Signatures-Virtual Private Network (VPN)

[8hrs., CO3]

UNIT V: ELECTRONIC PAYMENTS :

Overview of Electronics payments, The SET Protocol, Payment Gateway, Certificates

Digital Token, Smart Cards, Credit Cards, Magnetic Strip Cards, E-Checks, Credit/ Debit card EPS, Mobile Payments, Online Banking, Home banking, Emerging financial Instruments, EDI Application in Business, E-commerce laws, Forms of Agreement, Government Policies and Agenda, E-Commerce Strategy in Business Models and Internet.

[10hrs., CO4]

TEXT BOOKS

1. Ravi Kalakota and Andrew B Whinston, “Frontiers of Electronic Commerce”, Pearson Education,2013.

2. Greenstein and Feinman, “E-Commerce”, TMH,2001

REFERENCE BOOKS/OTHER READING MATERIAL

3. Denieal Amor, “The E-Business Revolution”, Addison Wesley, Second edition 2002.

4. Bajaj & Nag, “E-Commerce: The Cutting Edge of Business”, TMH,Second Edition 2005

5. DiwanParag / Sharma Sunil , “E-commerce :A Manager's Guide to E-Business”First edition 2000

Course outcomes: At the students shall be able to:

CO1.Distinguish the E-Commerce framework and business model applications

CO2. Outline the Infrastructure of E-commerce

CO3. Apply security algorithms

CO4. Identify and operate e-payment mechanisms.

Course Code: BTIT510-18	**CourseTitle:**Computational Biology	**3L:0T:0P**	**3Credits**

Detailed Contents:

Module 1: Introduction

Nature and scope of life science: Branches of life sciences, Characteristics of life, Levels of Organization, Origin of life, Biochemical evolution- evolution of Proteins and Nucleotide. Cell Biology: The cell as basic unit of life- Prokaryotic cell and Eukaryotic cell, Cell Structure and Function- cell membrane, cell organelles, Cell Division; Mitosis & Meiosis. Cell Energetics: Laws of Thermodynamics, Photosynthesis, Anaerobic & aerobic respiration, Structure and function of mitochondria, respiratory pathways: Glycolysis, Kreb's Cycle, Electron transport chain.

[10hrs]

(CO1)

Module 2: More about RNA and DNA

Chromosome-Genome-Genes-Databases: Bio-molecules- DNA, RNA, Protein and amino acids, Chargaff's Rules, GC content.

Central Dogma: Replication, Transcription, Translation, Post transcriptional & post translational modifications, RNA processing, RNA splicing and RNA editing. Sense/coding and anti-sense/template strands, Genetic code. Introduction to DNA and Protein sequencing.

[10hrs] (CO2)

Module 3: Proteins

Proteins and Databases: Protein structure and function, Protein Primary structure, Amino acid residues, Secondary, Tertiary, Quaternary Structure of Protein, Protein sequence databases-SwissProt/ TrEMBL, PIR, Sequence motif databases -Pfam, PROSITE, Protein structure databases. [8hrs] (CO3)

Module 4: Computation and Biology

Molecular computational biology: Gene prediction, sequencing genomes, similarity search, restriction mapping,. Sequence Analysis: Principles and its uses, Hidden Markov models for sequence analysis. Introduction of Markov Chain and Hidden Markov models. Forward backward algorithm, Viterbi and Baum-Welch algorithms. [14hrs] (CO4)

Course Outcomes: The student will be able to:

CO1: Understand the basic of cell structure, divisions involved in reproduction of a cell, and its generic functionality;

CO2: Recognize the base line elements of a RNA and DNA; including fundamental behind their complex structure;

CO3: Comprehend primary structure of the protein and various related data-sets.

CO4: Demonstrate the concept of gene sequence alignment and simulate various related algorithms for the same.

Text books

1.Pevzner, P. A., Computational Molecular Biology, PHI Learning Pvt. Ltd, ISBN-978-81-203-2550-0.
2.Ghosh, Z. and Mallick, B., Bioinformatics Principles and Applications (2008) Oxford University Press ISBN 9780195692303
3.Mount, D. W., Bioinformatics – sequence and genome analysis.

Reference Books

1.Devasena, T. (2012). Cell Biology. Published by Oxford University Press.
2.Fall, C.P., Marland, E.S., Wagner, J.M., Tyson, J.J.(2002). Computational Cell Biology. Springer
3.Becker, W. M., Kleinsmith, L. J., Hardin, J., & Raasch, J. (2003). The world of the cell (Vol. 6). San Francisco: Benjamin Cummings.
4.Rastogi, S. C. (2005). Cell biology. New Age International.
5.Reece, J. B., Taylor, M. R., Simon, E. J., & Dickey, J. (2009). Biology: concepts & connections (Vol. 3, p. 2). Pearson/Benjamin Cummings.

Course Code: BTIT511-18	**Course Title:** Artificial Intelligence	**3L:0T:0P**	**3Credits**

DETAIL CONTENTS:

UNIT1: **Introduction**

Concept of AI, history, current status, scope, agents, environments, Problem Formulations, Review of tree and graph structures, State space representation, Search graph and Search tree. [6hrs., CO1]

UNIT 2. Search Algorithms

Random search, Search with closed and open list, Depth first and Breadth first search, Heuristic search, Best first search, A* algorithm, Game Search. [9hrs., CO2]

UNIT3. **Probabilistic Reasoning**

Probability, conditional probability, Bayes Rule, Bayesian Networks- representation, construction and inference, temporal model, hidden Markov model. [10 hrs., CO3]

UNIT4. Markov Decision process

MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially observable MDPs. [10 hrs., CO3]

UNIT5. Reinforcement Learning

Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning- Q learning.

[6hrs., CO4]

LIST OF SUGGESTED BOOKS:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach" , 3rd Edition, Prentice Hall

2. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill

3. Trivedi, M.C., "A Classical Approach to Artifical Intelligence", Khanna Publishing House, Delhi.

4. Saroj Kaushik, "Artificial Intelligence", Cengage Learning India, 2011

Course Outcomes: At the end students shall be able to:

CO1: understand the basics of Artificial Intelligence

CO2: Understand and design the search algorithms used in AI

CO3: Integrate the mathematics backbone of required for solving AI based problems.

CO4: Determine the application of AI to solve problems and build logistics required for them.

Course Code: BTIT512-18	**Course Title: E-commerce lab**	**0L:0T:2P**	**1Credits**

LIST OF PRACTICALS

1. List and understand working of various broad band communication devices.

2. Write a programme to implement any one wireless application protocol

3. Write a programme to implement symmetric encryption.

4. Write a programme to implement DES

5. Write a programme to implement asymmetric encryption.

6. Write a programme to implement SET protocol

7. Mini project on Payment gateways.

Course Code: BTIT513-18	**Course Title: Cyber laws and IPR lab**	**0L:0T:2P**	**1Credits**

Students are expected to take minimum three case studies related to cyber crimes, IPR and copy rights and make their power point presentations.

The lab coordinator will allocate the topics.

Course Code: BTIT514-18	**Course Title:** Computational Biology Lab	**0L:0T:2P**	**1 Credits**

List of Experiments:

Task 1: Introduction of Bio Python, Various Packages and its Installation.

Task 2,3: Parsing sequence file formats
- Sequences and Alphabets
- Sequences act like strings
- Slicing a sequence
- Turning Seq objects into strings
- Concatenating or adding sequences
- Changing case
- Nucleotide sequences and (reverse) complements
- Transcription
- Translation

Task 4,5: Sequence annotation objects
- The SeqRecord object
- Creating a SeqRecord
  - SeqRecord objects from scratch
  - SeqRecord objects from FASTA files
  - SeqRecord objects from GenBank files
- Feature, location and position objects
  - SeqFeature objects
  - Positions and locations

Sequence described by a feature or location

Task 6,7,8: BLAST
- Running BLAST over the Internet
- Running BLAST locally
  - Introduction
  - Standalone NCBI BLAST+
  - Other versions of BLAST
- Parsing BLAST output
- The BLAST record class
- Dealing with PSI-BLAST
- Dealing with RPS-BLAST

BLAST and other sequence search tools
- The SearchIO object model
  - QueryResult
  - Hit
  - HSP
  - HSPFragment
- A note about standards and conventions
- Reading search output files
- Dealing with large search output files with indexing
- Writing and converting search output files

Task 9,10: Multiple Sequence Alignment objects
- Parsing or Reading Sequence Alignments
  - Single Alignments
  - Multiple Alignments
  - Ambiguous Alignments
- Writing Alignments
  - Converting between sequence alignment file formats
  - Getting your alignment objects as formatted strings
- Manipulating Alignments
  - Slicing alignments
  - Alignments as arrays

Task 11,12,13: Sequence motif analysis using Bio.motifs
- Motif objects
  - Creating a motif from instances
  - Creating a sequence logo
- Reading motifs
  - JASPAR
  - MEME
  - TRANSFAC
- Writing motifs
- Position-Weight Matrices

Quick Reference:
http://biopython.org/DIST/docs/tutorial/Tutorial.html#htoc106
https://biopython.readthedocs.io/en/latest/Tutorial/chapter_seq_objects.html

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Course Code: BTIT515-18	Course Title: Artificial Intelligence Lab	0L:0T:2P	1Credits

LIST OF PRACTICALS

1. Write a programme to conduct uninformed and informed search.

2. Write a programme to conduct game search.

3. Write a programme to construct a Bayesian network from given data.

4. Write a programme to infer from the Bayesian network.

5. Write a programme to run value and policy iteration in a grid world.

6. Write a programme to do reinforcement learning in a grid world.

7. Mini Project work.

Course code: HSMC122-18

Credits: 3

COURSE TOPICS:

The course has 28 lectures and 14 practice sessions in 5 modules:

Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

1. Purpose and motivation for the course, recapitulation from Universal Human Values-I
2. Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and ExperientialValidation- as the process for self-exploration.
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations
4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario.
6. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking.

Module 2: Understanding Harmony in the Human Being - Harmony in Myself!

7. Understanding human being as a co-existence of the sentient 'I' and the material

'Body'

8. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility
9. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
10. Understanding the characteristics and activities of 'I' and harmony in 'I'
11. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
12. Programs to ensureSanyam and Health.

Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease.

Module 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

13. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship.
14. Understanding the meaning of Trust; Difference between intention and competence
15. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship.
16. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals.
17. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives.

Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

18. Understanding the harmony in the Nature
19. Interconnectedness and mutual fulfilment among the four orders of nature - recyclability and self-regulation in nature
20. Understanding Existence as Co-existence of mutually interacting units in all-pervasive space
21. Holistic perception of harmony at all levels of existence.

Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

Module 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

22. Natural acceptance of human values
23. Definitiveness of Ethical Human Conduct
24. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
25. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of peoplefriendly and eco -friendly production systems, c. Ability to identify and develop appropriatetechnologies and management patterns

for above production systems.

26. Case studies of typical holistic technologies, management models and production systems.

27. Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations.

28. Sum up.

Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. to discuss the conduct as an engineer or scientist etc.

3. READINGS:

3.1 Text Book

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010.

3.2 Reference Books

1. Jeevan Vidya: EkParichaya, A. Nagaraj, Jeevan VidyaPrakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.

6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J CKumarappa
8. Bharat Mein Angreji Raj -PanditSunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

OUTCOME OF THE COURSE:

By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction. This is only an introductory foundational input. It would be desirable to follow it up by

a) Faculty -student or mentor-mentee programs throughout their time with the institution.

b) Higher level courses on human values in every aspect of living. E.g. as a professional.