# *BSc. ITM 3RD SEMESTER (NEP 2020)*

| SUBJECT CODE | SUBJECT NAME |
|---|---|
| MAJOR-P-5 | Digital Logic |
| MAJOR-P-6 | Computer Networks |
| MAJOR-P-7 | Business Accounting |
| MINOR-2-P-2 | Introduction to Algebra & Number Theory |
| MDC-3 | Professional Writing |
| VAC-2 | Ethics & Values |

## Semester-III

**Core V** **Digital Logic**

**Course Objectives:**

Introduce the concept of digital and binary systems. Be able to design and analyze combinational logic circuits. Be able to design and analyze sequential logic circuits. Understandthe basic software tools for the design and implementation of digital circuits and systems.

**Course Outcomes**: **On completion of this course, students will be able to**

- Convert different type of codes and number systems which are used in digital communication and computer systems.
- Compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance and efficiency.
- Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.
- Design different types of digital electronic circuits for particular operation.

**Unit-I:**

Character Codes, Decimal System, Binary System, Decimal to Binary Conversion, HexadecimalNotation, Boolean Algebra, Basic Logic Functions: Electronic Logic Gates, Synthesis of Logic Functions, Minimization of Logic Expressions, Minimization using Karnaugh Maps, Synthesis with NAND and NOR Gates, Tri-State Buffers.

**Outcome:** Students will be able to understand the various types of number systems and their conversions and simplify Boolean expression and apply the Boolean theorems through logical gates.

**Unit-II:**

Arithmetic: Addition and Subtraction of Signed Numbers, Addition/ Subtraction Logic Unit, Design of Fast Adders: Carry-Look ahead Addition, Multiplication of Positive Numbers, Signed- Operand Multiplication: Booth Algorithm, Fast Multiplication: Bit-Pair Recoding Multipliers, Carry-Save Addition of Summands, Integer Division, Floating-Point Numbers and Operations: IEEE Standard for Floating-point Numbers, Arithmetic Operations on Floating-Point Numbers, Guard Bits and Truncation, Implementing Floating-Point Operations.
**Outcome:** Students will be able to design and implement variety of logical devices using combinational circuits concept.

**Unit-III:**

Flip-Flops, Gated Latches, Master-Slave Flip-Flops, Edge-Triggering, T Flip-Flops, JK Flip Flops. Registers and Shift Registers, Counters, Decoders, Multiplexers, Programmable Logic Devices (PLDs), Programmable Array Logic (PAL), Complex Programmable Logic Devices (CPLDs), Field-Programmable Gate Array (FPGA), Sequential Circuits, UP/DOWN Counters.
**Outcome:** Students will be able to analyze sequential circuits like registers and counters using flip-flops.

**Unit-IV:**

Memory System: Semiconductor RAM Memories, Internal Organization of Memory Chips, Static Memories, Asynchronous DRAMS, Synchronous DRAMS, Structure of Large Memories, Memory System Considerations, RAMBUS Memory. Read-Only Memories: ROM, PROM, EPROM, EEPROM, Flash Memory, Speed, Size, and Cost of Memory. Secondary Storage: Magnetic Hard Disks, Optical Disks, Magnetic Tape Systems.
**Outcome:** Students will be able to demonstrate and compare the construction of programmable logic devices and different types of ROM and RAM.

**Text Books:**

- ✓ ***Carl Hamacher, Z. Vranesic, S. Zaky: Computer Organization, 5/e (TMH).***

**Refence Books:**

- ✓ *M. Morris Mano: Digital Logic and Computer Design, Pearson.*

**Core V- Practical/Tutorial: Digital Logic Lab**

Introduction to Xilinx S/W (VHDL). Write the codes for the following using VHDL.

- Realizing all logic gates.
- Combination Circuit.
- ADDER.
- SUBTRACTOR.
- MUX.
- DE-MUX.
- Encoder.

- Decoder.
- PAL.
- PLA.

Also write the codes using VHDL for the following Sequential Logic Circuits:

- Flip Flops.
- Shift Registers.
- Counters.
- Memory Elements.

**Core VI** **Computer Networks**

**Course Objectives:**

This course is intended to provide an overview of the concepts and fundamentals of data communication and computer networks. It will help the students in understanding of various types of computer networks, different components of computer networks, various protocols, e-mail andcommunication protocols, network naming and addressing, modern technologies used in networking and their applications.

**Course Outcome: On completion of this course, the students will be able to**

- Understand network communication using the layered concept, Open System Interconnect (OSI) and the Internet Model.
- Understand various types of transmission media, network devices.
- Understand the concept of flow control, error control and LAN protocols.
- Explain the design of and algorithms used in the physical, data link layers.
- Understand the working principles of LAN and the concepts behind physical and logical addressing, subnetting and super netting.
- Analyze the contents in a given Data Link layer packet, based on the layer concept.
- Determine the various modulation and error detection and correction techniques andtheir application in communication systems.

**Unit-I:**
Introduction to Data Communications and Network Models: Protocols and Standards, Layers in OSI Models, Analog and Digital Signals, Transmission Modes, Transmission Impairment, Data Rate Limits, Performance, Digital Transmission, Network Devices & Drivers: Router, Modem, Repeater, Hub, Switch, Bridge (fundamental concepts only).
**Outcome:** Students will have the basic knowledge about computer network, causes of network errors, layers in networking and network devices & drivers.

**Unit-II:**

Signal Conversion: Digital-to-Digital Conversion, Analog-to-Digital Conversion, Digital-to- analog Conversion, Analog-to-analog Conversion. Transmission Media: Guided Media, Unguided Media, Switching Techniques: Packet Switching, Circuit Switching, Datagram Networks, Virtual- Circuit Networks, and Structure of a Switch.
**Outcome:** Students will have the knowledge about how data transmission takes place through signals and use of switching techniques.

**Unit-III:**
Error Detection and Correction: Checksum, CRC, Data Link Control: Framing, Flow and Error Control, Noiseless Channels, Noisy channels, (Stop and Wait ARQ, Sliding Window Protocol, Go Back N, Selective Repeat) HDLC, Point-to-Point Protocol. Access Control: TDM, CSMA/CD, and Channelization (FDMA, TDMA, and CDMA).
**Outcome:** Students will come to know about identifying and correcting errors occurred during data transmission.

**Unit-IV:**

Network Layer: Logical Addressing, IPv4 Addresses, IPv6 Addresses, Virtual-Circuit Networks: Frame Relay and ATM, Transport Layer: Process-Process Delivery: UDP, TCP. Application layers: DNS, SMTP, POP, FTP, HTTP, Basics of WiFi (Fundamental concepts only), Network Security: Authentication, Basics of Public Key and Private Key, Digital Signatures and Certificates (Fundamental concepts only).

**Outcome:** Students will able to understand various protocols used in network to transmit different types of data.

**Text Books:**

- ✓ *Data Communications and Networking, Fourth Edition by Behrouza A. Forouzan,T*

**Reference Books:**

- ✓ *Computer Networks, A.S. Tanenbaum, 4th edition, Pearson Education.*

## Core VI- Computer Network Lab using C/C++/any Simulator

- Simulate Even Parity generator and checker.
- Simulate two-dimensional Parity generator and checker.
- Simulate check sum generator and checker.
- Simulate Hamming code method.
- Simulate Cyclic Redundancy Check (CRC) error detection algorithm for noisy channel.
- Simulate and implement stop and wait protocol for noisy channel.
- Simulate and implement go backsliding window protocol.
- Simulate and implement selective repeat sliding window protocol.
- Simulate and implement distance vector routing algorithm.

**Core VII** # Business Accounting

**Course Objectives:**

The objective of this course is to introduce problems of financial accounting such as measuring and reporting issues related to assets and liabilities and preparing the financial statements. Students are expected to gain the ability of using accounting information as a tool inapplying solutions for managerial problems, evaluating the financial performance, and interpreting the financial structure.

**Course Outcomes: On completion of this course, students will be able to**

- Enable the students learn basic accounting principles, concepts, principles and conventions.
- Practice Financial and Management accounting applications.
- Construct the financial statements of company.
- Able to understand the provisions of Companies Act, 1956.
- Exposure on the different accounting software packages.

**Unit-I:**

Introduction: Financial Accounting-definition and Scope, objectives of Financial Accounting, Accounting v/s Book Keeping terms used in accounting, users of accounting information and limitations of Financial Accounting. Conceptual Framework: Accounting Concepts, Principles and Conventions, Accounting Standards concept, objectives, benefits, briefer view of Accounting Standards in India, Accounting Policies, Accounting as a measurement discipline, valuation Principles, accounting estimates.
Outcome: The students will be able to learn basic accounting principles, concepts, principles and conventions which used in business transactions and its applications.

**Unit-II:**

Recording of transactions: Voucher system; Accounting Process, Journals, Subsidiary Books, Ledger, Cash Book, Bank Reconciliation Statement, Trial Balance. Depreciation: Meaning, need & importance of depreciation, methods of charging depreciation.
Outcome: The students will be able to prepare trial balance, bank reconciliation statement, identify and rectify the errors in bank reconciliation statement and also understand methods of charging Depreciation.

**Unit-III:**

Preparation of final accounts: Preparation of Trading and Profit & Loss Account and Balance Sheet of sole proprietary business.
Outcome: The students will be able to prepare financial statements in accordance with generally accepted accounting principles, employ critical thinking skills to analyze financial data as well as the effects of differing financial accounting methods on the financial statements.

**Unit-IV:**

Introduction to Company Final Accounts: Important provisions of Companies Act, 1956 inrespect of preparation of final accounts, Understanding of final accounts of a company. an overview of computerized accounting system –Salient features and significance
Outcome: The students will be able to understand the provisions of companies act 1956, significance and application of computerized accounting system.

**Text Books:**

- ✓ *Anil Chowdhry, "Fundamentals of Accounting & Financial Analysis", Pearson Education.*
- ✓ *Agarwal, R.Srinivasan, "Accounting Made Easy", TMH*

**Reference Books:**

- ✓ *Amrish Gupta, "Financial Accounting for Management", Pearson Education*
- ✓ *S.N.Maheshwari, "Financial Accounting for Management: Vikas Publishing House*

## Core VII- Business Accounting

- Introduction to Tally, Features and Versions of Tally.
- Components of Tally Screen, Creation, Alteration & Deletion of Company.
- Primary Group & Subgroup, Creation.
- Alteration & Display of Ledger Accounting.
- Recording of Transactions through vouchers.
- DisplayofFinancialreportsF11andF12configuration.
- Introduction to Inventory system: Advantages of maintaining inventory system in Tally stock group Stock category, stock item units of measure, creation of inventory system.

# Introduction to Algebra & Number Theory

**Course Objectives:**

To present a systematic introduction to number theory and a basic course on algebra.

**Learning Outcomes:**

After completing the course the student will be able to

- Understand the equivalence relations and concept of group with different examples.
- Understand the properties of cyclic groups, rings, and integral domain.
- Know divisibility and division algorithm and find *gcd* using Euclidean Algorithm.
- Solve linear Diophantine equations, find least common multiples,solve linear congruence applying the Chinese remainder theorem.

**Unit I**

Integers and equivalence relations**,** properties of integers, modular arithmetic, mathematical inductions, equivalence relations, Introduction to groups**,** symmetries of a square, the dihedral groups, definitions and examples of groups, elementary properties of groups, subgroups, examples of subgroups.

**Unit II**

Cyclic groups, properties of cyclic groups, classification of subgroups of cyclic groups, definitions and examples of normal subgroups, Introduction to rings, definition and examples of rings, properties of rings, subrings, definition and examples of integral domain and fields.

**Unit III**

Divisibility**,** division algorithms, prime and composite numbers, Fibonacci and Lucas numbers, Fermat numbers, greatest common divisor, Euclidean algorithm.

**Unit IV**

Fundamental theorem of arithmetic, least common multiple, linear Diophantine equations, congruence, linear congruence, Chinese remainder theorem, Wilson's theorem, Fermat little theorem, Euler's theorem.

Books Recommended:


- ✓ *Joseph A. Gallian, Contemporary Abstract Algebra (4th Edition), Narosa Publishing House, New Delhi, 1999.(IX Edition 2010).*
- ✓ *Thomas Koshy, Elementary Number Theory with Applications (2nd Edition), Academic Press, 2007.*

# Professional Writing

## Course Objectives

- The course aims at teaching students to write grammatically correct, clear, effective prose and applies it to writing for the workplace.
- Its objective is to help students develop writing skills and acquire the knowledge to apply these skills in standard workplace document formats.
- It includes a study of writing in a variety of professional contexts with an emphasis on assessing rhetorical situations and crafting messages to inform and persuade diverse audiences in a variety of forms and formats.

## Unit-1

Writing: Definition and Requirement

Writing Process: Prewriting, Writing and Post writing

Basic Writing Skills

Plain English

## Unit-2

Genres of Writing: Persuasive, Expository, Narrative, Descriptive and Argumentative

## Unit-3

Basic forms: Letters, Application, Memo, Notices and Minutes

Raising the Bar: Presentations, Proposal, and Report

## Unit-4

The Elements of Style: Grammar, Usage, and Mechanics

## Prescribed Texts

- ✓ *The Craft of Professional Writing*, Second Edition by Michael S. Malone
- ✓ *Literature and Art of Communication*. Parhi, Pati, Mohol et al. Cambridge University Press, 2019.
- ✓ *Professional Writing Skills: A Write It Well Guide* by Natasha Terk

## Suggested Readings

- ✓ *Huddleston R., and Geoffrey K. Pulia, eds. A Student's Introduction to English Grammar. CUP.2005*
- ✓ *MLA Handbook for Writers of Research Papers. Eighth edition. Modern Language Association of America. 2021*
- ✓ Excellence In Business Communication by John V. Thill and Courtland L. BoveeOn Writing Well by William Zinsser

https://communicationprogram.wharton.upenn.edu/library/

https://www.osou.ac.in/eresources.php

# ETHICS & VALUES

**Credit point: 3** **Full mark -100** **Total Hours: 45**

## COURSE OUTCOME

- Development of a good human being and a responsible citizen
- Developing a sense of right and wrong leading to ethically correct behavior
- Inculcating a positive attitude and healthy work culture
- To equip the students to prepare themselves national and state level civil service and other competitive examination.

## COURSE CONTENTS

### UNIT-I- ETHICS AND HUMAN INTERFACE [5 Hours]

**Learning Outcome-**

- ✓ *Understand the basic concept of ethics and its relevance in life*

- Ethics and Human Interface: Essence, Determinants and consequence of ethics and human action.
- Dimensions of Ethics in private and public relationship
- Human Values: Tolerance, Compassion, Rationality, Objectivity, Scientific Attitude Integrity, Respecting conscience and Empathy etc.
- Mahatma Gandhi and Ethical Practices: Non-Violence, Truth, Non-hatred and love for all, concern for the poorest, objective Nationalism and Education for man making. Relation between Ends and Means.

**Subject Teacher: Philosophy/Political Science or Any other Teacher.**

### UNIT-II- ETHICS AND MAJOR RELIGIONS AND CIVILIZATIONS [7 hours]

**Learning Outcome-**

- ✓ *Be familiar with ethical principles and values promoted by major religious traditions and civilization*

- Hinduism- Dharma and Mokhya (out of 4 goals of life Dharma, Artha, Kama and Mokhya), Concept of Purusartha, Nisakama Karma(work without attachment to results), Concept of Basudev Kutumba and Peace ( Whole world including all animals, plants, inanimate beings and human form one world )
- Ten Commandments: (Christianity and Judaism Tradition)
- Islamic Ethics: Justice, Goodness, Kindness, Forgiveness, Honesty, Purity and Piety
- Egyptian- Justice, Honesty, Fairness, Mercy, Kindness and Generosity
- Mesopotian-Non-indulgence in lying, stealing, defrauding, maliciousness, adultery, coveting possession of others, unworthy ambition, misdemeanors and injurious teaching.
- Buddhism-Arya Astangika Marg: Right View, Thought, Speed, Action, Livelihood, Efforts, Attention and Concentration.
- Jainism-Right faith, knowledge and conduct( Triralna)

- Chinese-Confucianism- Respect for Autonomy, Beneficence, non-maleficence and justice. Taoism: No killing, No stealing, No sexual misconduct, No false Speech and No taking of intoxicants.

**Subject Teacher: History/Philosophy/Political Science or Any other Teacher.**

**UNIT-III- CONSTITUTIONAL VALUES, GOOD CITIZENSHIP, PATRIOTISM AND VOLUNTEERISM [10 Hours]**

**Learning Outcome-**

- ✓ *Students Learns about constitutional values of India, Civic Sense and good Citizenship (both National and International) Patriotism and need for Volunteerism*

- Salient Values of Indian Constitution: Sovereign, Socialist, Secular, Democratic, Republic, Justice, Liberty, Equality and Fraternity
- Patriotic values and ingredients of National Building, Examples of great Patriots, Rani Laxmi Bai, Bhagat Singh, Mangal Pandey, Birsa Munda, Laxman Naik, Subhas Chandra Bose and Khudiram Bose.
- Law abiding citizenship
- Concept of Global citizenship in contemporary world
- Volunteerism- concept and facts of Volunteerism, building a better society through Volunteerism, Blood Donation, Social work, Helping the Aged, Promotion of Green Practices and Environment protection.

**Subject Teacher: Philosophy/Political Science /History/ or Any other Teacher.**

**UNIT-IV- WORK ETHICS [6 hours]**

**Learning Outcome-**

- ✓ *Understand the concept of work ethics, ethics in work place and ethical practices to be adopted by various professionals*

- The concept of professionalism.
- Professional ethics at work place
- Core values needed for all professionals. Reliability, Dedication, Discipline, Productivity, Co-operation , Integrity, Responsibility, Efficiency, Professionalism, Honesty, Purity and Time Management, Accountability, Respect Diversity, Gender Sensitivity, Respect for others, Cleanliness, Rational Thinking, Scientific Attitude, Clarity in Thinking . Diligence, cleanliness and Environment Consciousness.
- Codes of conduct for Students(both in College and Hostels),Teachers, Business professional, Doctors, Lawyers, Scientist, Accountants, IT professionals and Journalist.
- Practical ethics in day to day life.

**Subject Teacher: Commerce/Philosophy/Education/History/ or Any other Teacher.**

**UNIT-V-ETHICS AND SCIENCE AND TECHNOLOGY [7 Hours]**

**Learning Outcome-**

- ✓ *Understand how Science is related to ethics and values has ethical implications.*

- Ethics of Science and Technology. Are science and Technology ethically neutral? Are Science and Technology Value Free?
- Ethics of scientific Research ,Innovation and Technology
- Ethics of Social Media, Modern Gadgets
- AI and Ethics

**Subject Teacher: Philosophy or Any Science Teacher**

**UNIT-VI- ETHICS AND VULNERABLE SECTIONS OF SOCIETY [10 hours]**

**Learning Outcome-**

- ✓ *Understand how various vulnerable sections of our society are treated unequally and what needs to be done to address their inequality*
- ✓ *Understand dimensions of substance abuse*

1. **Women and family-**Gendered practices in the family, marriages ( dowry, child marriage, women's consent).

   **Women and work-** women's work at home and at work place, pay gap, gendered roles, harassment at work place and working women and role conflict.

   **Women and Society-** Gender sensitive language, property right, marriage-divorce/Separation and women's right; violence against women
2. **Issues Relating to Children:** Nutrition and health , Child Exploitation: Child labour ,trafficking, sexual exploitation
3. **Issues Relating to Elderly Persons :** Abuse of Elders, Financial insecurity, Loneliness and Social insecurity, Health Care Issues, Needs for a happy and Dignified Ageing
4. **Issues Relating to persons with disability:** Rights of PWD, affirmative action, prevention of discrimination, providing equal opportunity, various scheme for empowering PWD and social justice for PWD.
5. **Issues Relating to Third Gender:** Understanding LGBTQ, Social justice for them, Removal of discrimination, Affirmative action and Acceptance of diversity of gender.

**Subject Teacher: Sociology/political Science /Anthropology or Any Science Teacher**

**Sample Questions-**

1. Birsa Munda belongs to which state of India?[1 mark]
2. Recall at least 4 constitutional values from the preamble to India constitution.[2 marks]
3. Explain utility of being Punctual.[5 marks]
4. Explain the ethical principles a scientist should follow.[8 marks]

**Course material:** To be developed by OSHEC and DDCE, Utkal University. Video Lectures will be also prepared by OSHEC and VTP, Utkal University. There shall be no internal examination for this course. The Term End Examination shall be conducted by the respective Universities. Student would engage in self-study and colleges shall conduct at least 4 doubt clearing session for each unit by engaging subject teachers as indicated above. The Principal may assign responsibility to any teacher.