DR. A P J ABDUL KALAM UNIVERSITY, INDORE

SYLLABUS

For

DIPLOMA CIVIL ENGINEERING, ELECTRICAL ENGINEERING

(FIRST YEAR, 2nd SEM)

(Session July- December 2016)

College of Polytechnic Engineering

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Diploma Civil Engineering, Electrical Engineering

List of Subject (First Year, 2nd Sem)

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Unit 1: Communication Process and Its Needs*:*

1.1 How to make communication effective, Barriers in communication, Removal of barriers
1.2 Grammar and vocabulary for correct English usage,Determiners, Prepositions, Auxiliary verbs and subject-verb agreement, Rewrite as directed (change voice, correct form of verbs/ tenses), Vocabulary – One word substitution, words often misused and wrongly spelt.

Unit 2: Passages of Comprehension:

2.1 Prescribed passages (six from existing syllabus)
- i Language of Science
- ii Desalination or Desalting Process
- iii Safety Practices
- iv Non-conventional Sources of Energy
- v Our Environment
- vi Entrepreneurship

2.2 Writing summary, moral and characterization of any one story from the book prescribed.

Unit 3: BUSINESS COMMUNICATION (One Question with Internal Choice):

3.1 Principles of effective business correspondence Its parts, mechanics, styles and forms.
3.2 Application for job, Bio-Data and C.V.
3.3 Letter of Enquiry
3.4 Placing order
3.5 Complaint

Unit 4: Composition & Translation:

4.1 Writing paragraphs of 150 words on topics of general interest i.e. pollution, ragging in college, importance of computers, importance of communication skill, importance of science and technology etc.
4.2 Translation (Hindi to English and vice-versa).

Unit 5: Unseen Passages & Precis Writing:

i Answer the questions based on the passage.
ii Give suitable title
OR
iii Writing Precis

References

1. English Conversation Practice - Grant Taylor
2. Practical English Grammar - Thomson & Martinet
3. Communication Skills for Technical Students Book – I, Book – II - M/S Somaiya Publication, Bombay
4. Living English Structure- S. Allen
5. English Grammar, Usage, and Composition - Tickoo & Subramanian, S. Chand & Co. Standard Allen Longman.
6. Essentials of Business Communication - Dr. Rajendra Pal & J.S. Korlahalli S.Chand & Sons, New Delhi.
7. Effective Business Communication - M.V. Rodriques, Concept Pub. Co., New Delhi.
8. Communication for Business - Shirely Taylor, Longman, England.
9. Communication for Engineers and Professors - P. Prasad, S.K.Kataria and sons publications, New Delhi
10. Technical English Book-II, - Somaya Publications, New Delhi

Unit 1: Units & Measurement:

Fundamental and derived units Scalar and vector, Basic requirements to represent vector Symbols, abbreviation, and Proculation Linear measurement by vernier calipers, screw gauge and spherometer Angular measurement by angular vernier.

Unit 2: Motion:

Motion and its type Linear motion Circular motion Angular velocity and relation with linear velocity Centripetal acceleration, Centripetal and Centrifugal forces Rotatory motion, Axis of rotation, Moment of Inertia, Radius of gyration Kinetic energy of rotation Numerica problems and solution on the topic.

Unit 3: Properties of Matter:

Elasticity: Meaning, definition, stress, stain, Hook's law and elastic limit Surface Tension : Meaning, definition, molecular forces, cohesive and adhesive forces, surface energy, capillary rise and capillary rise method. Viscosity : Meaning, definition, stream line and turbulent flow, critical velocity, Stock's law. Numerical problems and solution on the topic.

Unit 4: Heat:

Heat and temperature, concept of heat as molecular motion Transmission of heat, study state and variable state. Concept of heat capacity, specific heat and latent heat. Calorimeter and its uses. Thermodynamics Relation between heat and work Mechanical equivalent of heat First law of thermodynamics and its application Second law of thermodynamics and its application Carnot cycle. Numerical problems and solution on the topic.

Unit 5: Heating Effect of Current And Thermoelectricity:

Heating effect of electric current: Joule's law, work energy and power in electric circuit, calculation of electric energy. Thermo electricity Seeback effect and thermoelectric power. Neutral temperature, temperature of inversion and relation between them Thermo electric thermometer and thermo couples. Numerical problems and solution on the topic.

Unit 6: Optics and Optical Instruments:

Refraction, critical angle and total internal reflection, refraction through lenses and problems, Power of lenses Spherical and chromatic aberrations Simple and compound microscope, telescope and derivation for their magnifying power Numerical problems and solution on the topic.

Unit 7: Electrostatics and Electromagnetic Induction:

Coulomb's law, Electric field intensity, potential. Capacity, principle of capacitor, types of

capacitor, combination of capacitors Electromagnetic Induction: Faraday's law, Lenz's law Self and mutual inductance Transformer and electric motor, Induction coil.

Unit 8: Basic Electronics:

Semiconductors, Types of semiconductors Explanation of conductor, semiconductor and Insulators on the basis of band theory. P-N junction diode as rectifier.

References

1. Applied Physics Vol. 1 & 2 - Saxena and Prabhakar
2. Physics - TTTI Publication
3. Physics Vol. 1 &2 - Halliday and Resnic R
4. Engineering Physics - Gaur and Gupta
5. Principle Of Physics - Brij Lal & Subramanyan
6. Physics for Technical Education - Ls Zednov

List of Experiments

1. Refractive index of prism (I-d) Curve
2. Refractive index of prism (spectrometer)
3. Focal length of a convex lens by u
4. Focal length of a convex lens by displacement method
5. Verification of Ohm's law
6. To find out unknown resistance by meter brid
7. To find out internal radius of hollow tube by vernier calipers.
8. To find out volume of given cylinder by screw gauge.
9. Surface tension by Capillary rise method. Coefficient of viscosity
10. Coefficient of Thermal conductivity by searl's method.
11. Verification of Newton's cooling law.

Sub Code: 203	Sub Name: Chemistry	6 Credits

Unit 1: Atomic Structure and Radioactivity:

Discovery of electron, proton, neutron and nucleus. Rutherford's and Bohr's model of an atom. Bohr Burry scheme of filling the electrons in various orbits. Idea of s, p, d, f orbital. Alfa, Beta and Gamma rays, theory of radio activity, Group displacement law, half life period, numerical problems on half life period, fission and fusion.

Surface Chemistry and Its Application

True solution, colloidal solution and suspension, lyophobic and lyophillic colloids, optical and electrical properties of colloids, coagulation, coagulants, idea about gels and emulsions.

Unit 2: Electrochemistry:

Electrolysis, Faraday's laws of electrolysis, Numerical problems on Faradays Law, electroplating of copper and nickel.

Colligative Properties

Osmosis & osmotic pressure, Relative vapour pressure and Raoult's law. Internal energy (enthalpy), Entropy, Entropy fusion free energy, Effect of change in temperature catalysis.

Unit 3: Chemical Bonding:

Nature of bonds, Electrovalent, Covalent, coordinate and hydrogen bond

Metals and Alloys

Physical and chemical properties of metals, copper, iron, aluminum, tin, nickel, General principle of metallurgy, minerals/ ores, ore dressing, roasting, smelting, bassemerisation, fluxes, purification. Explanation of alloying purposes, methods of alloying, composition and uses of alloy like brass, bronze, duralium, German silver, gun metal, solder, stainless steel, casting and bearing alloy.

Unit 4: Glass, Cement and Refractory

Glass: Basic raw materials for glass, composition and manufacture of glass, varieties of glass and annealing of glass,. Cement: Constituting compounds in cement, Composition of Portland Cement, its manufacture, setting and hardening of cement. Refractories: Meaning, characteristics, use of common refractory materials.

High Polymers, Rubber And Insulators

Polymerization and condensation, classification of plastics, Compounding and Moulding constituents of plastics. Preparation, Properties and uses of PVC, polyethene, polystyrene, polyamides, polyesters, Bakelite. Synthetic fibers–nylon, rayon, decron, and polyesters. Definition characteristics, classification and properties of insulators. Glass, wool and thermocol.

Unit 5: Lubricants, Paints and Varnishes

Lubricants: Meaning, type and theory of lubricants, properties of a good lubricants, Flash and fire point and cloud point, emulsification number, viscosity. Paints and Varnishes: Meaning, ingredients and characteristics of good paints and varnishes, their engineering application.

Fuels, Fire Extinguishers and Explosives

Classification of fuel, gross and net calorific value, Determination of a solid fuel by bomb calorimeter, octane and octane number, Proximate analysis of fuel, its utility, crude petroleum, products of fractional distillation, Fire extinguishers–Description and use, Explosives–Meaning, types, characteristic and use of explosives. Name Dynamite, lead azide, T.N.T., Picric acid.

Reference books –

1. Physical chemistry – Bahl and Tuli
2. Inorganic chemistry – Satyaprakash
3. Modern text book of applied chemistry – Dr. G. C. saxena, Jain prakashan, indore
4. Applied chemistry - Dr. G. C. saxena, Deepak Prakashan, gwalior
5. Applied chemistry – Shrivastava & Singhal, PBS Publication, Bhopal.
6. Engineering chemistry – UPPAL.
7. Engineering chemistry – Rao and Agrawal
8. Engineering chemistry – P.C. Jain
9. Polymer chemistry – O.P. Mishra
10. Applied chemistry – H.N. Sahni, Deepak Prakashan.

List of Experiments

1. Determine the percentage of moisture content in the given coal sample.

2. Determine the change of viscosity of given lubricating oil with Change in temperature by Redwood viscometer No.1.

3. Determine the change of viscosity of given lubricating oil with Change in temperature by Redwood viscometer No.2.

4. Determine the flash & fire point given lubricating oil by able's closed cup apparatus.

5. Determine the type & extent of alkalinity of given sample of water by N/20 HCl (hydrochloric acid when P>1/2 M).

6. Determination of the chloride ions in given water sample by Mohr's method.

7. To determine the strength (in g/L) of the given unknown strength sodium thiosulfate (hypo) solution by a known strength (5.0000 g/L) N/40 standard cupper sulfate solution.

8. To determine the strength (in g/L) of the given unknown strength sodium thiosulfate (hypo) solution by a known strength (5.0000 g/L) N/40 standard cupper sulfate solution.

9. To determine the strength (in g/L) of ferrous ammonium sulfate ($FeSO_4$, $(NH_4)_2SO_4$,$6H_2O$) by titrating it against standard (1.0 g/L) potassium dichromate ($K_2Cr_2O_7$) solution.

10. Determination of iron content in an iron are by titrating it against standard N/20 $K_2Cr_2O_7$ solution using potassium ferricyanide $[K_3Fe(CN)_6]$,H_2SO_4, $FeSO_4$ as an external indicator.

Sub Code: 204	Sub Name: Mathematics	4 Credits

Unit 1: Differential calculus:

Define constant, variable, function., Value of the function, Concept of limit of a function. Definition and concept of differential, coefficient as a limit, Derivatives of sum, difference, product, quotient of two functions., Diff. coeff. of function of a function., differential coefficient of implicit function.

Unit 2: Integral Calculus

Definition as a inverse process of differentiation, Methods of Integration, Integration by parts, breaking up into partial fraction, Concept of Definite Integral.

Unit 3: Trigonometry & Matrix:

Partial Fractions, Define a proper, Break a fraction into partial, Allied angles. Trigonometrical ratios of sum and ,difference of angles, Sum and difference of trigometric ratios ,Multiple angles , Definition of Matrix., Types of Matrix, Row, Column, Square, Unit, Upper and lower triangular, Symmetric , Adjoint of a Matrix., Inverse of a Matrix.

Unit 4: Co-Ordinate Geometry:

Co-ordinate System : Cartesian and Polar., Distance, Division, Area of a triangle., Slope of St. Line, Angle between two , Standard and general equation of St.line,. Point of intersection of two st lines.

Unit 5: Statistics:

Measures of Central tendency (Mean, Mode, Median), Measures of Dispersion (Mean deviation, standard deviation)

Unit 6: Vector Algebra:

Concept of Vector and Scalar Quantities., Different types of vectors. Addition and subtraction of vectors, Components of a vector, Multiplication of two vectors, Scalar Product, Vector Product

Reference

1. Mathematics for Polytechnics Vol. I and II- Prepared by T.T.T.I. Bhopal
2. Differential Calculus- Gorakh Prasad
3. Integral Calculus-Gorakh Prasad
4. Co-ordinate Geometry -S.L. Loni
5. Engineering Mathematics- Dr. S.K. Chouksey
6. Mathematical Statistics- Ray and Sharma
7. Higher Engineering- B.S. Grewal

DETAILED INSTRUCTIONS TO CONDUCT PROFESSIONAL ACTIVITIES:

A. Study hours, if possible should be given greater time slot with a minimum of two hrs/week to a maximum of four hrs/week.

B. This course should be evaluated on the basis of grades and mark sheet of students, should have a separate mention of the grade awarded. There will be no pass/fail in professional activities (PA).

C. Following grade scale of evaluation of performance in PA has been established.

Grades	Level of performance
A	Excellent
B	Good
C	Fair
D	Average
E	Below Expectations

D. Grades once obtained in a particular examination shall become final and no chance of improvement in grades will be given to the students.

E. Assessment of performance in PA is to be done internally by the Institution, twice in a Semester/Term through a simultaneous evaluation of the candidate by a group of three teachers, of the deptt. Concerned. Group of teachers will jointly award the grade to candidate in the assessment. Best of the grades obtained by the student in these two assessments shall be finally taken on the mark sheet of the respective Semester/Term.

Candidate abstaining from the prescribed course work and/or assessment planned at the Institute shall be marked ABSENT in the mark sheet, instead of any grade.

F. While awarding the grades for performance in PA, examining teacher should reach the final consensus based on the attendance, punctuality, interest, presentation skills in seminar on the topic assigned (collection of relevant data, observations, analysis, findings/conclusion) and its written report, awareness of latest developments in the chosen programme of study.

G. Institution shall maintain the record of grades awarded to all the students in PA for a period of 1 year.

H. It shall be mandatory for students to submit a compendium for his PA in the form of a Journal.

I. Compendium shall contain following:

I. Record of written quiz.

II. Report/write up of seminar presented

III. Abstract of the guest lectures arranged in the Institution.

IV. Topic and outcome of the group discussion held.

V. Report on the problems solved through case studies.

VI. Report on social awareness camps (organized for social and environmental prevention).

VII. Report on student chapter activities of professional bodies like ISTE, IE (India), CSI etc.

J. PA is not a descriptive course to be taught in the classroom by a particular teacher. Various activities involved in the achievement of objectives of this course should be distributed to a number of teachers so that the talent and creativity of group of teacher's benefit the treatment of the course content.

These activities should preferably be conducted in English language to maintain continuity and provide reinforcement to skill development.

Small groups shall be formed like in tutorials, group discussion, case studies, seminar, project methods, roll play and simulation to make the development of personality affective.

Treatment of PA demands special efforts, attention, close co-operation and creative instinct on the part of teachers of department concerned. Since this course is totally learner centered, many of the activities planned under this course shall come out from the useful interaction of student, among themselves and with the teachers. The guide teacher/s shall best act as a facilitator of these creative hunts/ exercises, which unfold many of the hidden talents of the students or bring out greater amount of confidence in them, to execute certain activity.