



Syllabus for Written Examination

(For Special Internal Competition)

Post: **Assistant Professor/Lecturer**

Subject: **Information Technology/Electronics**

1. **The knowledge of the related subject matters which are generally included in the concerned bachelor and master level courses (60%)**
 - (a) **Object Oriented Programming:** Platform independence, class, object, methods, inheritance and polymorphism, exceptions.
 - (b) **Web Technology:** Internet, WWW, Web Browser, Web servers, URL: HTTP, HTTPS, POP, SMTP, FTP, Domain Name and hierarchy, HTML, XHTML..
 - (c) **Information Technology:** Information System, Elements of Architecture, Information Technology components, Computer Security and Encryption, E-business and E-commerce, Decision Support Systems.
 - (d) **Discrete Mathematics:** Logic and induction, Mathematical reasoning, Finite state automata and Grammars, Recurrence Relation.
 - (e) **Software Engineering:** Software engineering process, process models, Agile development, requirement modelling, design concepts, implementation and testing, security, software quality assurance.
 - (f) **Data Structures and Algorithms:** Structures like lists, stack, Queue, Tree, Graphs and operations like searching, sorting, algorithms complexity.
 - (g) **Database Management Systems:** Database concepts and applications, data abstraction and independence, schema and instances. Data models, RDBMS and NOSQL databases, normalization, query processing and optimization, Transactions processing and concurrency control, database recovery and backup.
 - (h) **Computer Graphics:** Line Drawing algorithms, Composite transformation, Line clipping and algorithms, color models, 2D and 3D Transformations.
 - (i) **Computer Architecture and Microprocessor:** Register Transfer Language, Booth's algorithms, cache memory, paging, segmentation, Replacement algorithms, RISC and CISC, Instructions set, addressing modes of 8085 microprocessor.
 - (j) **Digital Logic:** Boolean algebra, SOP, POS, Karnaugh map, Multiplexing, Demultiplexing, Encoder and Decoder.
 - (k) **AI and Machine Learning:** Intelligent Agent, PEAs, Searching (BFS, DFS, Greedy Search), fuzzy logic, ANN, classification algorithms (KNN, Decision tree), Types of Learning, linear Regression.
2. **Basic Knowledge of the recent trends in Information Technology and Electronics (15%)**
 - (a) Software & Web Technologies – Low-code development, microservices, Web 3.0, serverless computing, cybersecurity trends, and quantum computing.

- (b) AI & Data Science – Explainable AI, transformer models (ChatGPT, BERT), federated learning, AI-driven software engineering, and big data analytics.
 - (c) Computing & Architecture – Edge computing, 5G, blockchain, RISC-V processors, neuromorphic chips, and heterogeneous computing (GPUs, TPUs).
 - (d) Embedded Systems & Security – FPGA-based AI acceleration, SoC architectures, open-source hardware (RISC-V, OpenTitan), and secure hardware modules (TPM).
 - (e) Graphics & Visualization – Ray tracing, VR/AR, AI-enhanced rendering (NVIDIA DLSS), MetaVerse technologies, and digital twins.
- 3. National and global trends and Issues regarding the Information Technology and Electronics Education (10%)**
- (a) Integration of AI & Data Science in IT Curricula – How universities can incorporate AI, ML, and data science into traditional IT programs.
 - (b) Skill Gap in IT & Electronics Industry – Challenges in aligning university curricula with industry demands in Nepal and abroad.
 - (c) Women in IT & Electronics Education – Trends, challenges, and initiatives to promote gender diversity in technical fields.
- 4. Teaching and Research Methodology (10%)**
- (a) Teaching Skills & Strategies – Effective communication, student-centered learning, classroom management, and use of technology in IT & Electronics education.
 - (b) Common research methods – Conceptualizing a Research Topic, Identifying research gaps, formulating hypotheses, data collection, aligning with current trends, and exploring multidisciplinary research areas.
 - (c) Curriculum Review & Lesson Planning – Designing industry-relevant curricula, structuring lesson/work plans, integrating theory with practical learning, and incorporating emerging technologies.
 - (d) Academic Planning & Reference Material Development – Preparing quality reference materials, using open educational resources (OER), and structuring academic calendars effectively.
 - (e) Culturally Responsive Teaching – Promoting diversity and inclusion, adapting to different learning styles, and module based teaching & evaluation.
 - (f) Research Paper & Proposal Writing – Structuring research papers, writing proposals, maintaining academic integrity, and selecting high-impact journals.
 - (g) Assessment & Evaluation Methods – Implementing effective assessment techniques, feedback mechanisms, and ensuring student engagement through innovative teaching practices.
- 5. Governance, Policies, and Legal Framework of Gandaki University (5%)**
- Overview of Gandaki University’s establishment, vision, academic structure, governance bodies, strategic plans, key acts, laws, and bylaws, and Nepal’s higher education policies.