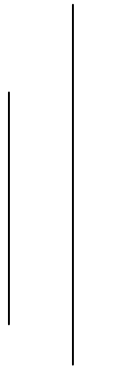# TRIBHUVAN UNIVERSITY

Faculty of Management

Office of the Dean

Master of Information Technology Management (MITM)

Program Regulations and Curriculum Structure

(Two Years / Four Semesters Program)

Effective from 2026 Intake

1. Introduction

The Masters of Information Technology Management (MITM) program is consolidation of information technology and management courses with special focus on managing Information Technology and related systems used in organizations. MITM aims to equip students with the knowledge, understanding and research skills necessary to use and manage cutting-edge technology to solve real-world problems in organizations. In order for students to have the intellectual and conceptual grounding necessary to play leadership roles in the development of the information technology industry, the MITM program makes available the opportunity to gain profound theoretical and practical knowledge in various areas of information technology management.

The MITM program curriculum covers the standard courses and elective courses related to Information Technology and management. The foundation and core courses are designed to meet the graduate program requirement, and the elective courses are designed to meet the need of rapidly changing information technologies. Along with the basic academic curriculum, students will work on research projects in the field of information technology management that will provide them the abilities to create and manage best information technology practices in the industry.

2. Program Objectives

The objective of MITM program is to deliver comprehensive education in information technology management so as to:

- Prepare IT managers and leaders for the development of best IT practices in context of Nepal with global perspectives
- Build skillful manpower with problem solving, and information technology management capabilities
- Create self-driven, skilled IT entrepreneurs and managers who will be able to start and look after the IT firms and enterprises
- Produce IT managers who will be align business strategies with technology practices for value creation in organizations

3. Learning Outcomes

Upon completion of this program, graduates will be able to:

a. Develop an extensive and practical knowledgebase of theory, tools, skills, practices, and researches related to business and IT alignment

b. Apply the IT management skills to address problems and opportunities that are encountered in the modern technology enabled enterprises.
c. Direct technological research by studying organization goals, strategies, practices, and user projects
d. Maintain organization's effectiveness and efficiency by defining and delivering strategic plans for implementing and managing information technologies

4. Student Intake

The program is designed for a small class size of 44 students. Students' intake will be once a year.

5. Eligibility

The minimum qualification required to apply for the program are as follows:
- BIM with a minimum CGPA of 3.00 with letter grade "B" or CGPA of 2.00 with letter grade "C" (pass before 2021 AD). Or,
- A minimum Bachelor's Degree in information technology, computer and engineering related programs with a minimum CGPA of 3.00 with letter grade "B" or second division marks.

Students' intake will be based on a highly competitive basis with three-stage screening evaluations:

a. A written test for MITM students. (Verbal ability, Quantitative ability, Issue-based Essay Writing and Case Analysis)
b. Group discussions.
c. Individual presentation on a given topic.
d. Personal interview by the expert panel.

6. Orientation and Socialization

After the admission of students to the program, the college/campus will arrange an in-house orientation and socialization program to students and bear all the costs thereon.

7. Class Modalities

Colleges/Campuses will implement the management and IT courses, and project-based classes centered on the study of problem-solving courses through lectures, class and group discussion, case study, project work, workshop, practical, and so on based on IT and Management related areas.

8. Curricular Structure

First Semester

Course Code	Course Title	Cr
MGT 501	Fundamentals of Business Management	2
ACC 501	Financial Accounting & Taxation	2
ENG 501	Professional &Technical Communication	2
MIT 501	Advanced Programming Concepts	3
MIT 502	Object-Oriented Analysis & Design	3
MIT 503	Information Technology Audit	3
Total		**15**

Second Semester

Course Code	Course Title	Cr
ECO 551	Economics for Business Decisions	2
STT 551	Statistics & Data Management	2
FIN 551	Financial Management	2
MIT 551	Big Data Technologies	3
MIT 552	Applied Data Science	3
MIT 553	Information Retrieval & Web Search	3
Total		**15**

Third Semester

Course Code	Course Title	Cr
MGT 601	Organizational Behavior & HR Analytics	3
MGT 602	Digital Marketing & Business Intelligence	2
RCH 601	Research Methodology	2
MIT 601	Machine Learning for Business	3
MIT 602	Financial Technology	2
MIT 649	Practicum in IT Project	1
……	Elective I	3
Total		**16**

Fourth Semester

Course Code	Course Title	Cr
MGT 651	Business Environment & Strategic IT Planning	2
MIT 651	Techno Entrepreneurship	2
MIT 652	Practicum in IT Business Plan Development	1
MIT 698	Graduate Research Project	6
……………	Elective II	3
Total		**14**

List of Electives (Elective I : Any One):		
Course Code	Course Title	Cr
EIT 635	Software Project Management & Quality Assurance	3
EIT 636	Knowledge Management	3
EIT 637	Enterprise Systems & Strategy	3
EIT 638	Emerging Technologies	3
EIT 639	Cyber Security & Digital Forensics	3

List of Electives (Elective II: Any One):		
Course Code	Course Title	Cr
EIT: 685	Human Computer Interaction	3
EIT 686	Enterprise Cloud Computing	3
EIT 687	Social Informatics	3
EIT 688	Advanced Computer Network	3
EIT 689	Digital Governance & Management	3

9. Major Project in IT

Students are required to undertake a project assignment and prepare an integrative project report in the field of information technology. It involves the preparation and presentation of the project of approximately 30,000 words in length. Students are required to attend *viva-voce* examination and give a seminar presentation. The weight given for *viva-voce* and the research report will be 25% and 75% respectively. The evaluation of the viva-voce and seminar

presentation is conducted jointly by the Research Committee and an external examiner appointed by FOM. The evaluation of the project report is carried out at FOM by an expert appointed by FOM.

10. Examinations and Evaluation

The performance of students will be evaluated through ongoing in-semester evaluations and semester-end examinations. The FOM shall have the final authority in conducting, evaluating and awarding grades in semester-end examinations. The course facilitator (instructor) will decide the grades in the in-semester (internal) evaluations.

11. In-semester Evaluations

The in-semester (internal) evaluation shall generally have a total weight of 50 percent in class-room and project-based course. The concerned faculty shall be responsible for the continuous in-semester evaluations. The in-semester evaluation shall be based on a student's performance in class presentations, case analysis, and project assignments, class tests and others as required by the course. In order to qualify to appear in the semester-end examination, students must secure a GPA of 3.00 (60%) in the in-semester evaluation; otherwise, they will be awarded an NQ.

12. Assessment Methods

A range of assessment methods are used across the course, the choice of which reflects the needs and demands of the different types of course module. Some course modules will assess the ability to work collaboratively in a team and others will assess individual capability. Types of assessment will range from examinations to group presentations including IT and management projects, reports, financial analyses, IT practicum and research-based projects.

The interactive nature of the taught sessions offers opportunities to gain feedback on your performance before being formally assessed and increasing use is made of eLearning to further support the feedback process.

13. Semester-end Examinations

The semester-end examinations on course work related subjects shall have a total weight of 50 percent. The semester-end examination shall be based on problem solving questions, analytical questions, and case studies or any other formats as demanded by a course. The duration of the examination shall be 4 hours for 3 Credit Course and 3 Hour for 2 Credit Course.

14. Student Attendance

This program is an intensive professional program. This program demands a very high level of commitment from students. Students are required to attend regularly all classes and presentations as required by the course. Students failing to attend 80 % of classes shall not be allowed to appear in the semester-end examinations.

15. Grading System

The grading system followed in the program will be based on the absolute performance of a student in the in-semester evaluations and semester-end examinations. The performance of a student in the MITM program shall be made on a four-point scale ranging from 0 to 4. The passing grade in the semester-end examination for an individual paper shall be grade "B minus" or GPA of 2.7 (50 percent).

In order to pass the semester examination, the student must secure a minimum of Grade "B" or Cumulative Grade Point Average (CGPA) of 3.0. The following table presents the Letter Grade, GPA, percentage equivalent and Performance Remarks for the program:

Grade	CGPA	Performance Remarks
A	4.0	Distinction
A-	3.7	Very Good
B+	3.3	Good
B	3.0	Fair
B-	2.7	Pass in Individual Course
F	0	Fail

The students shall receive their semester grades and academic transcript grades only in letter grades and GPA scores.

16. Failing in Course

Students who do not qualify to appear in the semester-end examinations must re-register and retake the course as per the semester cycle. Students who qualify but fail to appear in the semester-end examinations, or who appear but fail the examinations, may take the make-up examinations as per the semester cycle. Students who fail or fail to appear in one or two courses in the final semester can reappear in the chance make-up examinations conducted by the Faculty of Management Examinations Control Division (FOMECD).

17. Degree Requirements

To receive MITM degree the student must have

- ➢ 'B' minus or better grade in each of the courses as specified in the curricular structure section;
- ➢ Obtained an overall CGPA of 3.0 or better after combining the GPAs obtained in all courses and projects;
- ➢ Completed all the course requirements as specified in the curricular structure section within the maximum time period of *five years* from the date of registration.

18. Graduate Prospects

The MITM program prepares graduates for a wide range of professional roles in the field of Information Technology and Business Management. Career paths include positions such as Business Analyst, Systems Analyst, Software Engineer, Network Administrator, Systems Manager, and Database Administrator. Graduates are also equipped to pursue roles in IT project management, electronic commerce development, and advanced programming. The program supports advancement into both technical and managerial positions within the IT and other business-related industries.

Faculty of Management

Level: Master

Course: Master of Technology Management (MITM)

Course Title: Financial Accounting and Taxation

Course Code: ACC 501	**Credit Value:** 2
Semester: I	**Total Hours:** 32

Course Objectives

This course aims to provide basic concepts of financial accounting and Taxation for a fundamental level of knowledge to prepare financial reports for the foundation of specialization-related theories. This also focuses on how to stay on the right track of financial transactions to maintain corporate governance and sustainable development of the organizations. This course also focuses on the knowledge of corporate taxation for decision making and enables them to work as tax consultants in the banking and corporate sector and tax officers in the government sector.

Course Description

Initially, this course discusses the conceptual foundations of financial accounting, including the processing and recording of business transactions, the accrual accounting concept, adjusting entries, closing entries, and so on. Then, after that, it includes the preparation and presentation of basic financial statements, such as the income statement, statement of retained earnings, balance sheet, and cash flow statement, to measure the performance of the organization. It is also designed to understand and apply knowledge of taxation and its law in the process of business administration. In taxation, students will be familiar with the subject matter, such as the conceptual foundation, taxation of income in Nepal.

Course Details

Unit 1: Accounting as an Information System   3 LHs

Concept of financial accounting; Financial Information: Need and users of financial information; Concept, objectives, and branches of Accounting; Qualitative features of accounting information; Nepal Financial Reporting Standards, and accounting principles.

Learning Outcomes: Understand the financial accounting and financial accounting information, and their users (Knowledge), Develop an idea of what types of accounting information will be in a business organization and for what purpose they are needed in business (Skill), Apply and implement such accounting information and NFRS, and accounting principles for decision making (Competency).

Unit 2: Processing of Financial Reporting   5 LHs

Financial events: Concept, external and internal events, cash and credit events; Source, Financial control systems, documents: Concept and role in recording financial transactions; Debit, credit and their rules; Recording process of accounting events: Journal, Ledger, and trial balance.

Learning Outcomes: Explain the financial events and their importance, recognize financial control systems (Knowledge); apply accounting systems in business(skill) for their decision making, and know how to keep and maintain the records, like journal entry, ledger, and trial balance. Apply the accounting principles to achieve organizational objectives and maintain good governance (Competency).

Unit 3: Financial Statements and Analysis **7 LHs**

Concept of Financial statements, Income statement, Statement of Retained earnings, and Balance sheet, Final Account with Adjustment, Closing and Opening Entries. Concept, purpose, and usefulness of financial statement analysis; Analyzing techniques: Horizontal, vertical, trend, and ratio analysis to measure and interpret the liquidity, stability, activity, profitability, productivity, and possibility. Preparation of cash flow statement (Direct Method).

Learning Outcomes: Identify and prepare the various financial statements; apply accounting principles for preparing statements (Knowledge), apply financial statement analysis to measure the financial soundness (Skills), prepare and organize various ratios and cash flow statements for proper reporting for decision making using technology (Competency).

Unit 4: Concept of Accounting Software **4 LHs**

Introduction to computerized accounting, Importance and functions, Computerized Accounting, Types of Accounting software: Tally, and Swastik Accounting. Components of accounting software, Modules of Accounting software: General Ledger, Inventory, Accounts Receivable, Accounts Payable, Payroll, Banking. Security Features.

Learning Outcomes: Understand the role of computerized accounting in business (Knowledge); Gain knowledge on how to operate accounting software to generate output (Skills); apply technology-led decision-making in business organizations for corporate governance and transparency (Competency).

Unit 5: Taxation of Income in Nepal **4 LHs**

Historical background of income tax in Nepal; Features of Income Tax Act, 2058; Definition of basic terms under Income Tax Act; Classification and status of assesses (Taxpayers): natural person and entity, resident, and non-resident, single and couple; Heads and sources of income: concepts, classification: income from employment, income from business, income from investment.

Learning Outcomes: Explain taxation and its features (Knowledge); know the status of taxpayers and their classification (Skills); Implement taxation systems for transparency and accountability in tech-led organizations (Competency).

Unit 6: Computation of Taxable Income **5 LHs**

Calculation of income from business: Components of income from business, Incomes which do not form part of income from business, Deductions allowed from income from business, Limitations and conditions for a particular deduction. Calculation of income from employment: Components of income from employment, and Incomes that are excluded from income from employment. Calculation of income from investment: Components of income from investment, Incomes which do not form part of income from

investment, Deductions allowed from income from business, Limitations and conditions for a particular deduction. Deductions allowed from taxable income.

Learning Outcomes: Understand income from business, employment, and investment, create an idea concept and significance of income from various sources (Knowledge), Calculate taxable income from business, investment, and investment (Skill), Apply the effective taxation system in the real business world (Competency).

Unit 7: Value Added Tax   **4 LHs**

Concept of Value Added Tax (VAT); Origin of VAT; Principle governing VAT; Types of VAT; Method of computing VAT; Method of collection/realization and refund of VAT; Penalties and appeal; Threshold limit and rate of VAT; Permanent Account Number and VAT number; Abbreviated invoice and VAT invoice.

Learning Outcomes: Understand Value Added Tax, Concept and Significance, current development in technology in business (Knowledge); Identify how to calculate VAT and suggest solutions for effective collection of revenues (Skills); Apply effective implementation of VAT in Business organizations, identifying ICT-related issues in business organizations (Competency).

Unit 8: e-**Filing and Verification of Electronic Records**   **3 LHs**

Concept of Inland Revenue Department and its Taxpayer portal, Preview of General Taxpayer Login, E-TDS Filing and TDS Certificate, VAT Billing Software and Electronic VAT Invoice, Online VAT Return Filing and Verification, Online Income Tax Return Filing.

Learning Outcomes: Understand e-filing and verification of electronic records and the Inland Revenue Department and its role; knowing principles of TDS and VAT Billing (Knowledge), knowing how to log in tax portal-TDS filing and TDS certificate (Skill), Apply the e-filing system and verification of electronic records to solve business problems effectively using technology (Competency).

Teaching & Learning Activities
- Lectures with real-world examples from technology-led business sector contexts.
- Weekly problem sets/case studies using real data from the company
- Study of preparing statements, consolidation templates of real-life examples.
- Individual project work: case analysis and presentation.
- Group project work: comprehensive annual report analysis and presentation
- Guest lectures from a practitioner (audit partner, CFO, regulators).
- Multi-media presentation to visualize concepts.
- Simulation, Group discussion, and Field visits.

Assessment Methods

1. Internal Assessment

Each student will be evaluated internally by the teaching faculty for 50% of the weight of the course. A regular assessment and evaluation is required from the teaching faculty under the following areas (not limited to) and submitted to the Office of the Dean, Faculty of Management, with or before the Examination form.

Assessment Types (Not limited to)	Weightage %
Class Participation and Attendance	10
Quiz/Surprise test/ Class test	5
Case study/Assignment	15
Group project (annual report analysis + presentation)	10
Weekly assignments	15
Midterm Examination	15
Preboard Examination	30

2. External Assessment

The final exam will be conducted by the Office of the Dean, Faculty of Management, in written form to test remembering, understanding, application, analyzing, evaluating, and creating.

Mapping Course: Learning Outcomes and Program Learning

Course Learning Objective (CLO) Dimensions	Knowledge (K)	Skills (S)	Competence (C)
Total Learning	30%	35%	35%

Suggested Readings

Government of Nepal, *Income Tax Rules, 2059* with amendments.
Government of Nepal. *Budget Speech and Finance Act* (recent).
Government of Nepal. Income Tax Act, 2058, with amendments.
Government of Nepal. *Value Added Tax Act, 2052* with amendments.
Government of Nepal. *Value Added Tax Rules, 2053* with amendments.
Kimmel, P., Weygandt, J., Kieso, D., Trenholm, B., & Irvine, W. (2011). *Financial Accounting: Tools for Business Decision Making.* John Wiley & Sons.
Lekhi, R. K. (2018). *Public Finance.* Kalyani Publishers.
Narayanaswamy, R. (2011). *Financial Accounting: A Managerial Perspective*. PHI Learning Private Limited.
Nepal Accounting Standards (NAS).
Nepal Financial Reporting Standards (NFRS) and International Financial Reporting Standards (IFRS).
Norton, C. L., & Porter. G. A. (2011). *Introduction to Financial Accounting.* South-Western Cengage Learning.

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Level: Master   **Course:** Master of Technology Management (MITM)
Course Title: Professional and Technical Communication
Course Code: ENG 501   **Credit Value:** 2
Semester: I   **Total Hours:** 32

Course Objectives

By course end, students will be able to create technical and professional documents to varied audiences and purposes, design and format documents—print and digital—for readability and usability, produce business correspondence (emails, memos, letters) and application materials (résumés, cover letters), develop a polished portfolio of formal technical proposals, reports, and executive summaries incorporating data and visuals, and collaborate on writing projects, manage version control, and observe professional ethics. The course aims to equip students to communicate effectively with diverse audiences, use collaborative and virtual communication tools effectively, apply and analyze a clear, concise style and professional tone across genres in both technical and workplace contexts.

Course Description

This course offers advanced principles and practices of professional and technical communication essential to managerial, entrepreneurial, and digital workplaces, equipping scholars with the skills to communicate complex information clearly and persuasively. Through a blend of theoretical frameworks and hands-on projects, scholars will learn to analyze user needs, conduct focused research, and apply a structured writing process to produce documents ranging from business correspondence and application materials to formal proposals, reports, and multimedia presentations. It emphasizes clarity, accuracy, user-centered design, teamwork communication, ethical reasoning, and data-driven presentation skills. Emphasizing real-world scenarios, the course integrates best practices in document design, visual data representation, and digital communication through real-world IT scenarios in Nepal, while reinforcing professional standards in ethics, collaboration, and version control.

Course Details

Unit 1: Foundations of Professional and Technical Communication   6 LHs

Nature, scope, and characteristics of technical communication; Communication in digital/entrepreneurial workplaces; Ethics, transparency, and data integrity; Intercultural and virtual communication; Audience profiling and context analysis.

Learning Outcomes: Understand the nature, scope, and ethical foundations of professional and technical communication, including audience profiling, intercultural communication, and digital workplace dynamics (knowledge); analyze communication contexts, evaluate audience needs, and produce clear, purpose-driven professional messages (skills); and demonstrate ethical reasoning, cultural sensitivity, and adaptability while communicating across managerial, entrepreneurial, and virtual environments (competency).

Unit 2: Writing in Business and IT Settings 8 LHs

Essentials of technical writing; Emails, memos, letters, resumé; Notices, Press Release, meeting minutes; Digital workplace writing (Slack, Teams, Jira); Requirements documentation and user stories

Learning Outcomes: Identify core structures and conventions of technical writing, business correspondence, notices, minutes, and IT documentation such as user stories and requirements notes (knowledge); draft concise, coherent, and audience-centered business/IT documents using professional tone, formatting, and clarity (skills); and apply workplace writing standards, maintain professionalism, and demonstrate job-ready communication competence suitable for Nepalese and global IT environments (competency).

Unit 3: Designing Technical Documents & Interfaces 6 LHs

Principles of document design; Typography, layout, templates; User manuals, instructions, SOPs; Graphics, dashboards, infographics; Accessibility and usability.

Learning Outcomes: Explain principles of document design, layout, typography, graphics, usability, and accessibility in user manuals, SOPs, infographics, dashboards, and digital interfaces (knowledge); design user-centered documents that integrate visuals, structure, and clarity using appropriate tools (skills); and produce industry-standard documentation ensuring readability, accessibility, and user-focused functionality for technical and managerial audiences (competency).

Unit 4: Workplace Collaboration & Leadership Communication 6 LHs

Proposals and reports; Teaming and collaboration processes; Leadership communication; Conflict resolution and feedback; Nepalese IT workplace case studies.

Learning Outcomes: Describe proposal/report structures, collaboration models, leadership communication techniques, and conflict-resolution approaches (knowledge); collaborate through shared digital platforms, facilitate discussions, and prepare structured proposals and reports (skills); and demonstrate leadership competence, teamwork efficiency, and communication strategies aligned with agile/scrum practices and Nepalese IT workplace contexts (competency).

Unit 4: Presentations & Data Storytelling 6 LHs

Planning and structuring presentations; Storytelling for technical/business contexts; Slide design and visual communication; Virtual presentation skills

Learning Outcomes: Understand principles of presentation planning, storytelling, slide design, and virtual communication etiquette (knowledge); prepare and deliver structured, visually engaging presentations that translate complex data into compelling narratives (skills); and demonstrate confidence, clarity, and persuasive communication in academic, managerial, and professional presentation settings both in-person and online (competency).

Preferred Assignments

Unit 1: Audience analysis and case study

Unit 2: Creating professional resumé, memo, and emails

Unit 3-4: Presenting or pitching an idea on a project proposal or report

Unit 5: Crafting and creating user manuals, instructions, and presentations

Pedagogical Strategies

- Workshops and writing labs
- Case studies
- Collaborative documentation
- Digital tools for writing and design
- Peer review and virtual teamwork

Evaluation

The course objectives will be evaluated internally (faculty evaluation) and externally (board exam by the Dean's office) in equal proportions.

Internal Assessment Methods and Types

Assessment Type	Weightage	Details
Attendance and involvement	10%	Class attendance and active participation in classroom discussion and engagement.
Class tests/Quizzes	15%	Periodic quizzes to assess comprehension
Case analysis reports/ Assignments/project reports	20%	Individual or group written analysis/reports
Mid-term examination	25%	Written test
Pre-board examination	30%	Comprehensive written test covering all units

External Assessment Methods and Types

Dean's office will arrange the final/board examination in writing to test understanding, application, analysis, evaluation, and creation.

Mapping Course: Learning Outcomes and Program Learning

Course Learning Objective (CLO) Dimensions	Knowledge (K)	Skills (S)	Competence (C)
Total Learning	30%	35%	35%

Suggested Readings

Cardon, P. W. (2022). *Business communication: Developing leaders for a networked world*. McGraw-Hill.

Duarte, N., & Reynolds, G. (2020). *The art of digital storytelling and presentation design*. Wiley.

Harvard Business Review (2019–2024). *HBR guide series*. Harvard Business Publishing.

Hynes, G. E., & Veltsos, J. (2019). *Managerial Communication: Strategies and Applications*. SAGE.

Johnson-Sheehan, R. (2024). *Technical Communication Today*. Pearson.

Kesteven, L., & Melrose, A. (2022). *Professional Writing*. Palgrave.

Markel, M., & Selber, S. A. (2024). *Technical communication*. Bedford/St. Martin's.

Open Oregon (2024). *Technical Writing*. https://openoregon.org/resources/

LibreTexts (2025). *Technical and Report Writing.* https://human.libretexts.org/@go/page/310329

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Level: Master   **Course:** Master of Technology Management (MITM)
Course Title: Foundations of Business Management
Course Code: MGT 501   **Credit Value:** 2
Semester: I   **Total Hours:** 32

Course Objectives

This course aims to introduce fundamental principles of business management, incorporating information technology in management functions, to students from diverse backgrounds. It seeks to facilitate students' understanding of basic managerial functions, including planning, organizing, leading, and controlling, and the application of digital tools and systems. Further, the course will develop students' abilities to analyze business environments, evaluate managerial decisions, and apply management theories within IT-driven workplaces. The course prepares students to think critically and work collaboratively, and to design innovative managerial solutions to address dynamic, technology-enabled business environments, integrating traditional management concepts with contemporary technological perspectives.

Course Description

This course provides a comprehensive foundation of business management emphasizing information technology in planning, decision-making, organizing, leading, and controlling. This course demonstrates to students how management functions are transformed through digital tools, data analytics, and emerging technologies. Students learn to analyze organizational challenges, utilize IT-enabled management tools, and design innovative solutions suitable for dynamic, technology-driven business environments through theoretical insights and practical applications. **Course Details**

Unit 1: Introduction   **5 LHs**

Concept and nature of business and management; Management functions; Evolution of management theories and rise of digital management; Managerial roles in technology-driven organizations; IT-enabled business models (e-commerce, digital platforms, cloud-based firms); Management challenges and opportunities.

Learning Outcomes: Explain the concept and nature of business and management, describe classical to contemporary management theories, including digital-era approaches, identify managerial roles in technology-driven organizations, explain IT-enabled business models such as e-commerce, digital platforms, and cloud-based firms (Knowledge); Analyze how digital technologies reshape traditional managerial functions, Compare management practices across traditional and IT-driven organizations, Illustrate challenges and opportunities created by digital transformation (Skills); Demonstrate the ability to interpret managerial roles and responsibilities in digital contexts, Evaluate the impact of evolving technologies on business models and organizational effectiveness (Competencies).

Unit 2: Business Environment Analysis   **5 LHs**

Meaning and role of business environment; Classification of business environment; Internal environment: organizational culture, organizational structure, human and physical resources, digital culture, IT resources, knowledge management; External environment: digital economy, emerging technologies; PESTLE and SWOC in IT-based business; Data-driven decision support for environmental analysis; Cyber laws, digital ethics, and corporate governance.

Learning Outcomes: Define business environment and its role in organizational functioning, explain internal and external components of the environment, including digital culture, IT resources, and emerging technologies, describe PESTLE and SWOC frameworks for environmental analysis, and understand cyber laws, digital ethics, and corporate governance requirements (knowledge); Conduct internal and external environment scanning using PESTLE/SWOC; apply data-driven tools for environmental analysis and decision support; identify risks and opportunities in the digital economy and technological ecosystem (Skills); Develop holistic environmental assessments for IT-driven businesses, integrate ethical, legal, and governance considerations into managerial decisions (Competence).

Unit 3: Planning and Decision-Making   **5 LHs**

Concept and Significance of planning in organization; Types of planning; Planning in digital organizations (agile, adaptive, real-time planning); IT-enabled strategic planning (Enterprise Resource Planning, Business Intelligence Systems, Customer Relationship Management Analytics); Decision-making models using Decision Support System, AI, and Machine Learning insights; Scenario analysis and digital forecasting tools.

Learning Outcomes: Explain planning concepts, significance, and types, identify planning approaches used in digital organizations (agile, adaptive, real-time), describe IT-enabled strategic planning tools (ERP, BI systems, CRM analytics), understand decision-making models supported by DSS, AI, and ML (Knowledge); Formulate organizational plans using digital planning tools and techniques; use AI/ML insights, dashboards, and forecasting tools for managerial decisions, apply scenario analysis for strategic choices (Skills); Design strategic and operational plans aligned with technological capabilities, demonstrate informed decision-making using data analytics and IT-enabled systems (Competence).

Unit 4: Organizing and Digital Workforce Management   **5 LHs**

Meaning and principles of organizing; Organizational designs; IT in staffing, e-recruitment, and applicant tracking systems; HR analytics and AI-driven performance management; Remote working systems, collaboration technologies, and cybersecurity issues.

Learning Outcomes: Explain organizational structures, principles, and design, identify digital tools for staffing, e-recruitment, and applicant tracking, understand HR analytics and AI-enabled performance management systems, describe remote working systems, collaboration tools, and cybersecurity considerations (knowledge); Develop

organizational structures suitable for digital and hybrid workplaces, use e-recruitment platforms and HR analytics for staffing decisions, manage virtual teams using collaboration technologies (Skills); Demonstrate ability to lead and manage digital workforces effectively, integrate cybersecurity and digital HRM practices into organization-wide systems (Competence).

Unit 5: Leadership   6 LHs

Concept and Functions of Leadership; Leadership qualities; E-leadership and digital leadership competencies; Motivational approaches in technology-driven workplaces; Teamwork in virtual teams; Communication technologies; Fostering innovation culture.

Learning Outcomes: Explain concepts, functions, and qualities of leadership, describe e-leadership and digital leadership competencies, understand motivation theories in technologically enriched environments, identify challenges of teamwork in virtual and hybrid settings (Knowledge); Apply leadership theories to digital organizational contexts, facilitate collaboration and communication in virtual teams, use digital tools to enhance innovation, motivation, and team performance (Skills); Demonstrate digital leadership behaviors in managing diverse, distributed teams, create innovative work cultures driven by technology and continuous improvement (Competence).

Unit 6: Controlling and Contemporary IT Issues   6 LHs

Meaning of controlling; Tools for controlling: Digital dashboards, KPIs, and Analytics-based control systems; Management Information System (MIS) and Automated Evaluation Systems; Quality management using IT (TQM software, Six Sigma tools); Contemporary IT issues in management: Artificial Intelligence, Automation, Digital Transformation, Agile Management; Sustainability, CSR, and green technologies in business management.

Learning Outcomes: Describe the meaning, importance, and methods of controlling, identify digital control tools—dashboards, KPIs, analytics systems, understand MIS, automated evaluation systems, and IT-enabled quality management, recognize contemporary issues: AI, automation, agile management, digital transformation, sustainability, and green technologies (Knowledge); Use digital dashboards and analytics to track organizational performance, apply MIS and quality management tools (TQM, Six Sigma software) for monitoring and improvement, analyze technological trends and their consequences for managerial control systems (Skills); Design effective digital control mechanisms for modern organizations, integrate sustainability and emerging technologies into long-term managerial strategies (Competence).

Teaching Pedagogy
- Interactive lectures and case-based discussions
- Group activities using digital collaboration platforms
- Group projects involving business problem-solving with IT tools
- Analysis of business cases (e-commerce, fintech, EdTech, SaaS)
- Use of video materials and virtual discussions

Evaluation

The course objectives will be evaluated internally (faculty evaluation) and externally (board exam by the Dean's office) in equal proportions.

Internal Assessment Methods and Types

Assessment Type	Weightage	Details
Attendance and involvement	10%	Class attendance and active participation in classroom discussion and engagement.
Class tests/Quizzes	15%	Periodic quizzes to assess comprehension
Case analysis reports/ Assignments/project reports	20%	Individual or group written analysis/reports
Mid-term examination	25%	Written test
Pre-board examination	30%	Comprehensive written test covering all units

External Assessment Methods and Types

Dean's office will arrange the final/board examination in writing to test understanding, application, analysis, evaluation, and creation.

Mapping Course: Learning Outcomes and Program Learning

Course Learning Objective (CLO) Dimensions	Knowledge (K)	Skills (S)	Competence (C)
Total Learning	30%	35%	35%

Suggested Readings

Charles, W. L. H., & Steven, L. M. (2008). *Principles of Management.* McGraw-Hill.

Griffin, R. W. (2012). *Management Principles and Applications.* Cengage Learning.

Laudon, K. C., & Laudon, J. P. (2023). *Management information systems: Managing the digital firm*. Pearson.

Misra, R. K., Shrivastava, A., & Sijoria, C. (2023). *Introduction to Technology, Management and Business: Evolving Perspectives*. https://doi.org/10.1108/S1877-636120230000031001

Richard, L. D. (2024). *Management*. Cengage Learning.

Robbins, S. P., & Coulter, M. (2021). *Management*. Pearson.

Stephen, P. R., & Mery, A. C. (2021). *Management*. Pearson.

Turban, E., Pollard, C., & Wood, G. (2021). *Information technology for management: On-demand strategies for performance, growth, and sustainability*. Wiley.

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Level: Master   **Course:** Master of Technology Management (MITM)

Course Title: Advanced Programming Concepts

Course Code: MIT 501   **Credit Value:** 3

Semester: I   **Total Hours:** 48

Course Objectives

By the end of this course, students will be able to understand the fundamentals of the Python programming language, including syntax, data types, operators, control structures, functions, and file and exception handling, apply object-oriented programming concepts in Python to develop modular and reusable code, utilize Python libraries such as NumPy, Pandas, Matplotlib, and Seaborn for data analysis and visualization, develop applications using Python GUI programming, perform database handling tasks, including connecting Python applications to databases and executing database queries, implement network programming concepts to build client-server applications using Python, design and develop web applications using Python frameworks and integrate them with databases and front-end components.

Course Description

This course covers different concepts of the Python programming language, including basic language and object-oriented programming. It also explores essential libraries such as NumPy, Pandas, Matplotlib, and Seaborn. Additionally, the course covers advanced Python topics, including GUI programming, database management, network programming, and web development.

Course Details

Unit 1: Language Basics   8 LHs

Installing and Running Python Programs; Installing, Uninstalling, and Upgrading Third-Party Libraries; Working with Virtual Environments; Writing Comments; Tokens, Identifiers, Keywords, and Literals; Variables and Constants; Operators; Data Types (Numeric, Sequence, Text, Set, Mapping, Boolean, and None); Indexing and Slicing; Comprehension; Control Statements (if, match-case, for, and while); break, continue and pass Statements; Functions; Passing Arguments to Functions; Lambda Function; File Handling; Exception Handling.

Learning Outcomes: Understand installation and library management, virtual environments, syntax, data types, control statements, functions, file handling, and exception handling (Knowledge); Write, debug, and execute Python programs; manipulate data using indexing, slicing, and comprehensions; implement loops, conditional statements, and functions (including lambda); handle files and exceptions (Skills); Develop efficient, robust, and well-structured Python applications independently (Competency).

Unit 2: Object-Oriented Programming   8 LHs

Object-Oriented Principles; Creating Classes and Objects; Instance Variables; Instance Methods; Class Variables; Class Methods; Static Methods; Method Overloading; Magic Methods; Operator Overloading; Inheritance; Method Overriding; Modules and Packages.

Learning Outcomes: Understand object-oriented principles, class and object creation, variables and methods (instance, class, static), inheritance, method overriding, and operator/method overloading (Knowledge); Design and implement Python classes and objects; apply inheritance, method overriding, and polymorphism; modularize code using modules and packages (Skills); Build reusable, maintainable, and modular object-oriented Python programs (Competency).

Unit 3: Python Libraries   **10 LHs**

NumPy – Creating and Processing Arrays, Array Attributes, Array Indexing and Slicing, Array Broadcasting; Mathematical and Statistical Functions; Pandas – Series and Data Frame; Inspecting, Selecting, and Modifying Data in Data Frames; Merging, Joining, and Concatenating Data Frames; Handling Missing Data; Working with CSV Files; Matplotlib – Line Plot; Scatter Plots; Bar Chart; Histogram; Pie Chart; Adding Titles Legends, and Labels Subplot; Seaborn – Box Plot; Violin Plot; Pair Plot; Heatmap; Customizing Seaborn Plots.

Learning Outcomes: Learn NumPy arrays and operations, Pandas series and data frames, Matplotlib and Seaborn plotting techniques, and data visualization concepts (Knowledge); Perform data manipulation, statistical and mathematical operations, and data visualization; merge, join, and clean datasets; customize plots for analysis (Skills); Analyze and visualize real-world datasets effectively using Python libraries (Competency).

Unit 4: GUI Programming   **5 LHs**

Creating Windows; Using Widgets; Handling Layouts and Events.

Learning Outcomes: Understand GUI components, layout management, and event handling in Python (Knowledge); Create interactive Python applications using windows, widgets, events, and manage layouts efficiently (Skills); Develop user-friendly graphical Python applications with functional interfaces (Competency).

Unit 5: Working with Databases   **5 LHs**

Relational and NoSQL Database; Connecting to Databases; Closing Connections; Creating Database and Tables; Executing SQL Queries; Using Parameterized Queries; Handling Exceptions; Working with NoSQL Databases.

Learning Outcomes: Understand relational and NoSQL databases, SQL queries, and database connectivity using Python (Knowledge); Connect to databases, perform CRUD operations, handle exceptions, use parameterized queries and interact with NoSQL databases (Skills); Develop Python applications that interact reliably and securely with databases (Competency).

Unit 6: Network Programming   **4 LHs**

IP Addressing, Subnetting, and Ports; Python socket Module; TCP and UDP Programming; File Transfer and Messaging.

Learning Outcomes: Learn IP addressing, subnetting, ports, TCP/UDP protocols, and Python socket module (Knowledge); Implement network communication, messaging, and file transfer using Python sockets (Skills); Build Python applications capable of network communication and data exchange (Competency).

Unit 7: Web Development   **8 LHs**

Apps, Models, Views, and Templates; Form Handling; Sessions and Cookies; Database Integration and ORM; Authentication and Authorization; Frontend Integration; Deployment and Hosting.

Learning Outcomes: Understand web application architecture, models, views, templates, forms, sessions, cookies, ORM, authentication, and frontend integration (Knowledge); Build full-stack web applications, integrate databases, implement authentication and authorization, and deploy applications (Skills); Develop and deploy secure, functional, and interactive Python-based web applications (Competency).

Pedagogical strategies

- Lectures with demonstration
- Hands-on lab sessions
- Problem-based learning
- Guest lectures from tech industry experts
- Continuous assessment and feedback
- Multimedia presentations to visualize concepts
- Mini project

Internal assessment methods and types

Assessment Type	Weightage	Details
Class participation & attendance	10%	Contribution to discussions, engagement in class activities
Quizzes/short tests	15%	Periodic quizzes to assess comprehension
Practical/Project	20%	Lab sessions and mini project
Mid-term examination	25%	Written test
Pre-board examination	30%	Comprehensive written test covering all units

External assessment methods and types

Dean's office will arrange the final/board examination in writing to test understanding, application, analysis, evaluation, and creation.

Mapping course: Learning outcomes and program learning

Course Learning Objective (CLO) Dimensions	Knowledge (K)	Skills (S)	Competence (C)
Total Learning	35%	40%	25%

Laboratory Work

Students will get hands-on experience through practical exercises that help strengthen their understanding of Python programming concepts. This includes writing programs to practice language basics and object-oriented programming, performing data analysis and visualization using libraries, developing applications with a GUI, creating and managing databases, building client-server applications for network programming, and designing web applications. These exercises aim to provide practical experience in implementing real-world Python solutions across multiple domains.

Suggested Readings

Ernesti, J., & Kaiser, P. (2022). *Python 3: The Comprehensive Guide*. Rheinwerk Computing.

Moore, A. D. (2021). *Python GUI Programming with Tkinter: Design and build functional and user-friendly GUI applications*. Packt Publishing.

Meier, B. A. (2019). *Python GUI Programming Cookbook: Develop functional and responsive user interfaces with tkinter and PyQt5*. Packt Publishing.

Jackson, C. (2018). *Learn programming in Python with Cody Jackson*. Packt Publishing.

Kumar, V. (2016). *Learning Python network programming*. Packt Publishing.

Singh, R. (2020). *Python web development with Django & Flask*. Packt Publishing.

Romano, F. & Kruger, H. (2021). *Learn Python Programming – An in-depth Introduction to the fundamentals of Python*. Packt Publishing.

Lambert, K. A. (2024). *Fundamentals of Python: First Programs*. Cengage Learning Publishing.

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Faculty of Management

Level: Master   **Course:** Master of Technology Management (MITM)

Course Title: Object-Oriented Analysis & Design

Course Code: MIT 502   **Credit Value:** 3

Semester: I   **Total Hours:** 48

Course Objectives

By the end of this course, students will be able to understand and apply the phases of the System Development Life Cycle (SDLC), conduct effective requirements gathering and analysis, develop comprehensive UML models, apply object-oriented design principles and patterns, and design and present a systems solution through a real-world project.

Course Description

Object-Oriented Analysis and Design (OOAD) provides students with a comprehensive understanding of the principles and practices used to develop modern software systems. This course introduces fundamental object-oriented concepts and equips students with the ability to model real-world problems using the Unified Modeling Language (UML).

Course Details

Unit 1: Introduction   6 LHs

System Development Life Cycle (Planning, Analysis, Design, Implementation); Systems Development Methodologies (Structured Design; Rapid Application Development; Agile Development); Selecting the Appropriate Development Methodology; Characteristics of Object-Oriented Systems (Classes and Objects, Methods and Messages, Encapsulation and Information Hiding, Inheritance, Polymorphism and Dynamic Binding); Object-Oriented Systems Analysis and Design (Use-Case Driven, Architecture-Centric, Iterative and Incremental); Benefits of Object-Oriented Systems Analysis and Design; Unified Process and Unified Modeling Language.

Learning Outcomes: Understand the phases of SDLC, describe various development methodologies, explain OO characteristics, understand OOAD fundamentals and explain unified process and UML (Knowledge); Compare and select suitable development methodologies, identify key OO features and interpret SDLC phases and map them to real-world system development (Skills); Justify the selection of a development methodology for a system, articulate OO concepts for designing modern systems, and begin modeling systems using UML (Competency).

Unit 2: Requirements Determination   5 LHs

Requirements Determination; Requirements Analysis Strategies (Problem Analysis, Root Cause Analysis, Duration Analysis, Activity-Based Costing, Informal Benchmarking, Outcome Analysis, Technology Analysis, Activity Elimination); Requirements-Gathering Techniques (Interviews, Joint Application Development,

Questionnaires, Document Analysis, Observation, Concept Maps, User Stories); System Proposal.

Learning Outcomes: Understand requirements determination and its importance in system development, describe requirements analysis strategies, understand various requirements gathering techniques and explain the purpose of system proposal (Knowledge); Apply appropriate requirement-gathering methods in real contexts, analyze problems using systematic analysis strategies, and organize gathered requirements into structured documentation (Skills); Create an accurate set of functional and non-functional requirements and prepare a system proposal that communicates findings clearly (Competency).

Unit 3: Business Process and Functional Modeling   7 LHs

Business Process Identification with Use Cases and Use-Case Diagrams; Business Process Modeling with Activity Diagrams; Business Process Documentation with Use Cases and Use-Case Descriptions; Verifying and Validating the Business Processes and Functional Models.

Learning Outcomes: Understand business process identification using use case and activity diagrams, understand use-case descriptions for documenting system behavior, and learn verification and validation techniques for business process models (Knowledge); Create use case diagrams for representing system functionality and model business workflows using activity diagrams (Skills); Able to analyze and document business processes systematically, model system functionality using UML, and ensure that functional models accurately represent business requirements (Competency).

Unit 4: Structural Modeling   9 LHs

Structural Models; Object Identification; CRC Cards; Class Diagrams; Creating Structural Models Using CRC Cards and Class Diagrams

Learning Outcomes: Understand structural models and their purpose in OOAD, and understand CRC cards and class diagrams (Knowledge); Identify objects, attributes, and relationships within a problem domain, develop CRC cards to explore responsibilities and collaborations, create detailed class diagrams using UML notation, and transform conceptual object ideas into complete structural models (Skills); Design well-structured object models, represent system structure using UML class diagrams, and apply CRC-based analysis to refine and validate structural models (Competencies).

Unit 5: Behavioral Modeling   7 LHs

Behavioral Models; Interaction Diagrams; Behavioral State Machines; Creating and Verifying, and Validating the Behavioral Model

Learning Outcomes: Understand behavioral modeling concepts, learn interaction diagrams: sequence and communication diagrams and explain behavioral state machines and state transitions (Knowledge); Model object interactions using sequence and communication diagrams, develop state machine diagrams to represent dynamic

behavior, analyze system scenarios to derive behavioral models (Skills); Represent system behavior over time and across interactions, link behavioral models to requirements and structural models, and design accurate and consistent dynamic models (Competencies).

Unit 6: Design Modeling   **10 LHs**

Verifying and Validating Analysis Models; Evolving Analysis Models into Design Models; Packages and Package Diagrams; Class and Method Design; Design Criteria; Verifying and Validating Class and Method Design; Data Management Layer Design (Mapping Problem Domain Objects to Object Persistence Formats, Designing Data Access and Manipulation Classes); User Interface Design (Principles of User-Centered Design, Developing Interface Structure and Prototypes, Designing Forms, Reports and Navigation, Usability Testing and Feedback); Physical Architecture Layer Design (Elements of the Physical Architecture Layer, Architectural Components, Server-Based Architectures, Client-Based Architectures, Client–Server Architectures, Client–Server Tiers, Selecting a Physical Architecture, Cloud Computing).

Learning Outcomes: Understand the process of evolving analysis models into design models, learn package diagrams, class and method design principles, and design criteria, understand data management layer design and object persistence formats, learn user interface design principles, prototyping, forms, reports, and usability testing, and understand physical architecture such as server-based, client-based, client–server, cloud computing, and multi-tier architectures (Knowledge); Convert analysis models into detailed design models, design classes, methods, and packages according to best practices, map domain objects to appropriate storage and design data access classes, develop UI structures, prototypes, and navigation flows and evaluate and select suitable physical architecture for system deployment (Skills); Design scalable and maintainable software architectures, create user-centered interfaces, perform usability testing, and design complete system layers (Competency).

Unit 7: Construction, Installation, and Operations   **4 LHs**

Construction; Managing Programming; Developing Documentation; Designing Tests; Conversion; Change Management; Post-Implementation Activities.

Learning Outcomes: Understand the construction phase, programming management, and documentation requirements and learn test design, system conversion strategies, change management, and post-implementation activities (Knowledge); Create test plans and test cases for system validation, manage programming tasks and documentation development, apply conversion techniques such as direct, parallel, pilot, and phased conversions (Skills); Manage system deployment and operational activities, handle user support, maintenance, and post-implementation evaluation, and ensure smooth transition from development to operation (Competency).

Pedagogical strategies

- Lectures with demonstration
- Hands-on lab sessions
- Problem-based learning
- Guest lectures from tech industry experts
- Continuous assessment and feedback
- Multimedia presentations to visualize concepts
- Mini project
- Case study

Assessment Methods

a. Internal assessment methods and types

Assessment Type	Weightage	Details
Class participation & attendance	10%	Contribution to discussions, engagement in class activities
Quizzes/short tests	15%	Periodic quizzes to assess comprehension
Practical/Project	20%	Lab sessions and mini project
Mid-term examination	25%	Written test
Pre-board examination	30%	Comprehensive written test covering all units

b. External assessment methods and types

Dean's office will arrange the final/board examination in writing to test understanding, application, analysis, evaluation, and creation.

Mapping course: Learning outcomes and program learning

Course Learning Objective (CLO) Dimensions	Knowledge (K)	Skills (S)	Competence (C)
Total Learning	40%	40%	22%

Laboratory Work

The laboratory work focuses on turning theory into practical system development skills. Students practice identifying system requirements, creating use-case models, drawing activity diagrams, and developing structural models using CRC cards and class diagrams. They also build behavioral models such as sequence, communication, and state machine diagrams. The lab helps students transform their analysis into complete design models, including package diagrams, class and method designs, data access components, user interface prototypes, and physical architecture plans. Students are also encouraged to develop a mini project in which they apply these concepts to design and model a complete object-oriented system.

Suggested Readings:

Booch, G., Maksimchuk, R. A., Engle, M. W., Young, B. J., Conallen, J., & Houston, K. A. (2007). *Object-oriented analysis and design with applications.* Addison-Wesley.

Dennis, A., Wixom, B. H., & Tegarden, D. (2015). *Systems analysis and design: An object-oriented approach with UML.* Wiley.

Larman, C. (2004). *Applying UML and patterns: An introduction to object-oriented analysis and design and iterative development.* Prentice Hall.

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Level: Master   **Course:** Master of Technology Management (MITM)

Course Title: Information Technology Audit

Course Code: MIT 503   **Credit Value:** 3

Semester: I   **Total Hours:** 48

Course Objectives

The course aims to enhance the students' understanding of the IT audit environment, apply the IT audit process and methodologies, and use the IT audit tools and techniques, evaluate IT governance and strategy, identify and evaluate risks, audit information system operations, conduct cyber security audits, and get familiar with IT audit frameworks.

Course Description

This course covers different concepts of the IT audit, including the IT audit environment, IT audit process, tools, and techniques for IT audit. The course introduces students to IT governance strategies, risk management, and controls. In addition, the course covers auditing of information system operations and cybersecurity. The course introduces IT audit frameworks.

Course Details

Unit 1: IT Environment and IT Audit   **5 LHs**

Concept of IT Environment; Auditing Profession; Internal versus External Audit Functions; IT Auditing; IT Auditing Trends; Need for IT Audit; Role of IT Auditor; IT Audit Profession; IT Auditor Profile.

Learning Outcomes: Understand the IT environment and its components and identify the responsibility and professional profile of an IT auditor (Knowledge); Analyze different IT environments and determine relevant audit requirements (Skill); Demonstrate professional understanding of IT audit roles and adapt to evolving audit requirements (Competency).

Unit 2: IT Audit Process   **4 LHs**

Audit Universe; Risk Assessment; Audit Plan; Audit Process.

Learning Outcomes: Understand the audit universe, risk assessment, audit planning, and audit process (Knowledge); Prepare a basic audit plan and identify elements of the audit universe (Skills); Execute structured IT audit processes (Competency).

Unit 3: Tools and Techniques for IT Audit   **8 LHs**

Audit Productivity Tools; System Documentation Techniques; Flowcharting and Flowcharting Techniques; Computer Assisted Audit Techniques (CAATs); CAATs for Sampling; CAATs for Application Reviews, CAATs for Auditing Application Controls; CAATs for Operational Reviews; Auditing Around Versus Through Computer; Computer Forensics Tools for Auditing

Learning Outcomes: Understand the concepts of audit tools and techniques for the audit process (Knowledge); Use audit tools to improve audit efficiency; prepare system

documentation using flowcharts and other techniques; apply Computer-Assisted Audit Techniques (Skills); Utilize modern audit tools to enhance audit efficiency and accuracy (Competency).

Unit 4: IT Governance and Strategy   **4 LHs**

IT Governance; IT Governance Frameworks; IT Performance Matrix; Regulatory Compliance and Internal Controls; IT Strategy; IT Steering Committee; Communication; Operational Planning.

Learning Outcomes: Explain IT governance frameworks and performance metrics along with the formulation of IT committee and operational plans (Knowledge); Assess internal controls, interpret performance metrics to evaluate IT effectiveness, and participate in strategic planning (Skills); Align IT governance practices with business objectives and regulatory standards (Competency).

Unit 5: Risk Management   **4 LHs**

Risk Management; Enterprise Risk Management; Risk Assessment; Guidance; Insurance.

Learning Outcomes: Understand the role of risk management in IT audit (Knowledge); Identify IT risks and conduct IT risk assessments (Skills); Propose appropriate risk mitigation measures (Competency).

Unit 6: Application System Risks and Controls   **6 LHs**

Application System Risks; End-User Development Application Risks; Risks to Systems Exchanging Electronic Business Information; Web Application Risks; Application Controls; IT Auditor's Involvement.

Learning Outcomes: Learn about various application system risks, including end-user development and electronic data exchange risks as well as their control mechanisms (Knowledge); Identify threats in application systems and evaluate associated control mechanisms (Skills); Conduct comprehensive application-level audits and recommend control improvements (Competency).

Unit 7: Auditing Information System Operations   **7 LHs**

Operating Policy and Procedures; Data Processing; Protection of Data Files and Programs; Physical Security and Access Controls; Environmental Controls; Program and Data Backups; Business Continuity and Disaster Recovery Plan; Auditing End-User Computing; Audit Involvement in Information Systems Operations.

Learning Outcomes: Understand policies and procedures for protecting data and programs using proper control recovery mechanisms (Knowledge); Evaluate IT operational controls, audit end user computing activities, and assess backup and disaster recovery (Skills); Provide recommendations for strengthening security, continuity, and operational processes of information systems (Competency).

Unit 8: Cybersecurity Audit   **6 LHs**

Cybersecurity Audit; Internal and External Cybersecurity Audit; Types of Cybersecurity Audits; Common Cybersecurity Risks Audit; Risk-Based Approach in Cybersecurity

Audits; Compliance Frameworks in Cybersecurity Audits; Tools for Network and Cybersecurity Audits.

Learning Outcomes: Understand the cybersecurity audit principles and tools for auditing cyberspace (Knowledge); Use cybersecurity and network auditing tools to identify vulnerabilities in cyberspace (Skills); Conduct cybersecurity audits (Competency).

Unit 9: IT Audit Frameworks **4 LHs**

COBIT; COSO; CIS; NIST; SOX IT Control Framework; ISO/IEC 27001; ISO/IEC 20000.

Learning Outcomes: Understand the scope and applicability of each IT audit framework (Knowledge); Apply and review selected frameworks for control assessment and compliance evaluation (Skills); Follow and integrate industry standard frameworks into IT audit (Competency).

Pedagogical strategies

- Lectures with demonstration
- Hands-on lab sessions
- Problem-based learning
- Guest lectures from tech industry experts
- Continuous assessment and feedback
- Multimedia presentations to visualize concepts
- Mini project

Assessment

a. Internal assessment methods and types

Assessment Type	Weightage	Details
Class participation & attendance	10%	Contribution to discussions, engagement in class activities
Quizzes/short tests	15%	Periodic quizzes to assess comprehension
Practical/Project	20%	Lab sessions and mini project
Mid-term examination	25%	Written test
Pre-board examination	30%	Comprehensive written test covering all units

b. External assessment methods and types

Dean's office will arrange the final/board examination in writing to test understanding, application, analysis, evaluation, and creation.

Mapping course: Learning outcomes and program learning

Course Learning Objective (CLO) Dimensions	Knowledge (K)	Skills (S)	Competence (C)
Total Learning	30%	45%	25%

Laboratory Work

Students will get hands-on experience through practical exercises that help strengthen their understanding of information technology auditing concepts. This includes using various tools to perform an IT audit of IT-related resources like network devices, operating systems, web servers, databases, servers and data centers, end user computing devices and applications, cyberspace, etc.

Suggested Readings

Cascarino, R. E. (2007). *Auditor's Guide to Information Systems Auditing.* Wiley.

Hingarh, V., & Ahmed, A. (2013). *Understanding and Conducting Information Systems Auditing.* Wiley.

Kegerreis, M., Schiller, M., Davis, C. (2019). *IT Auditing Using Controls to Protect Information Assets.* McGraw-Hill.

Otero, A. R. (2019). *Information Technology Control and Audit.* CRC Press.

Salihu, A. (2025). *Cybersecurity Audit: Essentials Tools, Techniques, and Best Practices.* Apress.

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