

CURRICULUM REVISION PROJECT

2012

TEACHER GUIDE FOR COMPUTER HARDWARE AND MAINTENANCE 17428

FOURTH SEMESTER

DECEMBER 2013



**MAHARASHTRA STATE
BOARD OF TECHNICAL EDUCATION, Mumbai**

INDEX

Content No.	Contents	Page No.
1.0	APPROACH TO CURRICULUM DESIGN	3
2.0	OBJECTIVES	8
3.0	CONTENT ANALYSIS	13
4.0	CURRICULUM	18
5.0	IMPLIMENTATION STRATEGIES	23
5.1	Planning of Lectures for a Semester with Content Detailing	23
5.2	Planning and Conduct of Test	29
5.3	Detail about Conduct of Assignment	29
5.4	Strategies for conduct of Practical	30
6.0	MODE OF ASSESSMENT	32
6.1	Class Test	32
6.1.1	Sample Test Paper -I	33
6.1.2	Sample Test Paper -II	34
6.2	Sample Question Papers	34
6.2.1	Specification Table	35
6.2.2	Question Paper Profile	35
6.2.3	Sample Question Paper	36

1.0 APPROACH TO CURRICULUM DESIGN

1.1 BACKGROUND:

MSBTE is introducing the revised curriculum under 'G' scheme from the academic year 2012-13.

There are many institutions in the state running different diploma courses. In order to ensure uniform and effective implementation of the curriculum it is necessary that every teacher is aware of approach for curriculum design, educational principles to be adopted, learning resources to be used and evaluation methods. The teacher guide prepared for each subject will provide the inputs related to above mentioned aspects to achieve uniform and effective implementation of curriculum of various subjects.

1.2 CURRICULUM PHILOSOPHY

MSBTE has adopted systems approach while designing the scientific based curriculum since 1995. The same approach has been adopted while revising the curriculum in semester pattern.

Fig. No. 1 shows the systems diagram. This diagram provides the holistic view for curriculum designing, development, implementation and evaluation

The input to polytechnic education system is the students having 10+ qualifications. The teaching learning process occurs in the institution for six/eight semesters. The output of the system i. e. Diploma pass out is normally the input to industries. (Some students do go for higher education). While designing the curriculum the expectations of the industries play a major role. Due to globalization and competition the industries expect that pass outs have generic and technological skills along with right attitude.

To fulfill the needs derived from systems approach following conceptual framework is considered:

1.3 CURRICULUM:

“Curriculum is an educational program designed and implemented to achieve specified educational objectives”

This definition takes into account the fact that

- Education is purposeful
- There is an organized plan of action contemplated
- Such a plan is translated into action through appropriate strategies of implementation.

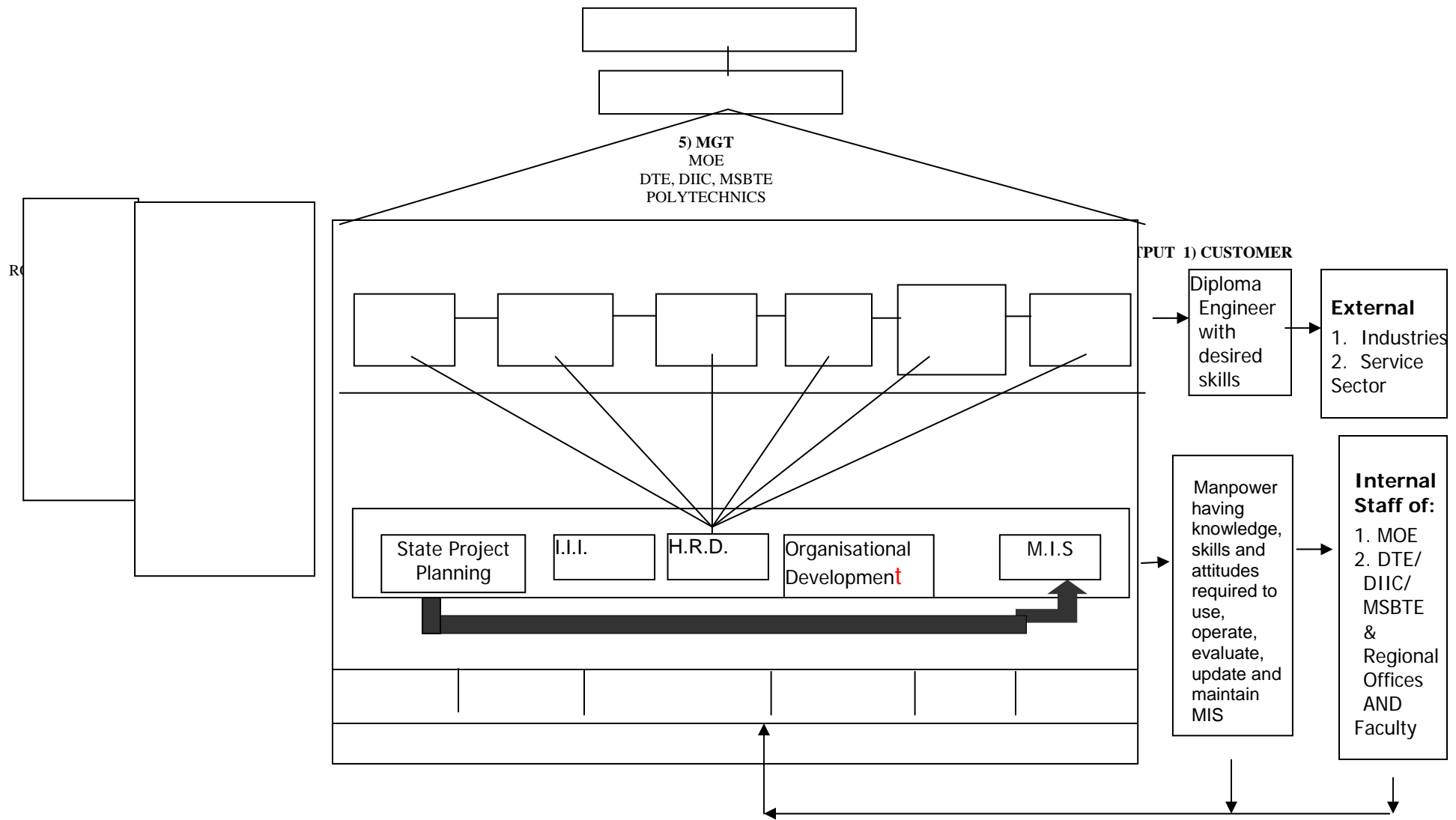


Fig 1 Systems Approach

1.4 CURRICULUM GOALS

1. To develop confidence in students by providing more exposure to industry experience and world of work at global level
2. To provide conceptual knowledge and develop analytical ability
3. To develop communication skill with good English by providing sufficient practice
4. To enhance latest technical knowledge industry interaction and media
5. To develop learning to learn skills and life skills to cope up with industrial culture
6. To impart managerial skills by providing appropriate theoretical inputs
7. To develop problem solving ability through technical projects.

1.5 DESIRED SKILLS

Industries expect from the diploma engineer the abilities and skills of general nature and specific to the job performance. The curriculum aims at developing life skills and technological skills so that the diploma pass outs would be suitable for industry. The skills are listed below:

Life Skills:

- Search information from various sources
- Develop communication ability
- Develop Presentation skill
- Work as a member of a team/group and as leader
- Collect field data
- Develop Learning to learn
- Write report for given task/work/project
- Develop computer proficiency
- Develop observation skills

Technological Skills:

Diploma engineers should possess following intellectual and motor skills in order to satisfactorily perform duties assigned to them:

A) Intellectual skills.

1. Identify the problem
2. Prepare the algorithms
3. Analyze the problem
4. Prepare the flowchart/model
5. Select hardware and software tools and technologies
6. Use of appropriate programming languages
7. Write programs
8. Test and debug computer Program
9. Diagnose the hardware faults
10. Prepare and interpret software documentation

B) Motor Skills.

1. Handle the Computer system
2. Handling trouble shooting tools
3. Assemble and disassemble computer system
4. Install hardware devices
5. Install network

1.6 SALIENT CHANGES IN THE CURRICULUM:

- ❖ For First Semester Basic Science is divided into two parts- Basic Physics and Basic Chemistry. Theory examination of both parts as well as practical examination of both parts will be conducted on separate days. Sum of theory marks of both parts shall be considered for passing theory examination of Basic Science. Similarly it is applicable to practical examination. It is mandatory to appear for theory and practical examination of both parts. Candidate remaining absent in any examination of any section will not be declared successful for that exam head.
- ❖ For second semester Applied Science is divided into two sections- Applied Physics and Applied Chemistry where the theory examination of 50 marks each and practical examination of 25 Marks each will be conducted separately and the minimum passing marks for Applied Science will be the combination of both the sections. . It is mandatory

to appear for theory and practical examination of both parts. Candidate remaining absent in any examination of any section will not be declared successful for that exam head.

- ❖ The components of Development of Life Skills were taught in two semesters. In Development of Life Skills –I the topics related to personal development, such as Learning to Learn Skills, personality development, presentation skills etc. were included. In Development of Life Skills – II the topics related to Team Building, Leadership, group behavior etc. were covered. In the revised curriculum the scope of development of life skills has been broadened to include behavioral science component. Therefore the subject Development of Life Skills – II has been renamed and it is now included at Vth Semester in the revised curriculum under the title Behavioral Science.
- ❖ The subject of Professional Practices was introduced to integrate the skills acquired in Development of Life Skills, through technical subjects from second to sixth semester. The experience in implementing the contents of the subject shows that there are limited activities possible in second semester as the technical knowledge given to the students is very limited. Also at sixth semester the student are doing projects in which they are performing many activities included in the Professional Practices and therefore it is proposed that the subject of Professional Practices be prescribed only for three semesters viz. Third, fourth and fifth semesters.
- ❖ Introduction of Environment Studies at fourth Semester for all courses.
- ❖ From the experience of implementation of Elective Subjects at V and VI semesters in last five years, it is proposed to have only one elective at the sixth semester for all courses. However the specialized courses like Medical Electronics, Electronics and Video Engineering will not have provision for electives. For elective, student will have to choose one from the given two/three subjects.
- ❖ While revising the curriculum redundant /obsolete topics/sub topics are being replaced by new/advance technology topics/sub topics.
- ❖ In Computer Engineering Group, for fourth Semester IF Computer Networks (CON) is replaced with Data Communication and Networking.
- ❖ For Fourth Semester IF, Applied Multimedia Technology Theory subject is changed to Practical.
- ❖ For Fifth semester CO, System Programming subject is included.

2.0 OBJECTIVES

2.1 INTRODUCTION:

Objectives are the statements which describe the expected learning outcome. Such statements enable teachers to plan instructional process with appropriate resources. These objectives also provide a direction to frame proper questions to assess the learning outcome. During last decade there has been research on cognitive approach in psychology. This approach is based on biological structure of brain and meta-cognitive knowledge dimension. Important elements of this approach which form basics of learning are explained below.

2.2 DOMAINS OF LEARNING:

Learning is a process by which students develop relatively permanent change in mental associations through experience. This is how learning is defined by cognitive psychologists. Behavioral; psychologists define learning as a relatively permanent change in behavior.

There are following domains of learning:

A: Cognitive Domain relates to intellectual skills or abilities

B: Affective Domain relates to emotions, feelings, likes, dislikes etc.

C: Psychomotor Domain relates to manipulative skills of hands, legs. Eye-hand coordination in Engineering & Technology courses, endeavor is made to design curriculum with a focus on development of cognitive skills through classroom teaching whereas manipulative (psychomotor) skills are developed in workshops, laboratories & seminars where students work individually or in a group. Development of affective skills attitudes and value is supposed to be acquired through projects and co curricular activities. These are also developed from the work culture or institutions.

How far a student has developed these abilities/skills especially from cognitive and psychomotor domains is assessed on the basis of suitable examinations. When classroom and laboratory teaching is viewed in this light, evaluation becomes an integral part of teaching – learning process.

2.3 LEVELS OF LEARNING:

Question paper is a tool/ instrument designed to test the extent of learning of the student. Various questions set in a question paper should assess the abilities of students to respond to level of learning.

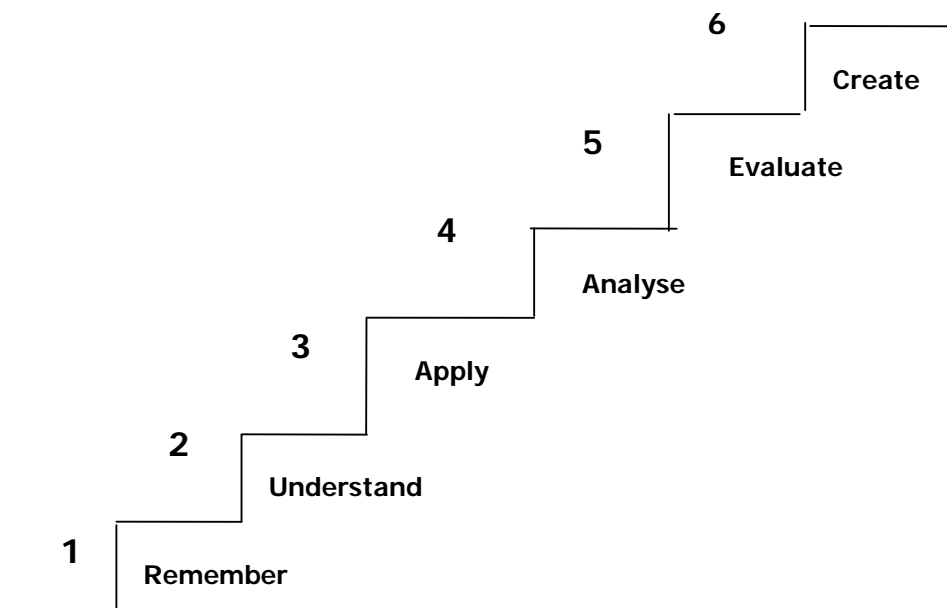
Dr. Bloom a German educationist classified levels of learning in cognitive domain for the purpose of writing objectives and assessment. Dr. Bloom's revised taxonomy is based on cognitive psychology and is two dimensional. First dimension is cognitive process dimension and other is knowledge dimension. Details of these two dimensions are given below.

2.4.1 COGNITIVE DOMAIN:

Dr. Benjamin Bloom (1956) analysed questions asked in various examinations in American situation and proposed a hierarchical arrangement of instructional objectives (Intellectual abilities) tested by these questions.

The lowest level of cognitive learning achieved by a student is demonstrated by the recall of information that the student retrieves from his long term memory. So, the storage and retrieval of

specific facts, concepts, principles, laws, definitions, properties, procedures etc. directly from memory was classified as a knowledge level objective. Thus questions testing memory of students were treated as at the lowest level of the hierarchy of intellectual abilities. The other levels of hierarchy proposed by Dr. Bloom in 1956 relate to the degree of information processing required in the brain needed to provide answer to a question. The various levels in the cognitive hierarchy proposed by Dr. Bloom in 1956 and further revised in 2001 are given below in the diagrammatic form.



Following are the details of each level which indicate the general and specific objectives. Further appropriate verbs are given which are useful in setting good questions. In this table only four levels are considered for diploma students.

Description of the Major Levels in the cognitive Domain (Bloom's Taxonomy)	Illustrative General Instructional Objectives	Illustrative verbs for stating specific learning outcomes
Remember – Knowledge is defined as the remembering of previously learned material. This may involve the recall of a wide range of material, from specific facts to complete theories, but all that is required to mind of the appropriate information. This represents the lowest level of learning outcomes in the cognitive domain	Knows common terms, specific facts, basic concepts, principles, methods & procedures	Define, describe, identify label, list, match, name, outline, reproduce, select, state
Understand – This is defined as the ability to grasp the meaning of material. This may be shown by translating material from one form to another (words or numbers) by interpreting material (explaining or summarizing), and by estimating future trends (predicting consequences or effects). Draw sketches these	Understands fact, principles Interprets verbal material, Interprets charts, tables, graphs. Translates verbal material to mathematical	Convert, distinguish estimate, explain, extend, generalize, give examples; infer, paraphrase, predict, rewrite, summarize, draw labeled sketches.

learning outcomes go one step beyond the simple remembering of material and represent the lowest level of understanding.	formula. Estimates consequences implied in data. Justifies methods & procedures.	
Apply – Application refers to the ability to use learned material in new and concrete situations. This may include the application of such things as concepts, principles, rules, methods, laws and theories. Learning outcomes in this area require a higher level of understanding than those under the level described earlier.	Applies principles to new situations. Applies theories to practical situations. Solves mathematical problem. Construct charts, graphs Demonstrates correct usage of a procedure	Change, compile, demonstrate, discover, manipulate, modify, operate, predict, prepare, produce, show, solve, use.
Analyze – Analysis refers to the ability to break down material into its component parts so that its organizational structure may be understood. This may include the identification of the parts, analysis of the relationship between parts, and recognition of the organizational principles involved. Learning outcomes here represent a higher intellectual level than “understand” and apply because they require an understanding of both the content and the structural form of the material.	Recognizes unstated assumptions and logical fallacies in reasoning. Distinguishes between facts and inferences. Evaluates relevance/adequacy of data.	Breakdown, diagram, differentiate, discriminate, distinguish, identify, illustrate, infer, outline, point out, relate, select, separate, subdivide.

2.4.2 CATEGORIES OF KNOWLEDGE DIMENSION

After considering the various designations of knowledge types, especially developments in cognitive psychology that have taken place since the original framework of Bloom’s taxonomy, knowledge is categorised in 4 types – Factual , Conceptual, Procedural and Meta-cognitive.

Factual Knowledge (A) is knowledge of discrete, isolated content elements. It includes knowledge of terminology and knowledge of specific details and elements. In contrast, *Conceptual Knowledge (B)* is knowledge of “more complex, organised knowledge form”. It includes knowledge of classifications and categories, principles and generalizations and theories, models and structures.

Procedural Knowledge (C) is “knowledge of how to do something”. It includes knowledge of skills and algorithms, techniques and methods, as well as knowledge of criteria used to determine and/or justify “when to do what” within specific fields and disciplines.

Meta-cognitive knowledge (D) is “knowledge about cognition in general as well as awareness of and knowledge about one’s own cognition. It encompasses strategic knowledge, knowledge about cognitive tasks, including contextual and conditional knowledge; and self-knowledge”.

Assessment is required to be done on the basis of categories of knowledge and levels of learning.

Table below indicates the two dimensional grid based on Blooms Taxonomy for setting questions.

Knowledge Dimension	COGNITIVE PROCESS DIMENSION			
	1 Remember	2 Understand	3 Apply	4 Analyze

A. Factual Knowledge				
B. Conceptual Knowledge				
C. Procedural Knowledge				
D. Meta-cognitive Knowledge				

2.5 COMPONENTS OF CURRICULUM:

2.5.1 Rationale: It indicates the logical basis for the inclusion of the subject in the curriculum. It also indicates the importance of the subject related to the entire curriculum.

Rationale tells the students the connection of subjects related to the study of higher level subjects and also the use in their job/profession.

2.5.2 Objectives: Objectives indicate what the student will be able to do/perform after he/she completes the study of the subject. It also in other words indicates the scope of the subject.

Objectives indicate what is achievable and hence gives direction to the student about how to study the subject, what important things are to be observed and performed during practicals.

Just as rationale indicates the use of the knowledge gained while studying the subject, objectives indicate how efficiently and effectively one can work if the objectives are fulfilled while studying the subject.

2.5.3 Learning Structure: It graphically/pictorially indicates the content of the curriculum of the subject and what is to be learnt in the subject. As you know that Cognitive Domain knowledge is divided into four components as mentioned in the Two dimensional grid. Of this Factual, Conceptual and Procedural knowledge components are identified in the curriculum of the subject along with the applications.

Facts, Concepts, Principles are used in developing procedures and applications. So these are given sequentially below procedure as Principles, Concepts and Facts in their order. Learning structure also provides an idea about how to develop the subject logically to achieve the objectives.

2.5.4 Contents: List of topics and subtopics to be included in the curriculum of the subject is given in the contents. This helps in achieving the rationale and objectives identified. Contents indicate the importance of the topics, sub topics in development of the subject and accordingly weightages in terms of Hours required to teach the subject components, so that the desired learning takes place. Marks to be allotted while testing the knowledge gained by the student are also indicated.

2.5.5 Practicals: While designing the curriculum the objectives are identified. To achieve these objectives students have to develop certain intellectual and motor skills. These skills are developed through well designed Practicals. So in the curriculum the list of the skills to be developed through Practicals is given. The list of Practicals is so developed that after performing the Practicals identified

skills will be developed. Here it is necessary that the teacher gives enough opportunity to all the students to perform the practical properly to develop the skills in each one of them.

The skills will be developed if the students actually perform certain activities or tasks. Therefore it is necessary that any practical included in the curriculum necessarily involve some activities to be done by the students. So one has to think and innovate to modify the study experiments so that students will be asked to perform some activity. It could be in terms of identifying components, listing of materials used for manufacturing the components, stating importance of use of certain materials etc.

So any curriculum of a subject is so designed that it achieves the objectives of that subject as well as fulfill the objectives of the entire curriculum

3.0 CONTENT ANALYSIS

3.1 Components of Content Analysis:

As we have discussed earlier, any curriculum or syllabus of a SUBJECT given to the teacher is organised in terms of UNITS which include TOPICS or SUB-TOPICS as the case may be indicating the TIME in which it is expected to be taught to the students. Components of a topic or part thereof are analysed here at a micro level.

Before we begin actual teaching of any topic (lesson), we must carefully and critically analyse it so that we can plan for teaching - select appropriate media, methods and techniques of teaching and arrange the suitable resources to be required. This analysis of the content of a Topic results in identification of the following components of the content:

1. Facts
2. Concepts
3. Principles (rules, laws, theories)
4. Applications
5. Procedures
6. Skills (Psychomotor Skills), and
7. Attitudes (underlying affective behaviors as quite often these are not specifically mentioned in the curriculum, still they are to be developed lesson after lesson gradually).

When we undertake the exercise of content analysis, we ourselves understand the subject fully well and at the same time we become clear as to what we are going to teach. It also gives us an idea as to which methods of teaching and media of instruction we should prepare and use and also what resources including time we will require. This analysis will also enable us to design assignments as well as how we are going to assess students learning.

Since the nature of the components of content (1 to 7) differs from one another. These are learned by the students differently as different mental processes are involved in learning these components. The immediate implication of this varying nature of components is that these need to be taught differently and assessed differently. For example, if you look at components 1 to 5 all of which belong to Cognitive Domain of Learning; Component 6 belongs to Psychomotor Domain and Component 7 belongs to Affective Domain (cannot be taught as these attitudes are caught), you will find that these differ from one another. The classification of human behaviors (activities) into the above three

domains of learning entails the use of entirely different methods and media of instruction. Different locations of learning (classroom, laboratories, workshops, field visits) need to be selected.

Now we will discuss these components in some detail and see how each one of these should be taught and assessed differently.

3.1.1 FACTS:

These are universally accepted and commonly understood items about which there cannot be much argument and discussion. These are required only to be informed. For example: The sun rises in east and sets in the west; names of scientists and the year in which their theories were propounded; the rules and regulations of admission and examination prescribed by the University are some of the examples of facts. Sometimes, they need not be emphasised in the class as the students already know them. But information can be passed on by word of mouth, if deemed necessary.

3.1.2 CONCEPTS:

A concept is an abstraction or an idea that permits the learner to classify a variety of related phenomena into a convenient and meaningful category. Concept of something is like a picture formation of that thing which helps in conceptualizing it. Gagne says that concept learning produces a certain fundamental change in human performance that is independent of subject or content. Concepts can be divided into the following two categories:

1. Concrete Concepts: those which can be seen, touched and manipulated e.g. house, book, table, chair, cat, dog, any machine or apparatus, overhead projector, chalkboard and duster.

2. Abstract Concepts: those which cannot be seen and touched and handled but can only be imagined e.g. force, work, fractions, decimal, bending moment, moment of inertia, friction, heat, and induction. Teaching of concrete concepts is not that difficult because the teacher can show the object physically or its picture. On the contrary, teaching of an abstract concept offers difficulty to the teacher as well as for students to understand. These concepts can be learned by heart without understanding as children mug up Nursery Rhymes without understanding even a single word. But at the stage of higher learning, this type of rote learning is not desirable. Adolescents (teenagers) and adults do not accept things without understanding.

3.1.3 CONCEPT ATTRIBUTES:

We identify a concept and understand it, once we are told about its qualities characteristics, and features. They are technically called concept attributes. While teaching a concept to our students we must spell out as many attributes as possible for better understanding of the concept.

Example: The Concept of **Friction**

Attributes:

1. Friction is a resistive force.
2. Frictional force acts in the direction opposite to the direction of the applied force.
3. Frictional force is more when the surfaces in contact are rough.
4. Smooth surfaces (perfect) have zero friction.
5. Frictional force is self-adjusting to a limit.

Towards the end of this Theme Paper a number of examples of concept attributes are given for your guidance.

The following questions pertaining to a concept (object or process) will be helpful in writing concept attributes:

1. What it is.
2. What are its constituent parts.
3. How it works.
4. How it is similar to and different from other known concepts.
5. What are its uses?

3.1.4 PRINCIPLES:

A principle is a statement of relationship between two or more concepts. Principles are sometimes called rules, laws or generalizations. In other words, relationship between two or more concepts which is scientific and universally true is called a Principle.

For Example: (related concepts are underlined)

1. Actions and reactions are equal and opposite.
2. Ohm's law $I = V/R$ is a principle, where I (Current), V (Voltage), and R (Resistance) are the concepts. While teaching a principle we must recall the concepts which it involves. These concepts might have been taught in the previous lesson. As you already know, concept learning is a prerequisite to Principle learning. Thus we recall the concepts of current, voltage and resistance by asking questions to the students. Only after that we must tell the relationship among these i.e. Ohm's Law.

3.1.5 APPLICATIONS:

Whatever principles, laws and theories have been learned are only academic exercises unless these are applied to solve a practical problem. In other words, we call this application transfer of learning to a

new situation. If you recall, the process of learning dealt with in Theme Paper 2, you will appreciate that the litmus test of learning having occurred is its application in a new situation or solving a new problem.

Forexample:

1. Ohm's law can be applied to find out the unknown quantity (voltage, current, and resistance).
2. Design of a structure can be made based on related principles and theories.
3. Principles of learning and events of instruction can be applied in 'Designing a lesson Plan' and 'Presenting the lesson in the classroom'.
4. The above principles can also be applied while preparing textbooks, workbooks, learning packages and laboratory manuals to be used by the students.

3.1.6 PROCEDURES:

While analysing the content of a topic you might come across certain standard procedures which are prescribed to perform an operation or a given task. These procedures should be clearly identified and taught accordingly not to be left to chance. We should not pre-suppose that the students understand them. We cannot afford to take these things for granted.

ForExample:

1. Procedure of setting up of an apparatus.
2. Procedure to start an engine.
3. Procedure to operate a machine (a lathe).

3.1.7 SKILLS (PSYCHOMOTOR):

A skill is an ability to perform a task expertly and well. The skilled performance; must meet a pre-specified standard of acceptable performance. A skill has the following three characteristics:

1. It represents a chain of motor responses;
2. It involves the co-ordination of hand and eye movements, and
3. It requires the organization of chains into complex response patterns.

Skills could be intellectual (thinking, understanding); interactive (communication skills) and social (socialising, mixing up with others) also. But normally when we use the word skills, it refers to psychomotor skills.

ForExample:

1. Welding a butt joint,
2. Setting a theodolite at a station,
3. Making proper circuit connections, and
4. Turning a job on a lathe machine.

Laboratories and workshops of Polytechnics are the locations where these skills are developed among the students under the guidance of expert instructors *of* operators. Drill and practice are the main methods of teaching and learning these skills through model demonstrations and careful observations thereof.

Alongside developing these skills, desirable attitudes like cooperation, team work, leadership, safety, cost consciousness are also developed.

3.2 TEACHING OF CONCEPTS;

In order to teach concepts effectively the following steps have been suggested by De Cecco& Crawford (1974).

Steps Suggested:

1. Describe the performance expected of the student after he has learned the concept.
2. Reduce the number of attributes to be learned in complex concepts and make important attributes dominant.
3. Provide the student with verbal indicators (explanation).
4. Provide positive and negative examples (non-examples) of the concept.
5. Present the examples in close succession or simultaneously.
6. Provide occasions for student responses and the reinforcement of these responses, and
7. Assess the learning of the concept.

3.3 TEACHING OF PRINCIPLES:

De Cecco& Crawford (1974) has suggested the following steps for teaching principles effectively.

Steps:

1. Describe the performance expected of the student after he has learned the principle.
2. Decide and indicate which concepts or principles the students must recall in learning the new principle.
3. Assist the student in the recall of component concepts.
4. Help the student in the recall of component concepts.
5. Help the student to combine the concepts and put them in a proper order.
6. Provide for practice of the principle and for reinforcement of student responses.
7. Assess the learning of the principle.

3.4 CONCLUSION:

To sum up, it can be said that. it is essential for the teachers to develop the skills of 'Content Analysis' of their subjects. It brings content clarity amongst the teachers themselves. More importantly, Content Analysis will be a pre-requisite for writing Instructional Objectives of the topic to be taught. Teaching and learning process is bound to be effective once these crucial academic activities are undertaken

4. Curriculum:

Course Name : Computer Engineering Group
Course Code : CO/CD/CM/CW/IF
Semester : Fourth
Subject Title : Computer Hardware & Maintenance
Subject Code : 17428

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	25#	--	25@	150

NOTE:

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

Rationale:

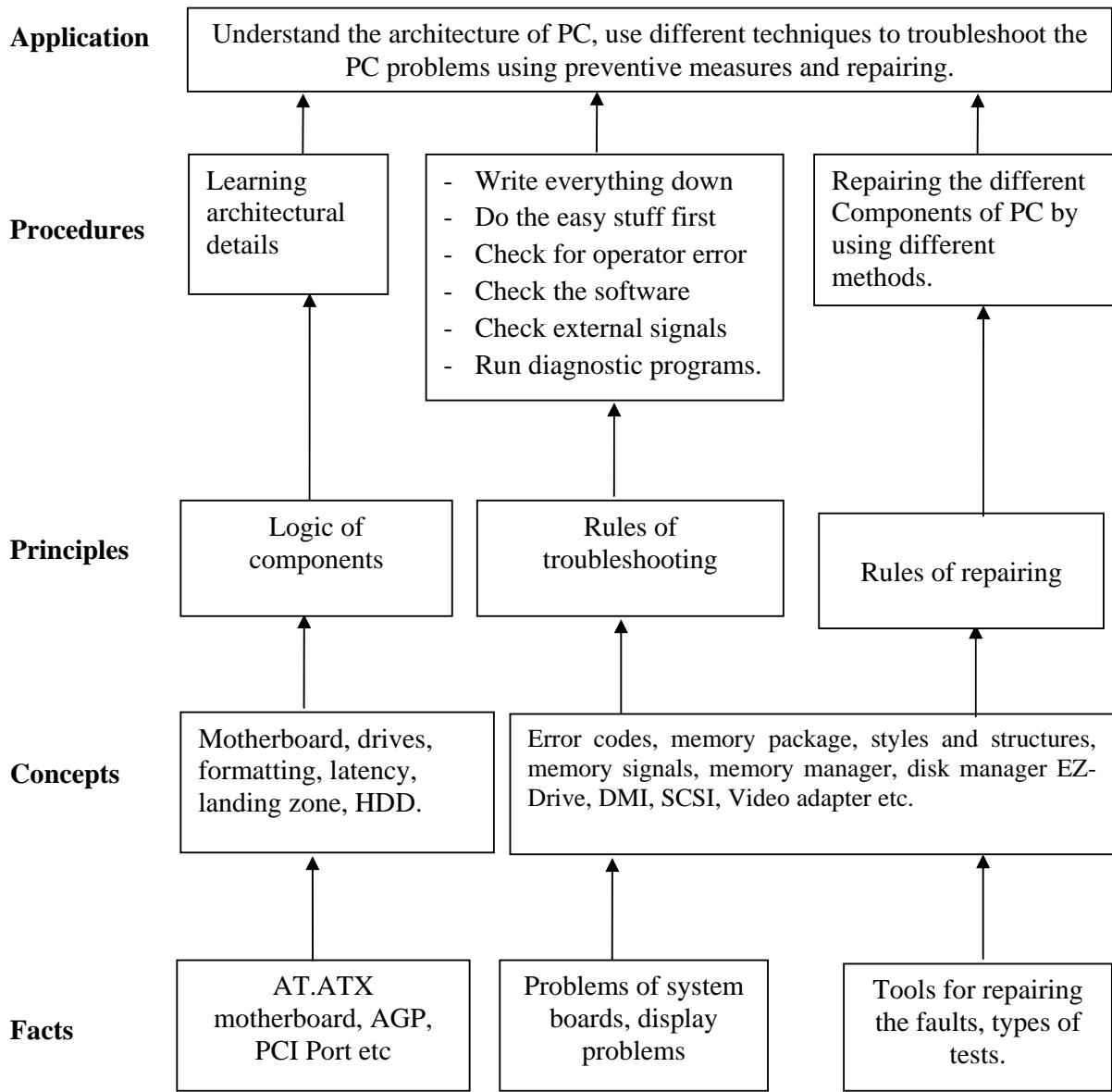
The aim of the subject is to teach the basic working of the computer motherboard, peripherals and add-on cards. The subject helps the students to do the maintenance of the Computer, peripherals and its add-on cards. The students will be able to select the proper peripheral as per their specification and requirement. This is the core technology subject. The pre-requisite of the subject is Microprocessor. The subject is practical oriented and will develop the debugging skills in the students.

Objectives:

The student will be able to:

1. Debug and repair the faults in system.
2. Assemble the system.
3. Load the operating system and device drivers in the system.

Learning Structure:



Theory:

Sr. No	Theory	Hrs.	Marks
1	<p>Motherboard & Its Component <u>Specific Objectives</u></p> <ul style="list-style-type: none"> ➤ To Understand the various components of Motherboard. ➤ To Know about the different memories in PC & their usage. ➤ To Understand the selection of different components of PC. <p>1.1 CPU – Concept like address lines, data lines, internal registers. 1.2 Modes of operation of CPU – Real mode, IA-32 mode, IA-32 Virtual Real Mode. 1.3 Process Technologies, Dual Independent Bus Architecture, Hyper Threading Technologies & its requirement. 1.4 Processor socket & slots. 1.5 Chipset basic, chipset Architecture, North / South bridge & Hub Architecture. 1.6 Latest chipset for PC 1.7 Overview & features of PCI, PCI –X, PCI express, AGP bus. 1.8 Logical memory organization conventional memory, extended memory, expanded memory. 1.9 Overview & features of SDRAM, DDR, DDR2, DDR3. 1.10 Concept of Cache memory: 1.11 L1 Cache, L2 Cache, L3 Cache, Cache Hit & Cache Miss. 1.13 BIOS – Basics & CMOS Set Up. 1.14 Motherboard Selection Criteria.</p>	12	20
2	<p>Storage Devices & Interfacing. <u>Objective</u></p> <ul style="list-style-type: none"> ➤ To understand the Recording techniques in storage devices. ➤ To understand the working of storage devices. <p>2.1 Recording Techniques: FM, MFM , RLL, perpendicular recording 2.2 Hard Disk construction and working. 2.3 Terms related to Hard Disk. Track, sector, cylinder, cluster, landing zone, MBR, zone recording, write pre-compensation. 2.4 Formatting: Low level, High level & partitioning. 2.5 FAT Basics: Introduction to file system, FAT 16, FAT 32, NTFS, 2.6 Hard Disk Interface: Features of IDE, SCSI, PATA, SATA, Cables & Jumpers. 2.7 CD ROM Drive: Construction, recording.(Block diagram) 2.8 DVD: Construction, Recording. (Block Diagram) 2.9 Blue-ray Disc specification.</p>	08	20

3	<p>Display Devices & Interfacing Objective</p> <ul style="list-style-type: none"> ➤ To understand the construction and working of display devices like CRT, LCD. ➤ To understand the Interfacing of above devices to PC. <p>3.1 CRT: - Block diagram & working of monochrome & colour Monitor 3.2 Characteristics of CRT Monitor :- DOT Pitch, Resolution, Horizontal Scanning frequency, Vertical scanning frequency, Interlaced Scanning, Non-Interfaced scanning, Aspect ratio. 3.3 LCD Monitor: - Functional Block Diagram of LCD monitor, working principle, Passive matrix, Active matrix LCD display. 3.4 Touch Screen Display – The construction and working principle 3.4 Plasma Display Technology: - Construction & working principle. 3.5 Basic Block Diagram of Video Accelerator card</p>	06	12
4	<p>Input and Output Devices Objective</p> <ul style="list-style-type: none"> ➤ To understand the construction and working of Input /Output Devices. ➤ To understand the Interfacing of the above peripherals. <p>4.1 Keyboard: Types of key switches: Membrane, Mechanical, Rubber dome, Capacitive, optoelectronic and interfacing. 4.2 Mouse: Opto-mechanical, optical (New design) 4.3 Scanner: Flat Bed, Sheet-fed, Handheld: Block diagram of flat Bed and specifications, OCR, TWAIN, Resolution, Interpolation. 4.4 Modem: Internal and External: Block diagram and specifications. 4.5 Printer: Printer Characteristics, Dot matrix, Inkjet, Laser: block diagram and specifications.</p>	06	16
5	<p>Power Supplies Objective</p> <ul style="list-style-type: none"> ➤ To understand the working of SMPS. ➤ To understand the power problems. <p>5.1 Block diagram and working of SMPS. 5.2 Signal description and pin-out diagram of AT and ATX connectors 5.3 Power supply characteristics: Rated wattage, Efficiency, Regulation, Ripple, Load regulation, Line regulation. 5.4 Power problems: Blackout, Brownout, surges and spikes. 5.5 Symptoms of power problems. 5.6 Protection devices: circuit breaker, surge suppressor. 5.7 Uninterrupted Power Supply, ONline and OFFline UPS, working of UPS: Block diagram, advantages and disadvantages, Ratings</p>	04	12
6	<p>Interfaces Objective</p> <ul style="list-style-type: none"> ➤ To understand the ports of PC. ➤ To understand interfacing techniques of devices to ports <p>6.1 SCSI, SCSI cables and connectors, SCSI drive configuration. 6.2 USB features. 6.3 RS 232 : (Voltages and 9 pin description) 6.4 Centronics (interface diagram, important signals and timing waveform) 6.5 Firewire features 6.6 Blue tooth</p>	06	12

	PC Troubleshooting, Maintenance and Tools.		
	Objective		
	➤ To understand the preventive maintenance of PC		
	➤ To understand the diagnostic tools of PC		
7	7.1 POST: POST sequence, Beep codes, visual display codes.	06	08
	7.2 Preventive maintenance: Active, Passive, periodic maintenance procedure.		
	7.3 Diagnostic Tools: logic Analyzer, logic probe.		
	7.4 Diagnostic software for trouble shooting PC.		
	BGA workstation and its applications for reballing of north bridge and south bridge		
	Total	48	100

PRACTICAL:

Skills to be developed:

Intellectual Skills:

- Understanding basic hardware of computer
- Fault finding of input/output devices.
- Troubleshooting of input/output devices
- Proper connection of input/output devices.

Motor Skills:

- Proper handling of Computer System Hardware.

List of Practical:

01. Identify and draw the motherboard layout of Intel i3 processor and understand connection and layout of the H67 or P67 chipset.
02. Perform Basic Input/output System (BIOS) setting and configuration setup using Complementary Metal Oxide Semiconductor (CMOS).
03. Format, partition and install a Hard Disk Drive (HDD) and format a pen drive.
04. Understand layout, characteristics and functions of different components of Hard Disk Drive (HDD) as a storage device.
05. Install Video Graphics Array (VGA) or Super Video Graphics Array (SVGA) display cards.
06. Install and understand the working of printer.
07. Install and understand the working of Input/output devices such as scanner and modem.
08. Connect Switched Mode Power Supply (SMPS) and identify different parts of SMPS. Understand the working of SMPS and Uninterrupted Power Supply (UPS).
09. Use diagnostic software to identify installed computer peripherals and test their working condition.
10. Find faults related to Monitor, CPU, Hard disk, Printer and other peripherals.
11. Form a pico net using Bluetooth devices and transfer data.
12. Assemble PC and install an operating system.

Learning Resources:

Books:

Sr. No.	Author	Title	Publisher
01	Scott Muller	Upgrading & Repairing PCs	Pearson
02	Mark Minasi	The Complete PC Upgrade & Maintenance guide	Wiley India
03	Barry Press and Maricia Press	PC Upgrade and Repair	Wiley India
04	Begelow	Bigelow's Troubleshooting, Maintaining & Repairing PCs	Tata McGraw Hill
05	Mike Meyers Scott Jernigan	Managing & Troubleshooting PCs	Tata McGraw Hill
06	D.Balasubramanian	Computer Installation & Servicing	Tata McGraw Hill

5. IMPLEMENTATION STRATEGY:

5.1 Planning of Lectures for a Semester with Content Detailing:

[The methods used to explain the contents are just guideline. Any relevant methods can be used for better understanding of students and effective teaching learning process]

Topic 1	<u>Name: Motherboard and Its Components</u>		
	Knowledge Category	Examples of Category	Teaching Methodology
	FACT	Motherboard, RAM, CPU, Socket, slot	Actual demo of motherboard/RAM/CPU in the class room and allow the students to handle it.
	CONCEPT	Cache, BIOS, system buses, internal registers, modes of operations of CPU	Show the BIOS configuration using computer and projector. Explain the concept of cache with live example
	PRINCIPLE	Threading	Demonstrate the principle of threading through PPTs
	PROCEDURE		Demonstrate the function of various parts through PPTs
	APPLICATION	Identifying various components of the motherboard	Discuss various motherboard selection criterion
<p>References material: Upgrading and Repairing PCs by Scott Muller Teaching Aids: Chalk-Board, PPT, Actual motherboard, CPU and Memory chips Websites: www.HowStuffWorks.com, www.pcsupport.about.com, http://www.buildcomputers.net, http://computer.howstuffworks.com/cache1.htm http://www.remotelan.net/tutorials/bios/bios.php</p>			
Lecture No.	Topic / Subject to be covered		

1	1.1 CPU – Concept like address lines, data lines, internal registers
2	1.2 Modes of operation of CPU – Real mode, IA-32 mode, IA-32 Virtual Real Mode.
3	1.3 Process Technologies, Dual Independent Bus Architecture, Hyper Threading Technologies & its requirement.
4	1.4 Processor socket & slots (Socket for i3 Processor only) (Description of various slots mentioned in the curriculum)
5	1.5 Chipset basic, chipset Architecture, North / South bridge & HubArchitecture.
6	1.6 Latest chipset for PC (H 67 and P 67 only)
7	1.7 Overview & features of PCI, PCI –X, PCI express AGP bus.
8	1.8 Logical memory organization conventional memory, extended memory, expanded memory.
9	1.9 Overview & features of SDRAM, DDR, DDR2, DDR3.
10	1.10 Concept of Cache memory. 1.11 L1 Cache, L2 Cache, L3 Cache, Cache Hit & Cache Miss.
11	1.13 BIOS – Basics & CMOS Set Up.
12	1.14 Motherboard Selection Criteria.

Topic 2	<u>Name: Storage Devices and Interfacing</u>		
	Knowledge Category	Examples of Category	Teaching Methodology
	FACT	Hard Disk, CD-ROM, DVD, Blue-Ray Disc	Actual demo of hard disk / CD ROM/ CD drive/ DVD / DVD Drive in the class room and allow the students to handle it.
	CONCEPT	Recording, Formatting, partitioning	Explain formatting and partitioning with live example
	PRINCIPLE	FM, MFM, RLL	Demonstrate FM, MFM, RLL with sample data
	PROCEDURE		Show formatting and partitioning on a PC
	APPLICATION		Formatting and partitioning of hard disk
Reference Material: Upgrade & Maintenance guide by Mark Minasi Computer Installation and Servicing by D. Balasubramanian Teaching Aids: Chalk-Board, PPT Websites: www.HowStuffWorks.com , http://www.ustudy.in/it http://www.ent.mrt.ac.lk/~ekulasek/it106/act.html			

	http://www.timefordvd.com/tutorial/DVDTutorial.shtml
Lecture No.	Topic / Subject to be covered
1	2.1 Recording Techniques: FM, MFM
2	2.1 RLL, perpendicular recording
3	2.2 Hard Disk construction and working.
4	2.3 Terms related to Hard Disk.Track, sector, cylinder, cluster, landing zone, MBR, zone recording,write pre-compensation. 2.4 Formatting: Low level, High level & partitioning
5	2.5 FAT Basics: Introduction to file system, FAT 16, FAT 32, NTFS. 2.6 Hard Disk Interface: Features of IDE, SCSI,
6	2.6 Hard Disk Interface: Features of PATA, SATA, Cables& Jumpers.
7	2.7 CD ROM Drive: Construction, recording.(Block diagram and working)
8	2.8 DVD: Construction, Recording. (Block Diagram and working) 2.9 Blue-ray Disc specification.

Topic 3	Name: Display Devices and Interfacing		
	Knowledge Category	Examples of Category	Teaching Methodology
	FACT	CRT / LCD / plasma / touch screen monitor, videoaccelerator card.	Block diagram through PPT
	CONCEPT	Persistence, Fluorescence, Horizontal and vertical scanning, trace, retrace, interfacing of above devices to PC.	Explain using animated PPT
	PRINCIPLE	Refresh rate, Resolution, Dot pitch, interlacing, non interlacing, aspect ratio.	Explain the calculation aspect ratio of monitor with example
	PROCEDURE		
	APPLICATION		Understanding different types of monitors
Reference Material: Upgrading and Repairing PCs by Scott Muller Teaching Aids: Chalk-Board, PPT Websites: www.HowStuffWorks.com, http://www.hardwaresecrets.com www.engineersgarage.com , http://www.ustudy.in/it ,			

Lecture No.	Topic / Subject to be covered																		
1	3.1 CRT: - Block diagram & working of monochrome & color Monitor																		
2	3.2 Characteristics of CRT Monitor :- DOT Pitch, Resolution, Horizontal Scanning frequency, Vertical scanning frequency, Interlaced Scanning, Non-Interlaced scanning, Aspect ratio.																		
3	3.3 LCD Monitor: - Functional Block Diagram of LCD monitor, Working principle, Passive matrix and Active matrix LCD display.																		
4	3.4 Touch Screen Display – The construction and working principle																		
5	3.4 Plasma Display Technology: - Construction & working principle.																		
6	3.5 Basic Block Diagram of Video Accelerator card (Explain working)																		
Topic 4	<p>Name: Input and output Devices</p> <table border="1"> <thead> <tr> <th>Knowledge Category</th> <th>Examples of Category</th> <th>Teaching Methodology</th> </tr> </thead> <tbody> <tr> <td>FACT</td> <td>Keyboard, Mouse, Scanner, Modem, Printer</td> <td>Explain the working with PPT</td> </tr> <tr> <td>CONCEPT</td> <td>interfacing, scanning</td> <td>Explain using PPT</td> </tr> <tr> <td>PRINCIPLE</td> <td>Operation of different types of keyboard switches, mouse, printer, scanner, modem.</td> <td>Actual hands on experiment</td> </tr> <tr> <td>PROCEDURE</td> <td></td> <td></td> </tr> <tr> <td>APPLICATION</td> <td></td> <td>Actual installation of modem, scanner, printer</td> </tr> </tbody> </table> <p>Reference Material: Computer Installation and Servicing by D. Balasubramanian, All about Keyboard and Mouse by M Lotia Upgrade & Maintenance guide by Mark Minasi Teaching Aids: Chalk-Board, actual devices Websites: www.HowStuffWorks.com, http://www.grassrootsdesign.com/intro/hardware</p>	Knowledge Category	Examples of Category	Teaching Methodology	FACT	Keyboard, Mouse, Scanner, Modem, Printer	Explain the working with PPT	CONCEPT	interfacing, scanning	Explain using PPT	PRINCIPLE	Operation of different types of keyboard switches, mouse, printer, scanner, modem.	Actual hands on experiment	PROCEDURE			APPLICATION		Actual installation of modem, scanner, printer
	Knowledge Category	Examples of Category	Teaching Methodology																
	FACT	Keyboard, Mouse, Scanner, Modem, Printer	Explain the working with PPT																
	CONCEPT	interfacing, scanning	Explain using PPT																
	PRINCIPLE	Operation of different types of keyboard switches, mouse, printer, scanner, modem.	Actual hands on experiment																
	PROCEDURE																		
	APPLICATION		Actual installation of modem, scanner, printer																
Lecture No.	Topic/Subject to be covered																		
1	4.1 Keyboard: Types of key switches: Membrane, Mechanical, Rubberdome, Capacitive, optoelectronic and interfacing.																		
2	4.2 Mouse: Opto-mechanical, optical (New design) (Explain working)																		
3,4	4.3 Scanner: Flat Bed, Sheet-fed, Handheld: Block diagram of flat bed and specifications, OCR, TWAIN, Resolution, Interpolation.																		
5	4.4 Modem: Internal and External: Block diagram and specifications.(Explain working)																		
6	4.5 Printer: Printer Characteristics, Dot matrix, Inkjet, Laser: block diagram and specifications. (Explain working of each printer)																		

Topic 5	Name: Power Supplies		
	Knowledge Category	Examples of Category	Teaching Methodology
	FACT	Switch Mode Power Supply, AT ATX Connectors, circuit breaker, surge suppressor	Actual handling of devices and connectors
	CONCEPT	Blackout, Brownout, surges and spikes	Explain with the help of PPT
	PRINCIPLE	Working of circuit breaker, surge suppressor	
	PROCEDURE	Steps to connect SMPS to PC	Actual Hands on experiment
	APPLICATION	Installation of SMPS, Hardware installation of UPS	Comparison of AT and ATX power supplies
Reference Material: Bigelow's Troubleshooting Maintaining & Repairing PCs Teaching Aids: Chalk-Board, LCD, actual SMPS Websites: http://www.power-solutions.com/power-quality/power-problems/common-problems			
Lecture No.	Topic / Sub topic to be covered		
1	5.1 Block diagram and working of SMPS. 5.2 Signal description and pin-out diagram of AT and ATX connectors		
2	5.3 Power supply characteristics: Rated wattage, Efficiency, Regulation, Ripple, Load regulation, Line regulation.		
3	5.4 Power problems: Blackout, Brownout, surges and spikes. 5.5 Symptoms of power problems. 5.6 Protection devices: circuit breaker, surge suppressor		
4	5.7 Uninterrupted Power Supply, Online and Offline UPS, working of UPS: Block diagram, advantages and disadvantages, Ratings		

Topic 6	Name: Interfaces		
	Knowledge Category	Examples of Category	Teaching Methodology
	FACT	IDE, SCSI, USB, RS 232, Centronics, Firewire, Blue tooth	Show actual connectors in class room
	CONCEPT	Hardware/ software interfacing, Termination.	Explain with the help of PPT
	PRINCIPLE	Serial/ Parallel data transfer	
	PROCEDURE		Connecting USB and Blue tooth device
	APPLICATION	Data transfer using USB and Blue tooth device	

	<p>Reference Material:Bigelow's Troubleshooting Maintaining & Repairing PCs Teaching Aids: Chalk-Board, LCD Websites:www. computerhope.com, www.howstuffworks.com http://www.camiresearch.com/Data_Com_Basics/RS232_standard.html http://www.omega.com/techref/pdf/RS-232.pdf,</p>
Lecture No.	Topic / Sub topic to be covered
1	6.1 SCSI, SCSI cables and connectors, SCSI drive configuration.
2	6.2 USB features.
3	6.3 RS 232 : (Voltages and 9 pin description)
4	6.4 Centronics (interface diagram, important signals and timing waveform)
5	6.5 Firewire features
6	6.6 Blue tooth features

Topic 7	Name: PC troubleshooting Maintenance and Tools		
	Knowledge Category	Examples of Category	Teaching Methodology
	FACT	logic Analyzer, logic probe, BGA workstation	Actual device / downloaded video clip should be shown to students
	CONCEPT	POST, active and passive maintenance, reballing	Showing steps in POST with actual demonstration
	PRINCIPLE	Reballing	Downloaded video clip should be shown to students
	PROCEDURE	Maintenance of peripheral devices	Different tools used for maintenance
	APPLICATION	Finding faults related to monitor, CPU, hard disk, printer and other peripherals	Rectifying the faults
	<p>Reference Material:Upgrade &Maintenance guide by Mark Minasi Bigelow's Troubleshooting Maintaining & Repairing PCs Installation and Servicing by D. Balasubramanian, Upgrading and Repairing PCs by Scott Muller Teaching Aids: Chalk-Board, LCD Websites:www. computerhope.com, www.HowStuffWorks.com, http://www.hardwaresecrets.com, www.engineersgarage.com</p>		
Lecture No.	Topic / Sub topic to be covered		
1	7.1 POST: POST sequence, Beep codes, visual display codes.		
2	7.2 Preventive maintenance: Active, Passive, periodic maintenance procedure.		

3	7.3 Diagnostic Tools: logic Analyzer, logic probe.
4	7.4 Diagnostic software for trouble shooting PC
5,6	BGA workstation and its applications for reballing of north bridge and south bridge

5.2 Planning and Conduct of Test:

- There will be Two Class Test, each of **25 Marks**.
- Schedule of Class Test and portion shall be declared in advance

Sr. No	Class Test	Marks	Topics
1	Class Test 1	25	Topic 1: Motherboard and Its Components Topic 2: Storage Devices and Interfacing Topic 3 : Display Devices and Interfacing
2	Class Test 2	25	Topic 4: Input and output Devices Topic 5: Power Supplies Topic 6: Interfaces Topic 7: PC troubleshooting Maintenance and Tools

Conduct of Test:

- Invigilator shall distribute the answer sheets 15 minutes prior to the test to the candidates.
- Invigilator shall ask the students to write his/her Roll number on question paper
- Invigilator shall sign each and every answer sheet and the supplements.
- Invigilator shall take the signature of each and every candidate on attendance sheet in duplicate.
- During the test Invigilator shall not be sitting but he shall move among the candidates to avoid the mal practices.
- Exchange of writing material and drawing instruments should be prohibited.
- Cell phones in the examination room should be switched off along with the cell phone of supervisor

5.3 Details about conduct of assignments:

[Students should submit the assignments at the time of submission of manual and teacher should check the assignments at the time of submission of Computer Hardware and Maintenance manual]

- After completion of each chapter one assignment should be given.
- Assignment question shall be given from sample question paper, old MSBTE question papers
- It shall be assessed by subject teacher before giving next Assignment.
- Evaluation of Assignment should be done effectively.
- Sample question paper of Computer Hardware and Maintenance to be solved by every student

5.4 Strategies for Conduct of Practical:

5.4.1 Approach for design of Manual:

- Basic approach of lab manual is to develop better understanding of importance of the subject and to know related skills to be developed such as intellectual skills and motor skills.

- The experiments included shall help students to develop their motor and intellectual skills.
- Teacher shall focus on the grid table and understand the skills to be developed among the students through the performance of particular experiment.
- The new concepts based on prior concepts and the concept structure, which links with the content, shall be explained by the teacher.
- Teacher shall involve the students with Mechanics of Structures laboratory through ‘Know your Laboratory’ experiment.
- Questions given at the end of experiment shall be discussed thoroughly, if required additional questions shall be introduced.

5.4.2 Suggestions for effective conduct of practical and assessment:

A) General instructions for effective conduct of practical.

- Display the Date wise schedule of the experiment to be performed in the Laboratory.
- At the beginning of the semester teacher/lab assistant should check and ensure that the equipment used for the experiments are in proper working condition
- Before start of any practical Teachers should explain the specific objective of that particular practical.
- Teachers should explain construction and operation of particular machine/ Equipment
- Teachers should explain how to prepare specimen for the test.
- Teacher should divide total students into number of group as given in practical manual.
- Assign the different activity to each group
- Teacher should refer the guidelines given in the lab manual.
- Teacher should make the students aware of instructions given in the lab manual.
- Teacher should motivate the students by taking activities on related contents in theory and practical.
- Teacher should ensure that at least one activity given in the Lab Manual is performed by the student and observations should be tabulated.
- There should be **one revision practical after every three regular practical** so that student can grasp the contents deeply.
- Teacher shall assess the performance of students continuously as per norms prescribed by MSBTE CIAAN norms.
- During assessment teacher is expected to ask questions to the students to tap their achievements regarding related knowledge and skills so that students can prepare while submitting record of the practical. Focus should be given on development of enlisted skills rather than theoretical / codified knowledge.
- **Questions on confirmation of learning (given below observation table of every experiment) are compulsory.**

Guidelines for conduct of Practicals.

Experiment No	Activity	Time
1 Identify and draw the motherboard layout of Intel	Kindly arrange to get motherboard having i3 processor.	
	Divide the batch into group of 3 students / as mentioned in the Lab manual and allot a table.	05 mins

i3 processor and understand connection and layout of the H67 or P67chipset.		
	Issue of motherboard to group leader.	10 mins
	Explain and demonstrate the various components on the motherboard.	10 mins
	Explain the function of the components	10mins
	Ask the students to identify the components.	10 mins
	The students should try to recall the components and their functions.	10 mins
	The teacher may clarify doubts if any and ask the students to draw conclusions)	30 mins
	Teacher may assign questions to students	05 mins
	Students should return all the equipments to the Instructor.	
Assessment of manual. Ask a couple of questions to each student based on the performance of the experiment / application.	30 mins	

Experiment No.	Activity	Time
2 Perform Basic Input/output System (BIOS) setting and configuration setup using Complementary Metal Oxide Semiconductor (CMOS).	Ask the students to occupy their respective table.	05 mins
	Every group shall be allowed the use of one PC.	05 mins
	Teacher shall demonstrate the BIOS settings and CMOS set up to the students	30 mins
	The students should try to recall the settings and their use.	10 mins
	The teacher may clarify doubts if any and ask the students to draw conclusions)	10 mins
	The students should try to change the BIOS settings and bring it back to default settings	30 mins
	Assessment of manual. Ask a couple of questions to each student based on the performance of the experiment / application.	30 mins

6. Mode of assessment

6.1 Class Test

- Teacher should prepare model answer of class test question papers and display it on notice board after the class test for clear understanding of the subject by students.
- Teacher should show the answer paper of class test to the student and discuss about the mistakes in practical's or free time. Give appropriate suggestions.

Guidelines for Setting Class Test Question Paper:

- Each Test paper will have Three Questions: Question 1 will be for NINE marks. This question will have each bit of three marks and students will have to attempt any THREE out of FOUR

- Question 2 & 3 will be for EIGHT marks each. These questions will have each bit of FOUR marks and student has to attempt any TWO out of THREE

Following guidelines have to be followed for conducting Test Examinations at Institution Level.

- Total of Test marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).
- Institutes should maintain Subject wise Record of Test Marks along with students signature in separate register
- Question Paper for First Test should be based on 40% of the curriculum of the subject and Second test on 40% of the remaining curriculum

6.1.1 Guidelines for Setting Class Test Question Paper:

Question No 1 : Attempt any three out of four (3 x 3=9 Marks)

Question No 2 : Attempt any two out of three (2 x 4=8Marks)

Question No 3 : Attempt any two out of three (2 x 4 =8Marks)

6.1.2. Sample Question Paper:

Sample Paper Test I

Roll No.				
-----------------	--	--	--	--

Subject Code

Institute Name:

Course Name: CO /CD /CM / CW /IF

Subject: **Computer Hardware & Maintenance (17428)**

Marks: **25**

Course Code:

Semester : IV

Time: **1 hour**

Instructions:

1. All questions are compulsory
2. Illustrate your answers with neat sketches wherever necessary
3. Figures to the right indicate full marks
4. Assume suitable data if necessary
5. Preferably, write the answers in sequential order

Q1. Attempt any THREE of the following (3 x 3)

- a. State any three functions of BIOS.
- b. What is FAT? Enlist different types of FAT.
- c. What are the advantages of LCD monitor over CRT monitor?
- d. Describe the use of address bus, data bus, and control bus.

Q2. Attempt any TWO of the following (4 x 2)

- a. State any four differences between interlaced and non-interlaced monitor.
- b. For the data stream 10110111 how MFM recording technique will be applied?
- c. What is cache memory? What is L1, L2, L3 cache?

Q3. Attempt any TWO of the following (4 x 2)

- a. Define the terms related to CRT monitor: Frame rate, video band width, Resolution, Dot Pitch.
- b. Draw the block diagram of North bridge / South bridge architecture and describe the various blocks.
- c. Enlist types of servo techniques. Describe embedded servo technique.

Sample Paper Test II

Roll No.				
-----------------	--	--	--	--

Subject Code

Institute Name:

Course Name: CO /CD /CM / CW /IF

Subject: **Computer Hardware & Maintenance (17428)**

Marks: **25**

Course Code:

Semester : IV

Time: **1 hour**

Instructions:

6. All questions are compulsory
7. Illustrate your answers with neat sketches wherever necessary
8. Figures to the right indicate full marks
9. Assume suitable data if necessary
10. Preferably, write the answers in sequential order

Q1. Attempt any THREE of the following

(3 x 3)

- e. Give advantages of ink jet printer over dot matrix printer. (any three)
- f. Define: Blackout, Brownout, and Surge.
- g. Describe any three signals from printer to PC in centronics interface.
- h. State any three applications of BGA work station

Q2. Attempt any TWO of the following

(2 x 4)

- a. Write the working principle of mechanical key switch with neat diagram.
- b. With the help of suitable block diagram explain working of UPS.
- c. Give four features of USB.

Q3. Attempt any TWO of the following

(2 x 4)

- a. List any four virus infection symptoms. What precaution should be taken to prevent virus infection?
- b. Draw the block diagram of RS232 connector and give the function of each signal.
- c. With neat sketch describe external modem.

6.2.3 Sample Question Paper:

MSBTE Sample Question Paper

Course Name: Computer Engineering Group

Course Code: CO/CM/CD/IF/CW

Subject:- COMPUTER HARDWARE AND MAINTENANCE

Marks:- 100

Semester: FOURTH

Subject Code :-(17428)

Hours :- 3 Hrs

QI) (A) Attempt any SIX: (6x2)

12 Marks

- Write any four features of PCI bus.
- Write any two features each of parallel AT attachment and serial AT attachment.
- Write any four advantages of CRT display over LCD display.
- Define the terms TWAIN, and OCR with reference to scanner.
- Give disadvantages of ink jet printer. (Any two points)
- Define Line regulation and load regulation for a power supply.
- Give any four features of SCSI-3.
- List any four firewire features.

QI) (B) Attempt any TWO (2x4)

8 Marks

- Compare DDR2 and DDR3 (Any four points)
- Describe the construction and working of plasma display.
- Compare the characteristics of CRT and LCD monitors (Any four)

QII) Attempt any FOUR: (4x4)

16 Marks

- State any four features of P67 chipset.
- Describe the following terms related to hard disk: MBR, sector, Cylinder, Track
- Describe Write pre compensation with its use.
- Describe use of jumper selections. (Any four)
- Describe any six characteristics of CRT color monitor.
- List any four advantages of optical mouse.

QIII) Attempt any FOUR: (4x4)

16 Marks

- What is hyper threading technology? What is its requirement?
- Write any four differences between CRT and LCD.
- Explain the sequence of events in RS- 232 communication with signals.
- Name two hardware tools and two software tools used for trouble shooting of PC.
- Explain: RFI protection, Electrostatic Discharge.
- Give the test sequence of POST.

QIV) Attempt any FOUR: (4x4)

16 Marks

- With neat diagram explain the working of opto mechanical mouse.
- With neat diagram explain the working principle of flat bed scanner.
- Give the signal voltages for following colors of ATX connectors: Red, Black, Orange and Purple.
- State four advantages of UPS over normal power supply.
- Draw the timing diagram of centronics interface and explain.
- Draw the diagram of centronics interface and explain function of any four signals.

QV) Attempt any TWO: (2 x 8)

16 Marks

- a. What is cache hit and cache miss? Describe L1, L2 and L3 cache.
- b. State any eight motherboard selection criterion.
- c. Explain the working of dot matrix printer with neat diagram.

QVI) Attempt any TWO: (2x8)

16 Marks

- a. With suitable block diagram, describe the construction of CDROM drive.
- b. Describe frequency modulation (FM) and modified frequency modulation (MFMM) method of recording with suitable example.
- c. With suitable block diagram describe the working of SMPS.
