2.1 ENGLISH AND COMMUNICATION SKILLS – II

L	T	P
3	-	2

RATIONALE

Language is the most commonly used medium of self-expression in all spheres of human life – personal, social and professional. A student must have a fair knowledge of English language and skills to communicate effectively to handle the future jobs in industry. The objective of this course is to enable the diploma holders to acquire proficiency, both in spoken (oral) and written language. At the end of the course, the student will be able to develop comprehension skills, improve vocabulary, use proper grammar, acquire writing skills, correspond with others and enhance skills in spoken English. It is expected that each polytechnic will establish a **communication skill laboratory** for conducting practicals mentioned in the curriculum.

DETAILED CONTENTS

1. Facets of Literature (14 hrs)

1.1 Short stories
- 1.1.1 The Portrait of a Lady - Khushwant Singh
- 1.1.2 The Doll's House – Katherine Mansfield
- 1.1.3 The Refugees – Pearl S. Buck

1.2 Prose
- 1.2.1 Walking Tours – R.L. Stevenson
- 1.2.2 A Dialogue on Civilization – C.E.M. Joad
- 1.2.3 The Sign of Red Cross – Horace Shipp

1.3 Poems
- 1.3.1 All The World's A Stage – W. Shakespeare
- 1.3.2 Say Not, The Struggle Nought Availeth – A.H. Clough
- 1.3.3 Pipa's Song – Robert Browning

2. The Art of Précis Writing (04 hrs)

3. Grammar and Usage (08 hrs)

3.1 Narration

3.2 Voice

3.3 Idioms and Phrases

4. Correspondence (04 hrs)

4.1 Business Letters

4.2 Personal letters

5. Drafting (06 hrs)

5.1 Report Writing

5.2 Inspection Notes

5.3 Memos, Circulars and Notes

5.4 Notices

5.5 Press Release

5.6 Agenda and Minutes of Meetings

5.7 Applying for a Job: Forwarding letter, Resume/C.V., follow up.

6. Glossary of Technical & Scientific Terms (04 hrs)

7. Communication (08 hrs)

7.1 Media and Modes of Communication

7.2 Channels of Communication

7.3 Barriers to Communication

7.4 Listening Skills

7.5 Body language

7.6 Humour in Communication

LIST OF PRACTICALS

1. Practice on browsing information from Internet and e-mail
2. Group Discussions
3. Mock Interviews
4. Telephone Etiquette – demonstration and practice
5. Situational Conversation with feedback through video recording

6. Presentation on a given theme (using PowerPoint)
7. Exercises leading to personality development like mannerism, etiquettes, body language etc.
8. Reading unseen passages
9. Writing (developing) a paragraph
10. Exercises on writing notices and telephonic messages

Note:

1. *The Text Book on "English and Communication Skills, Book-II By Kuldip Jaidka et. al. developed by NITTTR, Chandigarh is recommended to be used for teaching & setting-up the question papers.*
2. *A communication laboratory may be set up consisting of appropriate audio-video system with facility of playing CDs/DVDS and a video camera for recording the performance of each student with play back facility. A set of CDs from any language training organization e.g. British Council etc. may be procured for use of students.*
3. *Elements of body language will be incorporated in all practicals*
4. The practical exercises involving writing may also be included in Theory Examination.

RECOMMENDED BOOKS

1. English and Communication Skills, Book-I by Kuldip Jaidka, Alwinder Dhillon and Parmod Kumar Singla, Prescribed by NITTTR, Chandigarh, Published by Abhishek Publication, 57-59, Sector-17, Chandigarh
2. Rich Vocabulary Made Easy by Kuldip Jaidka, Mohindra Capital Publishers, Chandigarh
3. Spoken English (2nd Edition) by V Sasikumar & PV Dhamija; Published by Tata MC Graw Hills, New Delhi.
4. Spoken English by MC Sreevalsan; Published by M/S Vikas Publishing House Pvt. Ltd; New Delhi.
5. Spoken English –A foundation course (Part-I & Part-II) By Kamlesh Sdanand & Susheela Punitha; Published by Orient BlackSwan, Hyderabad
6. Practical Course in English Pronunciation by J Sethi, Kamlesh Sadanand & DV Jindal; Published by PHI Learning Pvt. Ltd; New Delhi.
7. A Practical Course in Spoken English by JK Gangal; Published by PHI Learning Pvt. Ltd; New Delhi.
8. English Grammar, Composition and Usage by NK Aggarwal and FT Wood; Published by Macmillan Publishers India Ltd; New Delhi.

9. Business Correspondence & Report writing (4th Edition) by RC Sharma and Krishna Mohan; Published by Tata MC Graw Hills, New Delhi.
10. Business Communication by Urmila Rani & SM Rai; Published by Himalaya Publishing House, Mumbai.
11. Business Communication Skills by Varinder Kumar, Bodh Raj and NP Manocha; Published by Kalyani Publisher, New Delhi.
12. Professional Communication by Kavita Tyagi & Padma Misra; Published by PHI Learning Pvt. Ltd; New Delhi.
13. Business Communication and Personality Development by Bisiwajit Das and Ipseeta Satpathy; Published by Excel Books, Delhi
14. Succeeding Through Communication by Subhash Jagota; Published by Excel Books, Delhi
15. Communication Skills for professionals by Nira Konar; Published by PHI Learning Pvt. Ltd; New Delhi.
16. Developing Communication Skills (2nd Edition) by Krishna Mohan & Meera Banerji; Published by Macmillan Publishers India Ltd; New Delhi.
17. Effective Technical Communication By M .Ashraf Rizwi; Published by Tata MC Graw Hills, New Delhi.
18. Basic Communication Skills for Technology by Andrea J Rutherfoord; Published by Pearson Education, New Delhi
19. English & Communication Skills for students of Science & Engineering by SP Dhanavel; Published by Orient BlackSwan, Hyderabad.
20. Technical Communication- Principles & Practices by Meenakshi Raman & Sangeetha Sharma; Published by Oxford University Press, New Delhi.
21. Technical English by S. Devaki Reddy & Shreesh Chaudhary; Published by Macmillan Publishers India Ltd; New Delhi.
22. Advanced Technical Communication, by Kavita Tyagi & Padma Misra; Published by PHI Learning Pvt. Ltd; New Delhi.
23. Communication Skills for Engineer & Scientist by Sangeeta Sharma & Binod Mishra; Published by PHI Learning Pvt. Ltd; New Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	14	30
2	4	10
3	8	10
4	4	10
5	6	10
6	4	10
7	8	20
Total	**48**	**100**

GLOSSARY OF TECHNICAL AND SCIENTIFIC TERMS

1.	Absolute	परम, अचर, पूर्ण, स्थिर	مکمل ۔ ساکن
2.	Acceleration	त्वरण, प्रवेग	حرکت ۔
3.	Acid	अम्ल	عمل ۔ تیزاب
4.	Alkaline	क्षारीय, खारा	کھارا
5.	Air Compressor	वायु-संपीडक	ہوا کے دباؤ ۔ ایئرکمپریشر
6.	Air Conditioning	वातानुकूलन	ایئرکنڈیشن ۔
7.	Alignment	सरेखन	ایک لائن میں ۔ ایک سیدھ میں
8.	Alternating Current	प्रत्यावर्ती धारा	تعمیدل کرنٹ ۔ اے سی کرنٹ
9.	Altimeter	ऊंचाई मापने का यंत्र	اونچائی ماپنے کا آلہ
10.	Alum	फिटकरी	پھٹکڑی
11.	Ammeter	अम्मीटर	بجلی کا کرنٹ ماپنے کا آلہ ۔ ایمی میٹر
12.	Ampere	ऐम्पियर	بجلی کی طاقت کو ماپنے کی اکائی ۔ ایمپیئر
13.	Amplication	प्रवर्धन	پروردھن ۔ ایمپلی کیشن
14.	Amplitude	आयाम	آیام ۔ ایمپلی چیوڈ
15.	Angle	कोण	زاویہ ۔ کون
16.	Angular velocity	कोणीय वेग	کونیے ویگ ۔
17.	Angular Momentum	कोणीय संवेग	کونیے سنویگ
18.	Annealing	तापानुशीतन	تاپ انوشیتن ۔ انی لنگ ۔
19.	Anode	अनोड	انوڈ
20.	Apex	शीर्ष, शिखर, शिखाग्र	اونچائی ۔ سب سے اونچا
21.	Apparent	स्पष्ट	صاف
22.	Applied machanics	अनुप्रयुक्त यंत्रिकी	اوپریکٹ آلہ ۔ اپلائیڈ مکینک
23.	Applied Science	अनुप्रयुक्त विज्ञान	اوپریکٹ سائنس ۔ اپلائیڈ سائنس
24.	Archimedes's Principle	आर्किमिडीज़ का सिद्धांत	آرک میڈیز کا اصول ۔
25.	Architecture	वास्तुकला, स्थापत्यकला	تعمیراتی سائنس ۔ تعمیراتی کلا ۔
26.	Armature	आर्मेचर	آرمیچر ۔
27.	Atom	परमाणु	ایٹم
28.	Automatic	स्वचलित	اپنے آپ چلنے والا
29.	Axis	अक्ष	اکش
30.	Axle	धुरी	دھرا ۔ ایکسل ۔

31.	Balance (Scale)	तुला, तराजू	ترازو
32.	Ball Bearing	बाल-बेयरिंग	بال بیرنگ
33.	Bar magnet	छड़-चुम्बक	مقناطیس کا ٹکڑا
34.	Barometer	वायुदाबमापी	ہوا کا دباؤ ماپنے کا آلہ۔ بیرومیٹر
35.	Base	आधार	بنیادی
36.	Base Plate	आधार पट्टिका	بنیادی پلیٹ۔ آدھار پٹکا۔ بیس پلیٹ
37.	Battery	बैटरी	بیٹری
38.	Beaker	बीकर	بی کر
39.	Bending Moment	वंकन आघूर्ण	بینڈنگ مومنٹ جھکنے کی شکتی (طاقت) لچک
40.	Blast Furnace	झोंका भट्टी	بلاسٹ فرنس۔ بلاسٹ بھٹی۔
41.	Bleach	विरंजक	بلیچ۔ وِرنجک
42.	Boiler	उबालक	بوائیلر۔ اُبالنے والا۔ آبالک۔
43.	Bridge	पुल	پل
44.	Burette	ब्यूरेट	بیوریٹ۔ لیبارٹری میں استعمال ہونیوالی شیشے کی نالی۔
45.	Callipers	कैलिपर्स	کیلی پرس۔
46.	Calorie	कैलोरी	کیلوریز۔ خوراک کی طاقت ماپنے کی یونٹ
47.	Canal	नहर	نہر۔
48.	Capacitance	धारिता	کے پے سی ٹنس۔ دھارتا۔
49.	Carburettor	कार्बुरेटर	کاربوریٹر
50.	Cast Iron	ढलवा लोहा	کچا لوہا۔ کاسٹ آئرن
51.	Catalyst	उत्प्रेरक	اُت پریرک۔
52.	Cathode	कैथोड	کے تھوڈ
53.	Centre of Gravity	गुरूत्वाकर्षण-केन्द्र	دھرتی کی طاقت کا مرکز۔
54.	Centrifugal	उपकेन्द्रीय	مرکز سے دور کرنے والا۔ اپ کیندریہ
55.	Centripetal	अभिकेन्द्रीय	مرکز کی طرف لانے والا۔ ابھی کیندریہ
56.	Centroid	केन्द्रीय	مرکزی
57.	C.G.S. System	सी.जी.एस. पद्धति	سی۔جی۔ایس سسٹم
58.	Chemical Action	रासायनिक क्रिया	تیزابی نتیجہ۔
59.	Chain	श्रृंखला, माला	سلسلہ۔ مالا۔
60.	Change of State	अवस्था परिवर्तन	تبدیلیٔ حالات
61.	Characteristics	लक्षण	آثار۔ خوبیاں
62.	Charge (n)	आवेश	آویش۔ چارج بھرنا
63.	Choke	चोक	چوک۔ بجلی کی تیز رَو کو چلانے کیلئے لگایا جانیوالا پرزہ
64.	Chord, Major	गुरू स्वर-संघात	کارڈ میجر۔ لورد سنگھات۔
65.	Chord, Minor	लघु स्वर-संघात	کورڈ مائینر۔ چھوٹا سور سنگھات
66.	Circular	वृत्ताकार, वर्तुल	سرکولر۔ وِرتاکار۔ وِرتل۔ باہر سے جانیوالا

67.	Clock-wise	दक्षिणा वर्त	دائیں ہاتھ چلنے والا۔ دکشن ورت کلاک وائز
68.	Coagulation	स्कंदन	کواگولیشن۔ سکند
69.	Coefficient of Expansion	प्रसार गुणांक	کوایفی شنٹ آف ایکسپنشن۔ پرسارگنک۔ نمبر جو پھیلنے کی پیمائش بتائے
70.	Coil	कुंडली	کوائیل۔ کنڈلی۔
71.	Combustion	दहन	دہن۔
72.	Compass	दिशासूचक	کمپاس۔ اطراف بتانے والا آلہ۔ دِشا سُوچک۔
73.	Compound	यौगिक	کمپاؤنڈ۔ یوگک۔
74.	Concave	अवतल	کن ویو۔ اوتل
75.	Convex	उत्तल	کن ویکس۔ اُتل۔
76.	Concentrated (Solution)	(गाढ़ा, सांद्रित (घोल)	گاڑھا مشرب۔ گھول۔ سولیوشن
77.	Concrete	कंकरीट	کنکریٹ۔ پتھر کا۔
78.	Conduction	चालन	کنڈکشن۔ چالن۔
79.	Conductor	चालक	کنڈکٹر۔ چلانے والا۔
80.	Cone	शंकु	کون۔ شنکو۔
81.	Connection	सम्बंध, जोड़	جوڑ۔ تعلق۔
82.	Constant (Adj.)	स्थिर, अचल, एकसमान	کھڑا۔ ساکن۔ اچل
83.	Convection	संवहन	کنوکشن۔ سنرا ہونا۔ زور نہ ہونا۔ وزن نہ ہونا بات میں
84.	Coulomb	कूलोम (विद्युत शक्ति की इकाई)	طاقت کی اکائی۔
85.	Couple	बल युग्म	کپل۔ بل یگم۔ طاقت یگم
86.	Crane	क्रेन	کرین۔ وزن اٹھانے والی مشین
87.	Crystalline	रवेदार	روے دار۔ کرسٹالائن۔
88.	Dehydrate	निर्जल करना	بغیر پانی کے ہونا۔
89.	Distil	आसहन करना	عرق نکالنا
90.	Effervescence	बुदबुदाहट	بُد بداہٹ
91.	Element	तत्व, मूलतत्व	ایلی منٹ۔ بلب میں چلنے والی تار۔ تتو
92.	Empirical Formula	मूलअनुपाती सूत्र	بنیادی انوپاتی سوتر۔
93.	Equivalent Weight	तुल्यांकी-भार	ہم وزن۔ برابر وزن کا۔
94.	Flame Test	ज्वाला-परीक्षण	فلیم ٹیسٹ۔ آگ کے شعلہ کا ٹیسٹ
95.	Flash Point	प्रज्वलन-ताप	فلیش پوائینٹ۔ آگ کی گرمی
96.	Flask	फ्लास्क	فلاسک۔ پانی کو گرم یا ٹھنڈا رکھنے والی بوتل۔
97.	Spring Balance	कमानी तुला	سپرنگ دار ترازو۔
98.	Soluble	विलयशील	وے شیں۔ سلوایبل
99.	Viscosity	गाढ़ापन	گاڑھا پن
100.	Volumetric Analysis	आयतनी विश्लेषण	آئیتنی موازنہ۔ ولیومیٹرک موازنہ/مقابلہ

2.2. APPLIED MATHEMATICS - II

L	T	P
5	-	-

RATIONALE

Applied mathematics forms the backbone of engineering students. Basic elements of Differential calculus and integral calculus and statistics have been included in this course. This will develop analytical abilities to apply in engineering field and will provide continuing educational base to the students.

DETAILED CONTENTS

1. Differential Calculus (30 hrs)

1.1 Definition of function; Concept of limits.

Four standard limits $\lim_{x \to a} \frac{x^n - a^n}{x - a}$,

$\lim_{x \to 0} \frac{\sin x}{x}$, $\lim_{x \to 0} \frac{a^x - 1}{x}$, $\lim_{x \to 0} (1+x)^{1/x}$

1.2 Differentiation by definition of x^n, sin x, cos x, tan x, e^x, $\log_a x$ only

1.3 Differentiation of sum, product and quotient of functions. Differentiation of function of a function.

1.4 Differentiation of trigonometric inverse functions . Logarithmic differentiation. Exponential differentiation Successive differentiation (excluding nth order).

1.5 Applications:

(a) Maxima and minima

(b) Equation of tangent and normal to a curve (for explicit functions only) – Simple problems only

2. Integral Calculus (30 hrs)

2.1 Integration as inverse operation of differentiation

2.2 Simple integration by substitution, by parts and by partial fractions (for linear factors only)

2.3 Evaluation of definite integrals (simple problems)-

Evaluation of $\int_0^{\pi/2} \sin^n x.\, dx$, $\int_0^{\pi/2} \cos^n x\, dx$, $\int_0^{\pi/2} \sin^m x \cos^n x\, dx$

using formulae without proof (m and n being positive integers only)

3 Ordinary Differential Equations (10 hrs)

3.1. Definition and formation of Differential Equations

3.2. Solution of first order Differential Equations of the type:

(i) Variable separable form

(ii) Homogeneous Differential Equations

(iii) Linear Differential Equations

4. Statistics (10 hrs)

4.1 Measures of Central Tendency: Mean, Median, Mode
4.2 Measures of Dispersion: Mean deviation, Standard deviation

RECOMMENDED BOOKS

1. Elementary Engineering Mathematics by BS Grewal, Khanna Publishers, New Delhi.
2. Applied Mathematics –II by Dr. Sunita Rani Jain, Abhishek Publishers, Chandigarh
3. Engineering Mathematics by Vol. I & II by S Kohli, IPH, Jalandhar
4. Applied Mathematics by Dr. RD Sharma
5. Applied Mathematics, Vol. I & II by SS Sabharwal & Sunita Jain, Eagle Parkashan, Jalandhar
6. Comprehensive Mathematics, Vol. I & II by Laxmi Publications
7. Engineering Mathematics by Dass Gupta
8. Engineering Mathematics by C Dass Chawla, Asian Publishers, New Delhi
9. Comprehensive Mathematics, Vol. I & II by Laxmi Publications
10. Engineering Mathematics, Vol I, II & III by V Sundaram et.al, Vikas Publishing House (P) Ltd., New Delhi

10. Engineering Mathematics by N.Ch.S.N Iyengar et.al, Vikas Publishing House (P) Ltd., New Delhi

11. Engineering Mathematics, Vol I & II by SS Sastry, Prentice Hall of India Pvt. Ltd.,
12. Engineering Mathematics, Vol I & II by AK Gupta, Macmillan India Ltd., New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	30	35
2	30	40
3	10	10
4	10	15
Total	**80**	**100**

2.3 APPLIED PHYSICS – II

L T P
4 - 2

RATIONALE

Applied physics includes the study of a large number of diverse topics related to things that go in the world around us. It aims to give an understanding of this world both by observation and prediction of the way in which objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology

DETAILED CONTENTS

1. Optics (10 hrs)

   1.1 Review of basic optics laws: reflection and refraction

   1.2 Refraction and refractive index, image formation in lenses, image magnification, lens formulae (thin lens only), power of lens, total internal reflection and their applications

   1.3 Simple and compound microscope, astronomical telescope, magnifying power and its calculation (in each case), Terrestrial and Galileo's telescope (Concept only) and their applications

2. Electrostatics (12 hrs)

   2.1 Coulombs law, unit of charge, electric potential and electric potential difference

   2.2 Electric field, electric field intensity, electric lines of force, electric flux Gauss's Law

   2.3 Applications of Gauss law in finding electric field of point charge, straight charged conductor, plane charged sheet and between two plane parallel charged sheets

   2.4 Capacitance, types of capacitors, capacitance of parallel plate capacitor, series and parallel combination of capacitors, Dielectric and its effect on capacitance, and dielectric break down

   2.5 Application of electrostatics in electrostatic precipitator

3. DC Circuits (12 hrs)

   3.1 Concept of electricity, current and its units, direct and alternating current, voltage, resistance, potential difference and e.m.f,

3.2 Ohm's law and its applications, concept of resistance, conductance, specific resistance, effect of temperature on resistance, co-efficient of resistance, series and parallel combination of resistors, introduction to super conductivity.

3.3 Kirchhoff's laws, Wheatstone bridge principle and its applications (Slide Wire Bridge)

3.4 Heating effect of current and concept of electric power, energy and their units, related numerical problems

3.5 Application of electricity in various equipments, advantages of electrical energy over other forms of energy

4. Electromagnetism (13 hrs)

4.1 Magnetic field and its units, magnetic intensity, magnetic lines of force, magnetic flux and their units, Right hand thumb rule, magnetic lines of force due to straight conductor, circular coil and solenoid

4.2 Force on a charge, moving in a uniform magnetic field (Lorentz force). Force on a current carrying straight conductor. Torque on a current carrying rectangular coil.

4.3 Moving coil galvanometer conductor, its principle, construction and working, conversion of a galvanometer into ammeter and voltmeter.

4.4 Electromagnetic induction, Faradays Laws, Lenz's Law.

4.5 Applications of Electromagnetism

5. Semiconductor physics (07 hrs)

5.1 Energy bands, intrinsic and extrinsic semiconductors, p-n junction diode and its characteristics

5.2 Diode as rectifier – half wave and full wave rectifier, semiconductor transistor pnp and npn (concept only)

6. Modern Physics (10 hrs)

6.1 Electro magnetic spectrum, photo electric effect and work function, X rays - properties, production and their applications in medicine and industries.

6.2 Lasers: concept of energy levels, ionizations and excitation potentials; spontaneous and stimulated emission; lasers and its characteristics, population inversion, types of lasers, Helium- Neon and ruby lasers, their engineering and medical applications

6.3 Fibre optics: introduction to optical fiber materials, types, light propagation and applications in communication.

LIST OF PRACTICALS (To perform minimum eight experiments)

1. To find the focal length of convex lens by displacement method.
2. To determine the magnifying power of an astronomical telescope
3. Conversion of Galvanometer into an Ammeter of given range.
4. Conversion of Galvanometer into Voltmeter of given range.
5. To verify ohm's laws by drawing a graph between voltage and current.
6. To verify laws of resistances in series and in parallel connection.
7. To find resistance of galvanometer by half deflection method
8. To measure very low resistance and very high resistance using Wheat Stone bridge
9. To find the time constant of a capacitor
10. To draw characteristics of a pn junction diode and determine knee and break down voltages
11. To find wave length of He Ne semiconductor laser.

INSTRUCTIONAL STATREGY

Teacher may use various instructional media like models, charts and graphs while imparting instructions. The field application should be made clear before teaching the basics of waves, sound, light, electrostatics, dc circuits, electromagnetism, and semiconductor physics etc to develop proper understanding of the physical phenomenon. Use of demonstration can make the subject interesting and develop scientific temper in the students.

RECOMMENDED BOOKS

1. Text Book of Physics for Class XI (Part-I, Part-II) N.C.E.R.T
2. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi
3. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
4. Fundamentals of Physics by Resnick, Halliday and Walker, Asian Book Pvt. Ltd., New Delhi
5. Fundamentals of Optics by Francis A. Jenkins & Harvey E White, McGraw Hill International Editions, Physics Series
6. A Text Book of Optics, Subramanian and Brij Lal, S Chand & Co., New Delhi
7. Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publishers

8. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
9. Applied Physics I & II by RA Banwait & R Dogra, Eagle Parkashan, Jalandhar
10. Applied Physics Vol II by Jasmer Kaur and Bhupinder Singh, Lords Publications, Jalandhar
11. Basic Electronics and Linear Circuits by NN Bhargava et al Tata Mc Graw Hill Publishers, New Delhi
12. Principles of Electronics by SK Sahdev, Dhanpat Rai and Co, New Delhi
13. Engineering Physics by Vanchna Singh and Sheeetal Kumar, Cengage Learning India Pvt. Ltd. Patparganj, Delhi (year 2008)

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING PAPER SETTER

Sr No	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	Optics	10	15
2	Electrostatics	12	20
3	DC Circuits	12	20
4	Electromagnetism	13	20
5	Semiconductor Physics	07	10
6	Modern Physics	10	15
	Total	**64**	**100**

2.4 APPLIED CHEMISTRY-II

L T P
3 - 2

RATIONALE

The role of chemistry in every branch of engineering and technology is expanding greatly. Now a days, various chemical products are playing important role in the field of engineering with increasing number of such products each successive years. The strength of materials, the chemical composition of substances, their behaviour when subjected to different treatment and environment, and the laws of heat and dynamic energy have entered in almost every activity of modern life. Chemistry is considered as one of the core subjects for diploma students in engineering and technology for developing in them scientific temper and appreciation of chemical properties of materials, which they have to handle in their professional career. Effort should be made to teach this subject through demonstrations/ minor projects and with the active involvement of students.

Note:- Teachers should give examples of engineering/technology applications of various concepts and principles in each topic so that students are able to appreciate learning of these concepts and principles.

DETAILED CONTENTS

1. Metallurgy
(08 hrs)

A brief introduction of the terms: Metallurgy (types), mineral, ore, gangue or matrix, flux, slag, concentration (methods of concentrating the ores), ore, roasting, calcinations, smelting and refining of metal.

Metallurgy of (i) Aluminium (ii) Iron

Definition of an alloy, purposes of alloying, composition, properties and uses of alloys-brass, bronze, monel metal, magnalium, duralumin, alnico, stainless steel and invar.

2. Fuels
(10 hrs)

2.1 Definition of a 'Fuel', characteristics of a good fuel and classification of fuels with suitable examples

2.2 Definition of Calorific value of a fuel and determination of calorific value of a solid fuel with the help of Bomb calorimeter. Simple numerical problems based upon Bomb-calorimeter method of finding the Calorific values

2.3 Brief description of 'Proximate' and 'Ultimate' analysis of a coal. Importance of conducting the proximate and ultimate analysis of a fuel

2.4 Merits of gaseous fuels over those of other varieties of fuels

2.5 Manufacture, composition, properties and uses of (i) Water gas (ii) Oil gas (iii) Biogas

2.6 Composition, calorific values and applications of (i) LPG (ii) CNG (iii) Power alcohol

2.7 Fuel rating

2.7.1 Octane number for petrol
2.7.2 Cetane number for diesel

3 Corrosion
(06 hrs)

3.1 Definition of corrosion

3.2 Theories of corrosion i.e. (i) direct chemical action theory and (ii) electro chemical theory

3.3 Passivity

3.4 Prevention of corrosion by
1. (a) Alloying
   (b) Providing metallic coatings
2. Cathodic protections:
   (a) Sacrificial
   (b) Impressed voltage method
3. Heat treatment (quenching, annealing, tempering & normalizing)

4 Lubricants
(06 hrs)

4.1 Definition of (i) lubricant (ii) lubrication

4.2 Classification of lubricants

4.3 Principles of lubrication
(i) fluid film lubrication
(ii) boundary lubrication
(iii) extreme pressure lubrication

4.4 Properties of lubricants

4.4.1 Physical properties: viscosity, viscosity index, flash-point, fire-point, cloud-pour point, oiliness, volatility, emulsification

4.4.2 Chemical properties-Total acidity number (TAN) saponification and iodine value, coke number and aniline point.

5 Glass
(04 hrs)

5.1 Glass: Chemical composition, types of glasses and their applications

5.2 Manufacture of ordinary glass and lead glass

6. Classification and Nomenclature of Organic Compounds
(06 hrs)

Classification of Organic Compounds, functional group, Homogolus Series, IUPAC-Nomenclature of various homogolous series i.e. alcohols, aldehydes, ketones, carboxylic acids, and phenols.

7. Polymers & Plastics
(08 hrs)

7.1 Definition of polymer, monomer & degree of polymerization
7.2 Brief introduction of addition & condensation polymers with suitable examples (PVC, Polyester, Teflon, Nylon 66, Bakelite)
7.3 Definition of plastic & type of plastics (thermo & thermo setting plastics) with suitable examples
7.4 Applications of polymers & plastics in daily life.

LIST OF PRACTICALS

1. Gravimetric analysis and study of apparatus used
2. To determine the percentage composition of a mixture consisting of a volatile and a non-volatile substances
3 Determine the viscosity of a given oil with the help of "Redwood viscometer"
4 Determine the flash point of the given oil with the help of Abel's Flash Point Apparatus
5 Estimate the amount of moisture in the given sample of coal
6 Estimate the amount of ash in the given sample of coal
7 Electroplate the given strip of Cu with Ni
8 Confirmation test of alcohol, aldehydes, carboxylic acid, amine
9 To determination the total acidity number of a lubricant
10 Detection of metal iorn in the rust (solution of rust in concentrated HCl may be given
11 To prepare Bakelite
12 To study the effect of metal coupling on corrosion of metals

INSTRUCTIONAL STATREGY

Teacher may take help of various models and charts while imparting instructions to make the concepts clear. More emphasis may be laid on discussing and explaining practical applications of various chemical processes and reactions. In addition, students should be encouraged/motivated to study those processes in more details, which may find practical applications in their future professional life.

RECOMMENDED BOOKS

1. Chemistry in Engineering by J.C. Kuriacose and J. Rajaram; Tata McGraw-Hill Publishing Company Limited, New Delhi
2. Engineering Chemistry by Dr. S. Rabindra and Prof. B.K. Mishra ; Kumar and Kumar Publishers (P) Ltd. Bangalore-40
3. A Text Book of Applied Chemistry-I by SS Kumar; Tata McGraw Hill, Delhi
4. Progressive Applied Chemistry –I and II by Dr. G.H. Hugar; Eagle Prakashan, Jalandhar
5. Engineering Chemistry by Jain PC and Jain M Dhanpatrai publishers. New Delhi
6. Chemistry of Engineering by Aggarwal CV
7. Chemistry for Environmental Engineers by Swayer and McCarty, McGraw Hill, Delhi
8. A Text Book of Applied Chemistry-I by Sharma and Others; Technical Bureau of India, Jalandhar

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	08	16
2	10	20
3	06	14
4	06	14
5	04	08
6	06	12
7	08	16
Total	**48**	**100**

2.5 BASICS OF INFORMATION TECHNOLOGY

L	T	P
-	-	4

RATIONALE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. Almost all work places and living environment are being computerized. The subject introduces the fundamentals of computer system for using various hardware and software components. In order to prepare diploma holders to work in these environments, it is essential that they are exposed to various aspects of information technology such as understanding the concept of information technology and its scope; operating a computer; use of various tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

Note:

Explanation of Introductory part should be dovetailed with practical work. Following topics may be explained in the laboratory along with the practical exercises. There will not be any theory examination.

TOPICS TO BE EXPLAINED THROUGH DEMONSTRATION

1. Information Technology – its concept and scope, applications of IT, ethics and future with information technology
2. Impact of computer and IT in society.-- Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more
3. Generations of computer, block diagram of a computer, CPU, memory, data – numeric data, alpha numeric data; program, processing of data.
4. Computers for information storage, information seeking, information processing and information transmission, computer organization, computer hardware and software; primary and secondary memory: RAM, ROM, PROM etc. Input devices; keyboard, mouse, scanner, etc ; output devices ; VDU and Printer(Impact and non-Impact printers), Plotter etc. Primary and Secondary Storage (Auxiliary Storage), Secondary storage; magnetic disks – tracks and sectors, optical disk (CD, CD-RW and DVD Memory)
5. Introduction to Operating Systems such as MS-DOS and Windows, difference between DOS and Windows
6. Basics of Networking – LAN, MAN,WAN, Topologies

LIST OF PRACTICALS

1. Identify and list functions of various components and peripherals of given computer.
2. Installation of operating system viz. * Windows XP, *Windows 2007 etc.
3. Installing a computer system by giving connection and loading the system-software and application software and various sources to install software
4. Exercises on entering text and data (Typing Practice)

Features of Windows as an operating system

- Start , shutdown and restore
- Creating and operating on the icons
- Opening, closing and sizing the windows
- Using elementary job commands like – creating, saving, modifying, renaming, finding and deleting a file , creating and operating on a folder
- Introduction to all properties such as changing settings like, date, time, colour (back ground and fore ground)
- Using short cuts

5. Word Processing (MS Office/Open Office)

File Management:

- Opening, creating and saving a document, locating files, copying contents in some different file(s),

Editing a document:

- Entering text, Cut, copy, paste using tool- bars

Formatting a document:

- Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods
- Aligning of text in a document, justification of document ,Inserting bullets and numbering
- Formatting paragraph, inserting page breaks and column breaks, line spacing
- Use of headers, footers: Inserting footnote, end note, use of comments
- Inserting date, time, special symbols, importing graphic images, drawing tools

Tables and Borders:

- Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting a row in a table
- Print preview, zoom, page set up, printing options
- Using Find, Replace options

6. Spread Sheet Processing (MS Office/Open Office)

Starting Excel

- open worksheet, enter, edit, data, formulae to calculate values, format data, create chart, printing chart, save worksheet, switching between different spread sheets

Menu commands:

- Create, format charts, organize, manage data, solving problem by analyzing data, creating graphs

Work books:

- Managing workbooks (create, open, close, save), working in work books, Editing a worksheet:

- copying, moving cells, pasting, inserting, deletion cells, rows, columns, find and replace text, numbers of cells, formatting worksheet

Creating a chart:

- Working with chart types, changing data in chart, formatting a chart, use chart to analyze data

- Using a list to organize data, sorting and filtering data in list

Formulas:

Addition, subtraction, division, multiplication, percentage and auto sum

7. PowerPoint Presentation (MS Office/Open Office)

a) Introduction to PowerPoint
   - How to start PowerPoint
   - Working environment: concept of toolbars, slide layout, templates etc.
   - Opening a new/existing presentation
   - Different views for viewing slides in a presentation: normal, slide sorter etc.

b) Addition, deletion and saving of slides

c) Insertion of multimedia elements
   - Adding text boxes, importing pictures, movies and sound, tables and charts etc.

d) Formatting slides
   - Text formatting, changing slide layout, changing slide colour scheme
   - Changing background, Applying design template

e) How to view the slide show?
   - Viewing the presentation using slide navigator, Slide transition

- Animation effects etc.

8. Working with Data Processing (MS Office/Open Office)

   a) Understanding different data types

   b) Creation of table, entering data in a table and modify it.

   c) Retrieve data with query:

      - Create a pivot table, customizing a pivot table, statistical analysis of data
      - Exchange data with other application: embedding objects, linking to other applications, import, export document.

9. Internet and its Applications

   a) Log-in to internet, introduction to search engine

      Browsing and down loading of information from internet

   b) Creating E-Mail Account

      - Log in to e-mail account and Log out from e-mail account

   c) Managing E mail

      - Creating a message
      - sending, receiving and forwarding a message
      - attaching a file
      - Deleting a message

INSTRUCTIONAL STRATEGY

Since this subject is practice oriented, the teacher should demonstrate the capabilities of computers to students while doing practical exercises. The students should be made familiar with computer parts, peripherals, connectors etc. and proficient in making use of MS Office/Open Office in addition to working on internet. The student should be made capable of working on computers independently. This subject should by taught with the help of LCD projector, while teaching a group.

RECOMMENDED BOOKS

1. Fundamentals of Computer by E Balagurusamy,Tata McGraw Hill Education Pvt Ltd , New Delhi
2. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
3. Computers Fundamentals Architecture and Organisation by B Ram, revised Edition, New Age International Publishers, New Delhi
4. Fundamentals of Computer by Sumita Arora by Dhanpat Rai and Co , New Delhi
5. Computers Today by SK Basandara, Galgotia Publication Pvt ltd. Daryaganj, New Delhi.

6. Internet for Every One by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
7. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
8. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
9. Fundamentals of Information Technology by Leon and Leon;Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
10. Fundamentals of Information Technology by Vipin Arora, Eagle Parkashan, Jalandhar
11. Basics of Information Technology, by Ishan Publications, Ambala
12. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd , New Delhi

2.6 BASIC MICROBIOLOGY

L	T	P
3	-	2

RATIONALE

The main objectives of this subject is to develop knowledge and skills in the students in the following major areas:

a) the nature of micro-organisms found in food
b) techniques to assess the growth of micro-organisms
c) nature of useful micro-organisms
d) techniques to identify the micro-organisms

The basic knowledge and skills about these aspects are essential to understand others subject areas and for the application of microbiological considerations required in the food preservation and processing technology.

DETAILED CONTENTS

1. **Introduction** (16 hrs)

Classification of living system: Whittaker's five Kingdom concept. Definition of Microbiology. Historical Developments in Microbiology. Classification of microorganisms (Unicellular, Multicellular, Prokaryotes, Eukaryotes). Cell and cell organelles (including ribosomes, mitochondria, endoplasmic reticulum, vacuoles, etc) – their functions

2. **Pure Culture** (8 hrs)

Streak plating, pour plating, spread plating, serial dilution technique, Isolation and preservation – lyophilization, slant method, liquid nitrogen method

3. **Microbial Growth** (8 hrs)

Growth curve and its different phases, Synchronous growth, factors affecting microbial growth, generation time-their significance

4. **Bacteria** (8 hrs)

Structure size and shape. Types depending upon different requirements. Gram positive and negative bacteria. Mode of reproduction.

5. **Fungi** (8 hrs)

Yeast and moulds –structure: their growth requirements, mode of reproduction, its importance.

LIST OF PRACTICALS

1. Study of microscope
2. Study of yeast under Microscope
3. Study of moulds under Microscope.
4. Study of bacteria under microscope
5. Size determination of microorganisms under microscope
6. Media preparation for fungi
7. Media preparation for bacteria
8. Preparation of glass-wares for sterilization.
9. Methods of sterilization-dry heat and moist heat
10. Aseptic transfer of culture
11. Enumeration of bacteria in the media by pour plating, spread plating and streaking techniques
12. Measurement of cell number in a culture

13. Simple staining of bacteria

14. Differential staining: Gram staining of bacteria.

15. Capsule staining

16. Spore Staining

Note: Teachers should make use of charts and other appropriate media to support classroom instruction. Emphasis during the practical session should be on performance by individual students and teacher should develop instructional manual for various exercises to facilitate the students. Visits to some of the local industries and quality control centers may be arranged to demonstrate various aspects of basic microbiology to the students. Experts may be invited to deliver lectures on latest developments in the field.

RECOMMENDED BOOKS

1. Essentials of Microbiology by K.S. Bilgrami, CBS

2. Food Microbiology by W.C. Frazier: Tata Mc Graw Hill

3. Modern Food Microbiology by James M. Jay; CBS

4. Bacteriology by Salle

5. Basic Food Microbiology; Bannett Chapmen and Hall

6. Standard Methods for Waste Water Analysis – American Public Health Association (APHA)

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	32
2	8	16
3	8	18
4	8	18
5	8	16
Total	**48**	**100**