

CIRCULAR :-

A reference is invited to the Ordinances, Regulations and Syllabi relating to the Bachelor of Engineering (B.E.) degree course vide this office Circular No.UG/209 of 2001 dated 20th June, 2001 and No. UG/263 of 2005 dated 8th June, 2006 and the Principals of the affiliated colleges in Engineering are hereby informed that the recommendation made by the Dean of the faculty of Technology has been accepted by the Academic Council at its meeting held on 10th August, 2007 vide item No.4.17 and that, in accordance therewith, the syllabus of the F.E. (Sem.II) course (All branches) is revised as per Appendix and that the same has been brought into force with effect from the academic year 2007-2008.

MUMBAI-400 032
29th September, 2007

for I/c REGISTRAR

To, The Principals of the affiliated colleges in Engineering

A.C/4.17/10.08.2007

No.UG/ 387 -A of 2007

29th September, 2007.

Copy forwarded with Compliments for information to :-

- 1) The Dean, Faculty of Technology
- 2) The Officer Special Duty and Controller of Examinations.

for I/c REGISTRAR

Copy to :-

The Director, Board of College and University Development, the Deputy Registrar (Eligibility and Migration Section), the Director of Students Welfare, the Executive Secretary to the Vice-Chancellor, the Personal Assistant to the Pro-Vice-Chancellor, the Registrar and the Assistant Registrar, Administrative sub-center, Ratnagiri for information.

The Officer on Special Duty and Controller of Examinations (10 copies), the Finance and Accounts Officer (2 copies), Record Section (5 copies), Publications Section (5 copies), the Deputy Registrar, Enrolment, Eligibility and Migration Section (3 copies), the Deputy Registrar, Statistical Unit (2 copies), the Deputy Registrar (Accounts Section), Vidyanagari (2 copies), the Deputy Registrar, Affiliation Section (2 copies), the Director, Institute of Distance Education, (10 copies) the Director University Computer Center (IDE Building), Vidyanagari, (2 copies) the Deputy Registrar (Special Cell), the Deputy Registrar, (PRO), the Assistant Registrar, Academic Authorities Unit (2 copies) and the Assistant Registrar, Executive Authorities Unit (2 copies). They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to in the above Circular and that no separate Action Taken Report will be sent in this connection. the Assistant Registrar Constituent Colleges Unit (2 copies), BUCT (1 copy), the Deputy Account. Unit V (1 copy), the In-charge Director, Centralize Computing Facility (1 copy), the Receptionist (1 copy), the Telephone Operator (1 copy), the Secretary MUASA (1 copy), the Superintendent, Post-Graduate Section (2 copies), the

UNIVERSITY OF MUMBAI



Revised Scheme and Syllabus for the F.E (Sem.II) Examination

(With effect from the academic year 2007-2008)

Scheme for F.E. Semester II

Sr. No	Subjects	No. of Periods per week (60 minutes each)			Duration of Theory papers (Hours)	Marks				
		Lecture	Practical	Tutorial		Theory	Term-work	Practical (2 Hrs.)	Oral	Total
1	Applied Mathematics-II	04	--	01	03	100	25	--	--	125
2	Applied Physics-II	03	01	--	02	75	25	--	--	100
3	Applied Chemistry-II	03	01	--	02	75	25	--	--	100
4	Communication Skills	02	--	02	02	75	25	--	25(a)	125
5	Engineering Drawing	03	04	--	03	75	25	50	--	150
6	Computer Programming-II	04	02	--	03	100	25	25	--	150
7	Basic Workshop Practice-II	--	04	--	--	--	50	--	--	50
Total....		19	12	03	--	500	200	75	25	800

(a) Presentation should be given by students in the subject of communication skill, marks allotted to them on presentation

Each Term-Work Journal shall consist of Practical write-up/tutorial problems, assignment (if any) and test paper.

First Year Engineering (Semester I & II) (Revised) Course for
Academic Year 2007-08
(Common for all branches)
Revised Scheme for Semester I

Subjects	No. of Periods per week (60 minutes each)			Duration of Theory papers (Hours)	Marks				
	Lectu re	Practi-cal	Tuto -rial		Theory	Term- work	Prac- tical (2 Hrs.)	Oral	Total
Applied Mathematics-I	04	--	01	03	100	25	--	--	125
Applied Physics-I	03	01	--	02	75	25	--	--	100
Applied Chemistry-I	03	01	--	02	75	25	--	--	100
Engineering Mechanics	05	02	--	03	100	25	25	--	150
Basic Electrical & Electronics Engineering	05	02	--	03	100	25	25	--	150
Computer Programming-I	03	02	--	03	100	25	--	--	125
Basic Workshop & Practice-I	--	04	--	--	--	50	--	--	50
Total....	23	12	01	--	550	200	50	--	800

University of Mumbai

CLASS: F.E (All Branches of Engineering)

Semester - II

SUBJECT: Applied Mathematics II

Periods per week
of Period of 60 min.

Lecture 4

Practical --

Tutorial 1

Evaluation System

Theory Examination

Hours

Marks

3

100

Practical

--

--

Oral Examination

--

--

Term Work

--

25

Total

--

125

Detailed Syllabus:

Prerequisite:

Idea of curve tracing in Cartesian, Parametric and Polar forms. Standard curves such as Straight lines, Circles, Parabolas, Hyperbola, Catenary, Cissoid, Astroid, Cycloid, Lemniscate of Bernoulli, Cardioid. Concept of Solid Geometry-Planes, Spheres, Cones, Cylinders, Paraboloids,

Lectures/Week

02

2.1

Beta and Gamma functions, Differentiation under integral sign.

- 2.1.1 Definition of Beta and Gamma functions and properties
- 2.1.2 Relation between Beta and Gamma functions (with proof). Duplication formula (with proof)
- 2.1.3 Differentiation under the integral sign with constant limits of integration

06

2.2

Differential Equations of first order and first degree

2.2.1 Exact differential equations and those which can be reducible to the exact form by using integrating factors (four rules)

1. Homogeneous differential equations

2. $f(xy)ydx + g(xy)x dy = 0$

3. I.F. = $e^{\int f(x)dx}$ where $f(x) = \frac{\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x}}{N}$

4. I.F. = $e^{\int g(y)dy}$ where $g(y) = \frac{\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y}}{M}$

2.2.2 Linear differential equations and differential equations reducible to the linear form

2.2.3 Numerical solutions of differential equations using Taylor's series method

04

03

01

Term Work:

	Marks
1. Attendance (Theory and Tutorial)	05
2. Tutorials covering entire portion	05
3. Programming Assignments using Scilab	05
-Curve Tracing, intersection of surfaces, evaluation of Double and Triple Integrals, Solution of Differential equations of 1 st order and 1 st degree	10
4. Test (at least one)	25
	25

The final certification and acceptance of TW ensures the satisfactory performance of laboratory/Tutorial work and minimum passing in the TW.

Recommended Books:

- Higher Engineering Mathematics, Dr. B. S. Grewal, Khanna Publications.
- Differential Equation, Ross, , Wiley India, 3rd Ed.
- A textbook of Applied Mathematics, P.N. and J. N. Wartikar, Volume 1 and 2, Pune Vidyarthi Griha.
- Advanced Engineering Mathematics, Erwin Kreyszing, Wiley India, 8th Ed.
- Elementary Differential Equation, E. D. Rainville, P.E. & R.E. Bedient, Prentice Hall, 8th edition.

University of Mumbai
CLASS: E.E (All Branches of Engineering)

Semester - II

SUBJECT: Applied Physics II

Periods per week
01 Period of 60 min

Lecture 3
Practical 1
Tutorial --

Evaluation System

Theory Examination

Hours

Marks

2

75

Practical

--

--

Oral Examination

--

--

Term Work

--

25

Total

--

100

Details of the Syllabus:-

Sr.No.	Details	Hrs
Module-01	Optics ➤ Interference in thin films, wedge shaped films and Newton's rings, applications of interference ➤ Fraunhofer diffraction through double slit and diffraction grating, grating spectra, resolving power of grating. ➤ Total internal reflection, materials & types of optical fibres, numerical aperture, modes of propagation, V-number, attenuation, dispersion & other losses in fibres, applications.	12
Module-02	LASERS: ➤ Absorption, spontaneous & stimulated emission, population inversion, metastable state, pumping schemes, active medium, resonant cavity, derivation for Einstein's coefficients. ➤ He-Ne laser, Nd:YAG laser, semiconductor diode laser, introduction to molecular and tuneable lasers. ➤ Application of lasers to holography, Memory reading and writing & other applications.	08
Module-03	Foundations of Quantum mechanics: ➤ de'Broglie's hypothesis, group & phase velocity, wave packet, uncertainty principle & its applications. ➤ Wave function and probabilistic interpretation, one-dimensional time dependent Schrodinger equation, reduction to time independent form, application to free particle and particle in a box. ➤ Introduction to quantum computing.	06

Module-04	Magnetic Materials & circuits: ➤ Atomic origin of magnetization, magnetic moment of atom, diamagnetism, Langevin's theory of paramagnetism and Curie's law, Weiss' theory of ferromagnetism. ➤ Magnetic circuits, magnetomotive force, reluctance, permeance, Ohm's law for magnetic circuit, relation between mmf & "H", magnetic circuit due to solenoid, Hysteresis. ➤ Ferrites, soft and hard magnetic materials and their applications.	06
Module-05	Bio-Physics: ➤ Introduction and scope – molecular modeling, energy transfer & energy cycles, biomechanics, neurobiophysics. ➤ Tools – spectroscopy – UV/visible, IR, use of NMR, microscopy – SEM, STM and AFM.	04
Module-06	Vacuum technology: ➤ Basic definitions, units, low, high and ultrahigh vacuum, methods of production. ➤ Vacuum pumps – rotary, diffusion, vacuum gauges – pirani, penning, thermocouple. ➤ Application to thin films, microelectronics, nanotechnology, plasma physics.	04

Theory Examination:

1. Question paper will comprise of total 7 questions, each of 15 marks.
2. Only five questions need to be solved.
3. Question 1 will be compulsory and based on entire syllabus.
4. Remaining questions will be mixed in nature (for example suppose Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3).

In question paper weightage of each module will be proportional to number of respective lec hours as mentioned in the syllabus.

Term work:

Term work shall consist of minimum five experiments and a written test. The distribution of marks for term work shall be as follows:

Laboratory work (Experiments and journal)	: 10 marks
Test (at least one)	: 10 marks
Attendance (Practical and Theory)	: 05 marks.
Total	: 25 marks.

The final certification and acceptance of-TW ensures the satisfactory performance of laboratory work and minimum passing in the TW.

Suggested
Experiments

Applied Physics II.

- 1) Newton's rings.
- 2) Wedge-shaped film
- 3) Mercury spectrum using grating determination of wavelengths.
- 4) Determination of grating element with laser source.
- 5) Divergence of Laser beam.
- 6) Numerical Aperture of optical fibre
- 7) Optical fibre attenuation coefficient.
- 8) Determination of Planck's constant by photocell.
- 9) Hysteresis loop of magnetic materials
- 10) Study of basic low or high vacuum system.

Recommended Books:

1. Fundamentals of Physics, Holliday/ Resnick, Wiley India, 6th edi.
2. Fundamentals of optics – Jenkins & White, McGraw-Hill Int.
3. Understanding Physics, Cummins, Wiley India.
4. Modern Engineering physics – A S Vasudeva, S Shand Pbl.
5. A textbook of Engineering Physics – Kshirsagar & Avadhanulu, S Chand Pbl
6. Quantum mechanics – Bransden & Joachin, Wiley Eastern.
7. Vacuum technology – A Roth.
8. Bio-Physics – Vasantha Pattabhi & N Gautham, Narosa Pbl.

University of Mumbai
CLASS: F.E (All Branches of Engineering)

Semester - II

SUBJECT: Applied Chemistry II

Periods per week
01 Period of 60 min.

Lecture 3
Practical 1
Tutorial --

Evaluation System

	Hours	Marks
Theory Examination	2	75
Practical	--	--
Oral Examination	--	--
Term Work	-	25
Total		100

Details of the Syllabus:-

Sr.No.	Details	Hrs
Module 01	Corrosion: - Nernst theory, Standard Electrode potential, Types of corrosion Dry or chemical corrosion wet or electrochemical corrosion, Electrochemical, Galvanic cell, Concentration cell, Intergranular Stress cell corrosion. Polarization, Over voltage. Factors affecting rate of corrosion. - Methods to decrease the rate of corrosion, Cathodic and Anodic Protection, Cathodic and Anodic coatings. Advanced coatings and protection methods, Only constituents and their function of (a) Paints (b) Varnishes (c) Lacquors (d) Enamels. - Metallic Coatings : Methods of coating and study only electroplating method. Corrosion Engineering of electronic and photonic devices.	(8)
Module 02	Alloys: - Alloys, Types of alloys, Alloys of Al, Cu and Pb. Their composition properties and uses. Recent advances in alloy related materials. - Powder Metallurgy. Methods of metal powder formation, Metal Ceramic powders. Technology of Powder metallurgy. Applications of powder metallurgy.	(6)
Module 03	Fuel: Definition, Classification, Characteristic properties of a good fuel. Calorific value, Gross and Net calorific value, Conversion. Proximate and ultimate analysis of fuels, Combustion calculations for requirement of oxygen and air for given solid, liquid gaseous fuel.	(10)

	Liquid fuels: Crude Petroleum oil, classification Separation and purification of Gasoline from crude oil Thermal cracking Catalytic cracking Fixed bed, moving method for obtaining gasoline - Diesel, Bio diesel, methods to obtain bio diesel, production of ethanol using bio-mass Production of hydrocarbons from plants, Knocking, Octane value, Cetane Value, antiknocking agents and their function recent technology for catalytic converter.	
Module 04	Composite Materials: - Introduction, Constitution, Characteristic properties classification. Particle, fiber, reinforced composites structural composites. - Application of composite materials.	(5)
Module 05	Green Chemistry: - Introduction, Goals Significance, Basic ideas in the field of green chemistry research with 3 examples. - Industrial applications of green chemistry.	(5)
Module 06	Catalysis: - Introduction, Importance of catalysts and adsorbents in industry, Activation energy and catalysts - Molecular design for catalysts and adsorbents, Molecular design by nature- zeolites, zeotypes, pillard clays, Metal complexes and clusters, Oxide materials carbon materials, membranes.	(6)

Theory Examination:

1. Question paper will comprise of total 7 questions, each of 15 marks.
2. Only five questions need to be solved.
3. Question 1 will be compulsory and based on entire syllabus.
4. Remaining questions will be mixed in nature (for example suppose Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3).

In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

Term work:

Term work shall consist of minimum five experiments and a written test. The distribution of marks for term work shall be as follows:

Laboratory work (Experiments and journal)	: 10 marks
Test (at least one)	: 10 marks
Attendance (Practical and Theory)	: 05 marks.
Total	: 25 marks.

The final certification and acceptance of TW ensures the satisfactory performance of laboratory work and minimum passing in the TW.

List of Expts :

1. Estimation of Cu iodometrically
2. Estimation of Zn complexometric titration
3. Estimation of Ni complexometric titration
4. Estimation of Al complexometric titration
5. Calorific value of solid or liquid fuel using Bomb calorimeter
6. Preparation of membranes for filter any one Demon.
7. CO₂ from air by orsats method
8. Estimation of Fe by gravimetric method.
9. Estimation of Ni by gravimetric method.
10. Estimation of Sn iodimetrically.
11. Estimation by iodimetrically.
12. Preparation of biodiesel from edible oil.
13. Synthesis of simple layered materials and their characterization.
14. Preparing simple composites and their characterization.

Recommended Books:

1. Engineering Chemistry – Jain & Jain, Dhanpat Rai.
2. Basic Inorganic Chemistry, Cotton, Wiley India, 3rd edi.
3. Engineering Chemistry – Dara & Dara, S Chand
4. Materials Science & Engg. – William Callister,
5. Chemistry of advanced materials – CNR Rao, RSC Pbl
6. Membrane Filtration - Gutman, Adam Hilger Bristol.
7. Physical Metallurgy – B. K. Agarwal

University of Mumbai

CLASS: E.E (All Branches of Engineering)

Semester - II

SUBJECT: Communication Skills

Periods per week
01 Period of 60 min

Lecture 2
Practical --
Tutorial 2

Evaluation System

Theory Examination
Practical
Oral Examination
Term Work
Total

Hours

2

--

--

--

--

Marks

75

--

25

25

125

Details of the Syllabus:-

Sr.No.	Details	Hrs
Module-01	Communication Theory. • Concept and meaning of communication, Objectives of communication, Methods of communication, Communication in a business organization (Internal , upward, downward, horizontal, grapevine), Problems and solutions.	08
Module-02	Techniques to improve communication. • Speaking (Phonetics), Writing, Reading and Listening, Introduction to Modern Communication Media, Netiquette, Conferencing - Introduction, Importance, Techniques	05
Module-03	Summarization and Comprehension. • Techniques to comprehend and summarize a given technical, scientific or industry oriented text, Questions to test analytical skills and expressions (To test the ability to present the written matter in a brief and concise manner)	03
Module-04	Vocabulary, Grammar and Aptitude test.	03
Module-05	Basic Official Correspondence. • Principles of Correspondence, Language and style in official letters, Formats of letters (Complete block, Modified Block, Semi- Block form), Types of letters (Enquiry, Reply to enquiry, Placing an order, Claim and Adjustments).	08
Module-06	Basic Technical Writing. • Framing definitions, Writing instructions, Types of expositions (description and explanation).	03

Theory Examination:

1. Question paper will comprise of total 7 questions, each of 15 marks.
 2. Only five questions need to be solved.
 3. Question 1 will be compulsory and based on entire syllabus.
 4. Remaining questions will be mixed in nature (for example suppose Q 2 has part (a) from module 3 then part (b) will be from any module other than module 3).
- In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

Tutorials:

- Topics to be assigned for speech practice to test diction, modulation, fluency and non verbal communication.
- Practice for group discussion
- Writing Assignments

Term Work: 25 Marks

Each student to appear for at least one test during the term.

Term work shall consist of graded answer paper of the test and at least 06 hand written assignments (1 assignment per module).

The distribution of term work shall be as follows:

Written test: 10 marks

Assignments: 10 marks

Attendance: 05 marks

Oral Communication

(Only Internal Assessment for oral examination) : 25 marks

10 marks for public speaking

15 marks for Group Discussion.

Recommended Books:

- 1) Business Communication, Lesiker and Petit: Mc Graw- Hill Publications. 1995.
- 2) Communication Skills Handbook, Summers, Wiley India.
- 3) Business Communication (Revised Edition), Rai and Rai, Himalaya Publishing House.
- 4) Business correspondence and report writing, R. C. Sharma and Krishna Mohan, Tata McGraw- Hill, 2002. 3rd edition.
- 5) English for Engineers and Technologists: A skills approach. (Books 1 and 2) Course authors (Humanities and Social Sciences Division, Anna University, Madras). Orient Longman. (Mainly for comprehension).
- 6) Modern Business Correspondence, Mc Commas and Satterwhite; Sixth Edition, Mc Graw- Hill publications.
- 7) Technical Writing and Professional Communications, Huckins, Thomas, Mc Graw- Hill.
- 8) Contemporary Business Communication, Scott Ober, Wiley India.
- 9) Written Communication, Sarah, Orient Longman.

SUBJECT: Engineering Drawing

Periods per week
01 Period of 60 min.

Lecture 3
Practical 4
Tutorial --

Evaluation System

	Hours	Marks
Theory Examination	3	75
Practical	2	50
Oral Examination	--	--
Term Work	--	25
Total	--	150

Details of the Syllabus:-

Sr.No.	Details	Hrs
01	Module 1 Introduction: Drawing Instruments, symbolic lines, letterings, dimensioning systems as per I.S. conventions, geometrical constructions and tangential arcs.	02
02	Module 2 Projections: - Projection of points and lines inclined to both the reference planes including HT and VT - Projection of right regular solids (cube, prism, pyramid, cylinder, and cone) inclined to both HP and VP (excluding spheres, hollow and composite solids). - Development of surface (excluding reverse development)	05 06 03
03	Module 3: Sections: Section of solids(cube, prism, pyramid, cylinder, cone) cut by plane perpendicular to at-least one reference plane(excluding curved cutting planes)	04
04	Module 4: Orthographic projections: - Multi-view orthographic projections of simple machine parts by first angle method as recommended by Indian standards - Sectional views of simple machine parts(full section and half section only) - Reading of orthographic projections(missing views)	04 04 06

Module 5:**Isometric projections:**

Isometric projections/drawings of blocks(plain and cylindrical excluding spheres)

04

Module 6:**• Engineering Curves:**

Parabola, Ellipse, Hyperbola, Cycloid and Involutés

03

Free hand sketches of fasteners

Thread profile – IS conventions of external and internal threads, drilled hole, blind hole and tapped hole

03

Bolts, Nuts, Set screws,

Foundation bolts and locknuts.

Term work:

Term work shall consist of the following:

PART I: Drawing sheet**Five Drawing sheets to be prepared on half imperial drawing sheet:**

(To be completed in 30 Hrs.)

Sheet No 1: Curves (2 problems) and projections of lines (2 problems)

Sheet No 2: Projections of solids (2 problems) and section of solids (1 problem)

Sheet No 3: Orthographic projections (1 problem) and sect. ortho. Projections (1 problem)

Sheet No 4: Reading of orthographic projections (2 problems)

Sheet No 5: Isometric view (2 problems) and free hand sketches of fasteners.

Home-Work: One sketch book, A-3 Size, consisting of minimum 3 problems from each module. Duly signed sketch book is part of term-work.**PART II: Computer Aided Drawing (Auto-CAD)****Practice on Auto-Cad: Theory and practice to be completed during practical sessions.**

Sr. No.	Topic	No of Hours
1	Introduction to Auto-Cad	06
2	Fundamental of 2-D Constructions	04
3	Orthographic projections	06
4	Sectional orthographic projections	06
5	Reading of Orthographic projections	04
6	Fundamental of 3-D drawing Isometric view	04

Printout of problems solved in the practical class to be attached in the Term work (on Sr. No. 3, 4, 5 and 6)

Theory Examination:

- 1 Question paper will comprise of total 7 questions, each of 15 marks
- 2 Only five questions need to be solved
- 3 Question No. 1 will be compulsory
- 4 Remaining questions will be mixed in nature (for example suppose Q 2 has part (a) from module 3 then part (b) will be from any module other than module 3)
- 5 No questions to be asked from Module 1

In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

Practical Examination:

Practical examination will be based on Part II of the Term work (Practice on Auto-Cad).

Term work:

The distribution of marks for term work shall be as follows:

Part I and Part II work (Drawing sheets, Sketch book and Printouts)	: 10 marks
Test (at least one)	: 10 marks
Attendance (Practical and Theory)	: 05 marks.
Total	: 25 marks.

The final certification and acceptance of TW ensures the satisfactory performance of laboratory work and minimum passing in the TW.

Recommended Books:

- 1 Elementary Engineering Drawing, N. D. Bhatt, Charotar Publishing house.
- 2 Mastering AutoCAD, G Omura by Sybers (Autodesk Press), Wiley India.
- 3 Understanding AutoCAD, Sham Tickou, Autodesk Press, Wiley India.
- 4 Machine Drawing, N. D. Bhatt, Charotar Publishing house
- 5 Engineering Drawing , M. B. Shah and B C Rana
- 6 Engineering Graphics with Auto-Cad 2007 by James D. Bethune, 1st Edition, Pearson Education.

University of Mumbai			
CLASS: F.E (All Branches of Engineering)	Semester - II		
SUBJECT: Computer Programming-II			
Periods per week 1Period of 60 min.	Lecture	4 hours	
	Practical	2 hours	
	Tutorial	--	
Evaluation System		Hours	Marks
	Theory Examination	3	100
	Practical &Oral Examination	03	25
	Oral Examination	--	--
	Term Work	--	25
	Total	--	150

Detailed Syllabus: CP-II (Object Oriented Programming in JAVA)

1	Module 1 Introduction to Java - Characterizing Java as a enabler of contemporary software engineering paradigms- as a platform, Simple Programming Environment , Object-Oriented, Platform Independent, Safe ,High Performance, Java is Multi-Threaded , Dynamically linked, Java is Garbage Collected - Saving files on Windows , Compiling and Running - Increment and decrement operators - Print statements , Variables and Data Types , Comments - Command line arguments - Objects , Static Fields , Methods - Passing Arguments to Methods , Returning values from methods	5 hrs
2	Module 2 Primitive Data Types in Java - Java Operators , Literals , Identifiers, key words in Java - Addition of Integers in Java , Multiplication and division in Java - The Remainder or Modulus Operator in Java - Operator Precedence in Java , Mixing Data Types - Converting Strings to Numbers , The char data type in Java - The if , else , else-if statement in Java - The while loop , The for loop, The do while loop in Java - Booleans , Relational Operators , Relational Operator Precedence	15

- Break , Continue, The switch statement in Java
- The? : operator in Java , Logical Operators in Java

Object Oriented Programming

- Constructing objects with new , Methods , Invoking Methods
- Implied this , Member Variables vs. Local Variables
- Passing Arguments to Methods , Returning Multiple Values From Methods , Constructors
- Access Protection , The Four Levels of Access Protection

Module 3

19

Arrays as a Data Structure in JAVA

- Declaring Arrays , Creating Arrays , Initializing Arrays
- System.arraycopy()
- Multi-Dimensional Arrays
- strings
- vectors
- Exceptions
- try-catch
- The finally keyword
- Catching multiple exceptions
- The throws keyword , Throwing Exceptions

Module 4

5

Inheritance

- Inheritance: the superclass
- Multilevel Inheritance
- final and abstract keyword
- Interfaces
- Implementing Interfaces
- Overriding Methods
- Adding Methods
- Subclasses and Polymorphism
- toString() Methods
- Using toString() Methods
- Rules for toString() Methods
- static Members

Module 5

10

Multithreaded programming

- Creating threads, extending the thread class
- Stopping and blocking a thread
- Lifecycle of a thread
- Using thread methods, thread exceptions, thread priority.
- Synchronization
- **The Java Packages & Class Library**
- Wrapping Your Own Packages
- Naming Packages
- Documentation for the class library
- Importing Classes
- Package Imports
- Name Conflicts when importing packages
- The java.lang package
- The hashCode() method of java.lang.Object
- java.lang.Math , java.util.Vector , java.lang.String ,
java.util.Random , java.util.Hashtable java.util.Date ,
java.util.Calendar

6

Module 6

5

HTML

- Attributes , URLs , Links
- **Applet**
- The APPLET Element , Naming Applets
- JAR Archives , The OBJECT Element
- Passing Parameters to Applets
- The Basic Applet Life Cycle , init(), start(), stop(), and destroy()
- The Coordinate System , Graphics Objects , Loading Images
- Code and Document Bases , Drawing Images at Actual Size
- Scaling Images , Color , Fonts

Term work:

Term work shall consist of graded answer paper of the test and at least five take-home assignments. 15 debugged program listing demonstrating Object oriented constructs and concepts. Programs should be debugged (hand written or computer printouts) and should have suitable comments. Each student is to appear for at least one written test (preferably on-line) during the term.

The distribution of term work mark shall be as follows:

Written test (at least one):

Attendance : (Practical and Theory)

10 marks

Documentation of assignments

05 marks

and Debugged program (Laboratory work)

10 marks

Practical Examination: Practical examination will be based on CP-I and CP-II practical conduction.

Recommended Books:

Text books

1. Computing concepts with Java 2 essentials by CAY HORSTMANN, 2 Edition WILEY INDIA ISBN 81-265-0931-7
2. Programming with JAVA A Primer, E Balagurusamy 3rd Edition, Tata McGRAW-Hill, ISBN 0-07-061713-9

Reference books :

- 1 Big Java by CAY HORSTMANN, , 2 Edition , WILEY INDIA ISBN 81-265-0879-5
- 2 The Complete Reference JAVA , Herbert Schildt, Seventh Edition, Tata McGRAW-Hill, ISBN 0-07-063677-X .