TRENDS & ISSUES IN COMPUTERS IN EDUCATION
CURRICULUM OUTLINE

SUBJECT: Computer Studies

PROGRAM: Secondary - Year III

CREDITS: 3 Credits (45 Hours)

PREREQUISITES: T.I.E. I; CS101; CS102

RATIONALE:
Developments and innovations in computer technology have been increasing and changing at a very rapid pace. In this context of emerging technology there are always new trends and critical issues to be faced. Against this background schools are faced with challenges in introducing, adopting, and integrating the technology in curriculum and instruction. The newly college-trained classroom teacher needs to be aware not just of the related trends and issues, but also of their implications for professional development and teaching in the field. Coping with the changes in computer technology and appreciating the implications for educational practice, requires certain preparation in knowledge, insights, attitudes and higher order skills.

PURPOSE:
The main purpose of this course is to provide the soon to be classroom teacher of computer studies with the necessary higher order skills of: critical thinking; strategic planning; analyzing; problem solving; and the attitudes for dealing with trends and issues in computers in education.

COURSE DESCRIPTION:
The course is designed as a series of practical professional development seminars & workshops in which the student-teacher will be exposed to practical contentions with current trends and issues in computers in education. Delivery of this course should deliberately avoid the lecture format of instruction; and should instead be highly interactive – involving the students' creative inputs and varying styles of participation. The course presenter should play an important role in providing structure to the deliberations; and determine levels of responsibilities for participants.

Topics suggested for the course must of necessity be flexible, and so should be subject to an annual review. Course units are to be determined by the selection of related trends & issues. However, it is recommended that the number of units be fixed at four, and be equally weighted.
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<thead>
<tr>
<th>Unit</th>
<th>Trends</th>
<th>Issues</th>
<th>Activities</th>
<th>URL</th>
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</thead>
</table>
| I    | The introduction of computers into (all) schools as learning-resources, teaching tools and support facilities. | 1.1: Training needs assessment  
1.2: Orientation to computer uses.  
1.3: Technology integration plan.  
1.4: The various costs of computers  
1.5: Maintenance & other technology support systems and requirements. | Research, seminars & students’ in-class presentations and annotated literature reviews. | |
| II   | Increasing reliance on computer technology in society and the fact students are gaining both in-school and out-of-school experiences with computer/information technologies. | 2.1: Social, ethical, legal, and human issues engendered by computers.  
2.2: Impact of computers in schools.  
2.3: Challenges of “keeping up” with changes in computer technology.  
2.4: Impact of the society’s uses of computers on school/curriculum. | Research, debates, observations, and in-class discussions; and/or annotated literature reviews. | |
| III  | The introduction of commercially developed software into existing/established school curriculum. | 3.1: Validity and relevance of software.  
3.2: Software/courseware evaluation.  
3.3: Uses of software in instruction.  
3.4: Software & curriculum integration. | Software evaluation, selection & integration seminars, based on agreed criteria. | |
| IV   | Growth of the Internet, and online learning/distance education, as alternative or supplement to teacher-led classroom instruction. | 4.1: Access and Information sharing.  
4.2: Content validity and the Internet.  
4.3: The Internet & distance education  
4.4: Internet and teachers’ strategies.  
4.5: Online learning versus classroom instruction (delivery modes & strategies) | Research, seminars, observations, and classroom debates/discussions; and/or annotated literature reviews. | |
INSTRUCTIONAL OBJECTIVES:

Student-teachers in this course will develop and demonstrate the abilities to:

1.1 Conduct and/or review basic training needs assessments related to computers.
1.2 Identify implications for the introduction and use of computers in schools.
1.3 Develop strategies for dealing with students' interests in and demands on available computers in schools/classrooms and extra-curricula situations.
1.4 Discuss costs and implications of computer maintenance and other support systems.

2.1 Conduct related research and discuss social, ethical, legal and other issues related to computers in education; and suggest implications for teaching and learning.
2.2 Develop draft of basic technology utilization plan for schools and/or classrooms.
2.3 Identify and assess the major challenges of changes in information and communication technologies in education.
2.4 Identify and assess obvious and hidden impacts of computers in society on schools.

3.1 Conduct formative and summative evaluation of instructional software
3.2 Develop software selection criteria; and conduct means/ends matching of software with curriculum and instructional developments in schools.
3.3 Develop strategies and suggest implications of software integration in curriculum.

4.1 Conduct basic research on information access and sharing in educational context.
4.2 Review literature on content validity of web-based resources; and suggest implications for curriculum and instruction in schools.
4.3 Conduct basic research on distance education and online learning; and compare styles and appropriateness of teaching/learning strategies in these modes with those used in classroom instruction.
4.4 Discuss/debate issues related to distance learning versus classroom instruction.

ASSESSMENT OF THIS COURSE:

It is proposed that this course be assessed in both course work and final examination; and that the ratio of coursework to final examination should be 3:2 (60:40), distributed according to the following format and weighting scales.

COURSE WORK:
Assignments for coursework should include:

i) A minimum of three (3) annotated literature reviews 5 marks (5 marks each)
ii) One computer-related research and reflection paper. 10 marks
iii) Active participation in class discussions/debates. 15 marks

i) Two technology-related problem scenarios to be solved. (20 marks).
ii) One major current issue of technology in education to be developed/discussed, with recommendations. (20 marks).

REFERENCES FOR RECOMMENDED READINGS
RATIONAL

This course will introduce the student teacher to a variety of hardware and software principles and procedures in the design, implementation and maintenance of a computer network system within an organization/institution in addition, this course discusses current protocols, technologies, and performance issues involved in computer networking.

PURPOSE

This course will focus on both fundamental concepts and practice of computer network design by examining the design issues of the various types of networks, the design choices of these networks for different types of network applications, and the design alternatives/tradeoffs that accompany these choices. After this course the student teacher should have basic skill for critical evaluation of existing and future computer network and constructs. The emphasis is on design, not coding although there are a couple of network programming assignments.

STANDARDS:

The course computer networking is designed to prepare the prospective teachers to meet the following standards and performance indicators:

CS301 Standards:

STD 1.0: Demonstrate introductory knowledge, skills, and understanding of basic concepts related to computer networking.

STD 2.0: Demonstrate use of current technologies in the design and implementation of computer network facility.

STD 3.0: Demonstrate an ability to configure a network using the international standards for data transmission, connectivity, security and administration.

STD 4.0: Demonstrate appropriate knowledge and skills in the troubleshooting and maintenance of a computer network environment.

STD 5.0: Demonstrate continual growth in knowledge and skills that will enable the professional teacher to keep abreast of current and emerging network applications and trends.
COURSE DESCRIPTION

The course introduces students to the management of networked systems from local area networks (LANs) to the Internet. It teaches data communication concepts, and technical and application issues with a focus on managing a networked system. The Windows/NT system will be used as the main example. In this course, the focus on the problems of building and administering computer networks that can serve diverse network users. The student teacher will develop these concepts in the context of the Internet network architecture because of its proven ability to serve a heterogeneous population of users situated in diverse network technologies. It introduces the necessary tasks to run a network and how these tasks might best be handled.

Objectives:
Upon completion of this course the student teacher should be able to:

1A: Define, describe and use terms related to computer networking and its operating system

1B: Examine the relationship between different types of computer networks, their services and components.

1C: Assess the international standards that govern computer network and transmission media.

1D: Recognize and use various network protocols associated with methods of connectivity.

1E: Troubleshoot and maintain simple computer network functionalities to include hardware and software.

1F: Understand the principles and practice involving information security among functional and information resource personnel;
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<tr>
<th>Objectives</th>
<th>Content Specification</th>
<th>Major Activities</th>
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<tbody>
<tr>
<td>1A: Define, describe and use terms related to computer networking and its operating system</td>
<td>- Hubs, Switches, Bridges, Routers, Gateways CSU/DSU, Network Interface Cards/ISDN adapters/system area network cards Wireless access points, Modems - Public and Private network Packet switching vs. circuit switching ISDN, FDDI, ATM, Frame Relay, Sonet/SDH, T1/E1,T3/E3 - client support, interoperability, authentication file and print services, application support security</td>
<td>Creation of a Log or Journal of new terms within this section of the course. This must be assessed at the end of the course.</td>
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<tr>
<td>1B: Examine the relationship between different types of computer networks, their services and components</td>
<td>- Types of Networks, Network Services, Network Components. - Microsoft Windows 2000 Operating Systems: Features, Implementing Windows 2000, Domains, Domain Benefits, Active Directory, Administrative Tools, User Accounts, Security Permissions; Novell NetWare: Netware Features; Unix/Linux: the Linux Feature Set, Advantages of Linux</td>
<td>Literature review of the different types of network that exist and the software used to manage this configuration.</td>
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<tr>
<td>1C: Assess the international standards that govern computer network and transmission media.</td>
<td>- Speed, Access, Method, Topology &amp; Media 10BASE-T, 100BASE-TX, 10BASE2 10BASE5, 100BASE-FX, Gigabit Ethernet RJ-11, RJ-45, AUI, BNC, ST, SC - Cable Bandwidth, PVC and Plenum, Network Cables and Connectors, Fiber Optic Cable, Cable Restrictions - Selecting an appropriate media - The OSI Model: Application, Presentation, Session, Transport, Network, Data Link and Physical Layers</td>
<td>Group Research Presentation on the different standards used in computer network environments.</td>
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<tr>
<td>1E: Troubleshoot and maintain simple computer network functionalities to include hardware and software.</td>
<td>- Identify guidelines for troubleshooting network problems. - Identify the Problem; Design a Troubleshooting Model, Choosing the Right Tools, Hardware Tools, Environmental Problems, Error Messages and Indicators, Create an error Log Files, Microsoft Log Files, Diagnostic Indicators</td>
<td>Prepare an assessment of an existing network environment within an educational institution and present a paper on the hardware and software.</td>
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</tbody>
</table>
1F: Understand the principles ad practice involving information security among functional and information resource personnel;

- Port filtering, Packet filtering, Application filtering, Intrusion detection filtering
- Encryption software, Personal digital identification, such as a digital certificate
- Personal firewall software

Use the existing features of computer network security within a selected software studied to implement within the group work assigned in 4D and E

Suggested Assessment for course CS301:

**COURSE WORK:** Assignments for coursework include:

i) Individual assignment to design a proposal to setup a computer Network facility. (20Mks)

ii) Group Assignment to network an environment for internet sharing, Files and printers etc. (20Mks)

iii) Individual assignment to research current trends in computer Networking. (20Mks)

**EXAMINATION** A final examination paper should include:

i) 20 Objective Type Questions (20Mks)

ii) 1 case/scenario (problems solving of network configuration) question (10Mks)

iii) 1 Essay Type (Application of computer network) question (10Mks)

**RECOMMENDED RESOURCES:**

The following are recommended resources/reference materials; but are subject to annual review:

**BOOKS**


Network Communications Technology, Ata Elahi
COMPUTER FACILITIES AND LAB MANAGEMENT  
CURRICULUM OUTLINE

Course Code: CS302  
Program: Secondary  
Credits: 3(45 hours)  
Prerequisites: ITI, ITII and INTEGRATED METHOD II

RATIONALE:
The learning environment plays a key role in the delivery of computer studies and other Courses of study. In an Education system that is characterized by financial constraints, the efficient management of laboratories is of paramount importance. Teachers must have the skills necessary for designing facilities, purchasing equipment and supplies, controlling assets, maintenance of existing hardware and software along with all other equipment at a school’s computer laboratory.

PURPOSE:
This course is designed to provide student teachers with a working knowledge of the problems, techniques and procedures associated with planning, organizing, controlling and maintaining a computer laboratory facility. Emphasis is placed on the solution of real problems drawn from school laboratories.

Standards:

The course Computer Facilities and Lab Management is designed to prepare the prospective teachers to meet the following standards and performance indicators:

CS302 Standard:

STD 1.1  Demonstrate an ability to plan and organize the development of a computer facility.

STD 1.2  Explore and solve problems and issue in the provision and maintenance of computer facilities.

STD 1.3  Demonstrate skills in evaluating and selecting appropriate hardware and software for a selected facility.

STD 1.4  Develop competence in managing a computer facility throughout its daily operations
Objectives:
Upon completion of this course the student teacher should be able to:

1A Demonstrate an understanding of the basic consideration in planning and designing a computer facility.

1B Outline the criteria for selection of equipment for a computerized facility.

1C Recognize the advantages and disadvantages of existing laboratory designs.

1D Prepare a proposal for construction of a computerized facility for a particular area of specialization.

1E Demonstrate an awareness of purchasing procedures used within an educational institutions.

1F Determine the advantages and disadvantages of various equipments and materials needed to efficiently operate computer facilities.

1G Appreciate the importance of equipment and material control system within an organization/institution.

1H Appreciate the importance of a safety programme for a computer facility.

1I Create a maintenance plan for handling an efficient programme within a computer facility.

1J Troubleshoot with the aim of repairing/maintaining selected computer equipment.

1K Demonstrate the ability to use command-line functions and utilities to manage the operating system, including the proper syntax and switches.

1L Identify basic concepts and procedures for creating, viewing, and managing disks, directories and files. This includes procedures for changing file attributes and the ramifications of those changes (for example, security issues).

1M Identify the major system utilities available in at least two operating systems.

1N Identify the procedures for installing Windows 9x/Me, Windows NT 4.0 Workstation, Windows 2000 Professional, and Windows XP, and bringing the operating system to a basic operational level.

1O Identify the basic system boot sequences and boot methods, including the steps to create an emergency boot disk with utilities installed for Windows 9x/Me, Windows NT 4.0 Workstation, Windows 2000 Professional, and Windows XP.

1P Identify procedures for installing|adding a device, including loading, adding, and configuring device drivers, and required software.

1Q Identify procedures necessary to optimize the operating system and major operating system subsystems.

1R Recognize and interpret the meaning of common error codes and startup messages from the boot sequence, and identify steps to correct the problems.
1S Recognize when to use common diagnostic utilities and tools. Given a diagnostic scenario involving one of these utilities or tools, select the appropriate steps needed to resolve the problem.

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<th>Major Activities</th>
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<tr>
<td>1A</td>
<td>Demonstrate an understanding of the basic consideration in planning and designing a computer facility.</td>
<td>Lab Design</td>
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</table>

**Laboratory Design**
Curriculum considerations- Philosophy, goals, target, groups Objectives, methods, activities.

**Use of floor space**
- Recommended location for a computer laboratory
- Layout of workspace
- Layout of equipment.
- Location of auxiliary areas

**Utilities**
Electricity Service, Telephone

**Safety**
Lighting, ventilation, height of roof, floor material, location of exits, fire extinguishing facility, material and storage of material.

1B Outline the criteria for selection of equipment for a computerized facility.

**Selection of Equipment:**
- Curriculum considerations
- Required standards
- Equipment specifications
- Acquisition arrangements

Writing of specification for an item of equipment. Hardware and software selection.

1C Recognize the advantages and disadvantages of existing laboratory designs.

**Evaluation of Existing Laboratory Design:**
- Description of existing programme
- Advantages and disadvantages of the design
- Proposed changes.
- Rational for changes.

Redesign/design of computer studies Laboratory

1C cont’d

Preparation of a checklist on design features of a selected laboratory and a group discussion on the extent to which the design meets established criteria.

Investigation of the status of utilities in an Existing facility. Ensuring that the correct voltage/current/power is served to the laboratory.
<table>
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<tr>
<th>Task</th>
<th>Description</th>
<th>Identification of sources:</th>
<th>Perusal of current catalogues</th>
<th>Preparation of a requisition for materials and/or equipment</th>
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<tbody>
<tr>
<td>1D</td>
<td>Prepare a proposal for construction of a computerized facility for a particular area of specialization.</td>
<td>a. Local</td>
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<td>1E</td>
<td>Demonstrate an awareness of purchasing procedures used within an educational institution.</td>
<td>b. International</td>
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<tr>
<td>1F</td>
<td>Determine the advantages and disadvantages of various equipments and materials needed to efficiently operate computer facilities.</td>
<td>2.2. Purchasing procedure:</td>
<td></td>
<td>Panel discussion on the effectiveness of each equipment and materials storage facility</td>
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<td>1G</td>
<td>Appreciate the importance of equipment and material control system within an organization/institution.</td>
<td>A. Purchase requisition</td>
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<td>- Determining quantity, Describing items, identifying suppliers, determining prices.</td>
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<td>B. Purchase order</td>
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<td>Preparation of a purchase order</td>
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<td>- Preparation</td>
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<td>- Authorized signature(s)</td>
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<td>- Legal implications</td>
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<td>C. Terms Payment</td>
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<td>Charge account</td>
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<td>A. Principles of equipment and materials storage.</td>
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<td>B. Material storage facilities.</td>
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<td></td>
<td></td>
<td>- Floppy disk holders</td>
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<td>- CD storage Kit, Repair tool kit</td>
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<td>- Storage of paper ink and toner etc.</td>
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<td>1H</td>
<td>Appreciate the importance of a safety programme for a computer facility.</td>
<td>A. Inventory, stock records</td>
<td></td>
<td>Design of a system of tools and materials control for Computer Science Laboratory</td>
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<td>B. Distribution and retrieval of material.</td>
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<td>Research assignments</td>
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<td>C. Distribution of materials. Safety Programme:</td>
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<td>a. Promotion of safety</td>
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<td>- use of instructional materials</td>
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<td>- Adhere to the rules of the computer laboratory</td>
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<td>- Demonstration of proper use of a computer and other peripheral devices</td>
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<td>- Zoning of laboratory, and Field trips to related industries</td>
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<td>1I</td>
<td>Create a maintenance plan for handling an efficient programme within a computer facility.</td>
<td>Types of maintenance preventative, corrective</td>
<td>Designing of maintenance schedules for selected items of equipment.</td>
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<td></td>
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<td>Maintenance schedules</td>
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<td>- items to be checked, frequency of</td>
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<td>1J</td>
<td>Troubleshoot with the aim of repairing/maintaining selected computer equipment.</td>
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<td>1K</td>
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<td>1L</td>
<td>Identify basic concepts and procedures for creating, viewing, and managing disks, directories and files. This includes procedures for changing file attributes and the ramifications of those changes (for example, security issues).</td>
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<td>1M</td>
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<td>1N</td>
<td>Identify the procedures for installing Windows 9x/Me, Windows NT 4.0 Workstation, Windows 2000 Professional, and Windows XP, and bringing the operating system to a basic operational level.</td>
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<td><strong>checks</strong></td>
<td><strong>Basic Maintenance of laboratory Equipment</strong></td>
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<td>- Reports on checks made</td>
<td>- Use of maintenance schedules in carrying basic maintenance of selected items of equipment.</td>
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<td>- Documentation of maintenance results.</td>
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<td>- Identify the major operating system utilities, their purpose, location, and available switches.</td>
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<td>- Identify the procedures for installing Windows 9x/Me, Windows NT 4.0 Workstation, Windows 2000 Professional, and Windows XP, and bringing the operating system to a basic operational level.</td>
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<td>- Identify the basic system boot sequences and boot methods, including the steps to create an emergency boot disk with utilities installed for Windows 9x/Me, Windows NT 4.0 Workstation, Windows 2000 Professional, and Windows XP.</td>
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<td><strong>Demonstration of how to assess equipment for selected hardware or software malfunction.</strong></td>
<td><strong>Solve simple hardware and software problem within the use of group activities</strong></td>
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<td><strong>Prepare a Journal of repair procedures for selected hardware and software</strong></td>
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<td><strong>Install an operating system to its basic functionality on selected hardware</strong></td>
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### Suggested Assessment for course CS302:

**COURSE WORK:**

Assignments for coursework include:

(i) In class assessment to comprise a paper and pen/pencil test. (20Mks)

(ii) Group Assignment to configure a computer system to a basic level of functionality. (20Mks)

(iii) Individual assignment to research current trends in computer...
software and hardware installation and maintenance or management of computerized facility (20Mmks)

FINAL EXAMINATION

A final examination paper should include:

iv) 10 Objective Type Questions (10Mks)

v) 3 problems solving question about computer repair, maintenance and computer facility management (30Mks)

vi) 1 Essay Type (Application of computer network) question (10Mks)

RECOMMENDED RESOURCES:

The following are recommended resources/reference materials; but are subject to annual review:

BOOKS

NOTE: This list is to be completed based on evaluation of required text being done by the board members.