

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

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| 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, Alwainder 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 & 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 Bsiwajit 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 Rutherford; 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	04	10
3	08	10
4	04	10
5	06	10
6	04	10
7	08	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 - ایرکمپریشر
6. Air Conditioning	वातानुकूलन	ایئر کنڈیشن
7. Alignment	सरेखन	ایک لائن میں - ایک سیدھ میں
8. Alternating Current	प्रत्यावर्ती धारा	تعمیرل کرٹ - لے سی کرٹ
9. Altimeter	ऊंचाई मापने का यंत्र	اُونچائی ماپنے کا آلہ
10. Alum	फिटकरी	پھٹکڑی
11. Ammeter	अम्मीटर	بجلی کا کرٹ ماپنے کا آلہ - ایلمی میٹر
12. Ampere	ऐम्पियर	بجلی کی طاقت کو ماپنے کی اکائی - ایمپیر
13. Amplification	प्रवर्धन	پرو دھن - ایمپلی کیشن
14. Amplitude	आयाम	ایام - ایمپلسی چوڑ
15. Angle	कोण	زاویہ - کون
16. Angular velocity	कोणीय वेग	کونییے ویگ
17. Angular Momentum	कोणीय संवेग	کونییے سنویگ
18. Annealing	तापानुशीतन	تاپ اوشیتن - ائی ٹنگ
19. Anode	अनोड	انود
20. Apex	शीर्ष, शिखर, शिखाग्र	اُونچائی - سب سے اُونچا
21. Apparent	स्पष्ट	صاف
22. Applied mechanics	अनुप्रयुक्त यंत्रिकी	انوپریکٹ آلہ - اپلائیڈ میکینک
23. Applied Science	अनुप्रयुक्त विज्ञान	انوپریکٹ 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	آر میچر
27. Atom	परमाणु	ایٹم
28. Automatic	स्वचलित	اپنے آپ چلنے والا
29. Axis	अक्ष	اکس
30. Axle	धुरी	دھرا - ایکسل

31. Balance (Scale)	تولنا، ترازو	ترازو
32. Ball Bearing	بال-بیرنگ	بال بیرنگ
33. Bar magnet	छड़-चुम्बक	مقتضایس کا ٹکڑا
34. Barometer	वायुदाबमापी	ہوا کا دباؤ ماپنے کا آلہ۔ بیرومیٹر
35. Base	आधार	بنیادی
36. Base Plate	आधार पट्टिका	بنیادی پلیٹ۔ آڈیا ریڈنگ کا۔ بیس پلیٹ
37. Battery	बैटरी	بیٹری
38. Beaker	बीकर	بی کپ
39. Bending Moment	वंकन आधून	بنڈنگ مومینٹ (بھکنے کی شکتی طاقت) چوک
40. Blast Furnace	झोंका भट्टी	بلاسٹ فرنس۔ بلاسٹ بھٹی۔
41. Bleach	विरंजक	بلیچ۔ درنجک
42. Boiler	उबालक	بوائلر۔ اُبالنے والا۔ اُبالک۔
43. Bridge	पुल	پل
44. Burette	ब्यूरेट	بیوریٹ۔ لیبارٹری میں استعمال ہونے والی شیشے کی تالی۔
45. Callipers	कैलिपर्स	کیلیپرس۔
46. Calorie	कैलोरी	کیلو ریڈ۔ حرارت کی طاقت ماپنے کی یونٹ
47. Canal	नहर	نہر۔
48. Capacitance	धारिता	کے پے سی ٹنس۔ دھارتا۔
49. Carbuirettor	कार्बुरेटर	کاربوریٹر
50. Cast Iron	ढलवा लोहा	کچی لوہا۔ کاسٹ آئرن
51. Catalyst	उत्प्रेरक	آٹ پریٹرک۔
52. Cathode	कैथोड	کے کٹھوڈ
53. Centre of Gravity	गुरुत्वाकर्षण-केन्द्र	دھرتی کی طاقت کا مرکز۔
54. Centrifugal	उपकेन्द्रीय	مرکز سے دور کرنے والا۔ آپ کینڈریہ
55. Centripetal	अभिकेन्द्रीय	مرکز کی طرف لانے والا۔ ابھی کینڈریہ
56. Centroid	केन्द्रीय	مرکزنی
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	تبدیلی حالات
61. Characteristics	लक्षण	آثار۔ خصوصیات
62. Charge (n)	आवेश	آویش۔ چارج بھرنے
63. Choke	चोक	چوک۔ بسلی کی ٹیوب کو چلانے کیلئے دگایا جانے والا پڑزہ
64. Chord, Major	गुरू स्वर-संघात	کارڈ میجر۔ نورڈ سونگھات۔
65. Chord, Minor	लघु स्वर-संघात	کارڈ مائنر۔ چھوٹا سونگھات
66. Circular	वृत्ताकार, वर्तुल	اسرکولر۔ ورتا کار۔ ورتل۔ باہر سے چائے والا

67. Clock-wise	دائیں ہاتھ چلنے والا۔ دکشن ورت کلاک دائیں
68. Coagulation	کوآلیشن۔ سکند
69. Coefficient of Expansion	کوآلیشن شدت آف ایکشن۔ پراسارنگ۔ نمبر پیلے نمبر تک لیا گیا نمبر گونا گونا
70. Coil	کوآیل۔ کٹڈلی۔
71. Combustion	دھن۔
72. Compass	کمپاس۔ اطراف بتانے والا آلہ۔ دشا سوچک۔
73. Compound	کمپاؤنڈ۔ یوگک۔
74. Concave	کن وایو۔ اول
75. Convex	کن ویکس۔ اتل۔
76. Concentrated (Solution)	گاڑھا مشرب گھول۔ سولیوشن
77. Concrete	کنکریٹ۔ پتھر کا۔
78. Conduction	کنڈکشن۔ چالن۔
79. Conductor	کنڈکٹر۔ چلانے والا۔
80. Cone	کون۔ شنگو۔
81. Connection	جوڑ۔ تعلق۔
82. Constant (Adj.)	کنسٹنٹ۔ ساکن۔ اچھل
83. Convection	کنوکشن۔ سزا ہوتا۔ زور نہ ہونا۔ وزن نہ ہونا بات میں
84. Coulomb	کولوم (विद्युत शक्ति की इकाई)
85. Couple	کوپل۔ بل یوگ۔ طاقت یوگ
86. Crane	کرین۔ وزن اٹھانے والی مشین
87. Crystalline	کرستلین۔ روئے دار کرستلین۔
88. Dehydrate	دہائیڈریشن۔ پانی کے ہونا۔
89. Distil	ڈسٹیل۔ عرق نکالنا
90. Effervescence	ایفیرسینس۔ بیدار ہٹ
91. Element	ایلیمنٹ۔ بلب میں چلنے والی تار۔ توتو
92. Empirical Formula	ایمپیریکیل فورمولا۔ بنیادی نوپائی سوئزر۔
93. Equivalent Weight	ایکویولینٹ ویت۔ برابر وزن کا۔
94. Flame Test	فلیم ٹیسٹ۔ آگ کے شعلہ کا ٹیسٹ۔
95. Flash Point	فلش پوائنٹ۔ آگ کی گرمی
96. Flask	فلاسک۔ پانی کو گرم یا ٹھنڈا رکھنے والی بوتل
97. Spring Balance	سپرنگ بالینس۔ ارتزازو۔
98. Soluble	سولیبل۔ وٹیل۔
99. Viscosity	ویسکوسٹی۔ گاڑھا پن
100. Volumetric Analysis	اولیومیک مورالز۔ ویلیومیک مورالز / مقابہ

2.2 ORGANIC CHEMISTRY

L T P
3 - 2

RATIONALE

Diploma holders in Medical Laboratory Technology are supposed to know about the chemical properties of various materials. For this purpose, it is essential that they should be equipped with knowledge and skill covering topics like solutions, acids, bases and salts, electrolytes, ionization, organic chemistry such as hydrocarbons, alcohols, ethers, carbohydrates, lipids, proteins and enzymes etc., so as to enable them to perform various activities in a medical laboratory effectively.

DETAILED CONTENTS

1. Organic chemistry (02 hrs)
 - 1.1 Introduction and importance of organic compounds
 - 1.2 Comparison of organic and inorganic compounds
 - 1.3 Properties of carbon and Hydrogen

2. IUPAC Nomenclature of organic compounds (04 hrs)
 - 2.1 Hydrocarbons
 - 2.2 Alcohols and Ethers
 - 2.3 Aldehydes and Ketones
 - 2.4 Carboxylic Acids

3. Hydrocarbons (06 hrs)
 - 3.1 Preparation, properties and uses of saturated hydrocarbons
 - 3.2 Preparation, properties and uses of unsaturated hydrocarbons
 - 3.3 Sources of hydrocarbons
 - 3.4 Preparation, properties and uses of Halogen derivatives of hydrocarbons

4. Alcohols and ethers (05 hrs)

General introduction, classification, preparation and properties and uses of:

 - 4.1 Methyl alcohol, Ethyl alcohol and glycerol
 - 4.2 Diethyl ether

5. Aldehydes and ketones (05 hrs)
- General introduction, classification, preparation, properties and uses of:
- 5.1 Methanal and ethanal
 - 5.2 Propanone
 - 5.3 Amines:
 - a) Structure of amines groups (primary, secondary and tertiary)
 - b) Important methods, preparation and properties
6. Carboxylic Acids (05 hrs)
- General Introduction, classification, preparation, properties and uses of :
- 6.1 Methanoic acid
 - 6.2 Ethanoic acid
7. Carbohydrates (06 hrs)
- 7.1. Definition
 - 7.2. Optical Activity and mutarotation
 - 7.3. Composition and sources
 - 7.4. Classification
 - 7.5. Reactions
 - 7.6. Important monosaccharides, disaccharides, polysaccharides
 - 7.7. Breakage of glucose, fructose, galactose , lactose, maltose
 - 7.8. Importance of carbohydrates
- 8 Lipids (05 hrs)
- 8.1. Definition
 - 8.2. Classification
 - 8.3. Introduction to fatty acids, phospholipids, triglycerides, sterol, ergosterol, Cholesterol
 - 8.4. Reactions of fats
 - 8.5. Importance of lipids
9. Proteins (05 hrs)
- 9.1. Definition
 - 9.2. Classification
 - 9.3. Composition , molecular weight and hydrolysis
 - 9.4. Name of various amino acids
 - 9.5. Structure and properties of proteins
 - 9.6. Importance of proteins

10. Enzymes (05 hrs)

- 10.1 Definition
- 10.2 Classification
- 10.3 Chemical nature of enzymes
- 10.4 Properties of Enzymes
- 10.5 Factors affecting enzyme activity
- 10.6 Enzyme Inhibitors
- 10.7 Enzymes of Diagnostic Importance

LIST OF PRACTICALS

- 1. Iodometric titrations
- 2. Oxidation reduction titrations
- 3. Acid-base titrations
- 4. Saponification of fatty acids
- 5. Distinction between aldehydes and ketones
- 6. Detection of carbohydrates
- 7. Detection of proteins
- 8. Detection of lipids

RECOMMENDED BOOKS

- 1. Modern's Abc of Chemistry Vol I and II by Dr. S.P.Jauhar, Modern Publishers, New Delhi
- 2. A textbook of Biochemistry and Clinical Pathology by Sukhdev Singh and Om Parkash

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	02	05
2	04	08
3	06	12
4	05	10
5	05	10
6	05	10
7	06	10
8	05	10
9	05	10
10	05	15
Total	48	100

2.3 ANATOMY AND PHYSIOLOGY - II

L T P
3 - 2

RATIONALE

The students are supposed to have basic knowledge of structure of body, their anatomical parts, physiological functions. After studying this subject, the students shall be able to understand various parts of body and their anatomical positions along with functions. Students are also supposed to have basic operational skill of E.C.G.

DETAILED CONTENTS

Theory

1. Nervous system (8 hrs)
 - 1.1 Central nervous system (brain and spinal cord)
 - 1.2 Peripheral nervous system (cranial and spinal nerves)
 - 1.3 The sense organs (eye, ear, tongue and nose); structure and functions
2. Muscular system (6 hrs)
 - 2.1 Brief description of skeletal, smooth and cardiac muscles
 - 2.2 Muscle fatigue
3. Circulatory system (14 hrs)
 - 3.1 Composition and functions of blood
 - 3.2 Anatomy and physiology of Heart
 - 3.3 Circulation of blood, Cardiac Cycle and Conducting System of Heart
 - 3.4 The blood pressure
 - 3.5 Arteries and veins
 - 3.6 Lymph and lymphatic system
4. Endocrine system (10 hrs)

Description of each endocrine gland its secretions and their effect on the body
5. Reproductive System (10 hrs)
 - 5.1 Male and female reproductive system
 - 5.2 The ovarian cycle and ovulation
 - 5.3 Fertilization

LIST OF EXPERIMENTS

1. Study of various parts of nervous system (brain and spinal cord) (demonstration from model)
2. Study of structure of eye and ear (demonstration from models)
3. Study of structural differences between skeletal, smooth and cardiac muscles (permanent mounts) through demonstration.
4. Study of various parts of circulatory system through demonstration.
5. Examination of stained blood film for blood cells
6. Estimation of blood pressure
7. Study of various parts of reproductive system (male and female demonstration from models and charts)

RECOMMENDED BOOKS

1. Anatomy and Physiology by Pears; JP Brothers, New Delhi
2. Anatomy and Physiology by Sears; ELBS, London
3. Basic Anatomy and Physiology by N Muruges; Sathya Publishers, Madurai
4. Ross and Wilson Anatomy and Physiology by Anne Waugh and Kathleen JW Wilson; Churchill Living Stone; London

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks allotted (%)
1	8	16
2	6	12
3	14	30
4	10	20
5	10	22
Total	48	100

2.4 CLINICAL MICROBIOLOGY - II (Bacteriology)

L T P
3 - 4

RATIONALE

The students undergoing training of medical laboratory technology learn the knowledge of basic morphology, staining, culture, biochemical characteristics and lab-diagnosis of pathogenic bacteria. In addition to this, they are also made aware about the examination of bacteria present in milk and water.

DETAILED CONTENTS

Theory

1. Bacteriology (26 hrs)
 - General characteristics of bacteria - morphology, staining, culture, biochemical
 - Characteristics and distribution of :-
 - 1.1 Staphylococi
 - 1.2 Streptococci and pneumococci
 - 1.3 Enterobacteriaceae - I (E coli, Klebsiella, Enterobacter)
 - 1.4 Enterobacteriaceae – II (Salmonella, Shigella, Proteus)
 - 1.5 Pseudomonas
 - 1.6 Vibrio Cholerae
 - 1.7 Neisseria
 - 1.8 Treponema Pallidium
 - 1.9 Mycobacterium tuberculosis
2. Bacterial pathogenicity (06hrs)
 - 2.1 Definition of pathogenicity, pathogenesis and virulence
 - 2.2 Sources of infection
 - 2.3 Mode of spread of infection
 - 2.4 Types of infection

3. Nosocomial Infection (06 hrs)
 - 3.1 Introduction
 - 3.2 Common types and source of nosocomial infection
 - 3.3 Control of nosocomial infections

4. Laboratory diagnosis of infectious diseases (10 hrs)
 - 4.1 Respiratory tract infections (Throat Swab and Sputum sample)
 - 4.2 Wound infections
 - 4.3 Urinary tract infections
 - 4.4 Enteric fever

LIST OF PRACTICALS

1. Collection, transportation of clinical samples, processing including culture of following clinical samples for identification of pathogens – Urine, Stool, Sputum, Throat swabs, Pus and Pus swabs, Blood, Skin, Eye and Ear swabs and CSF
2. Identification of pure bacterial cultures of common pathogens.

INSTRUCTIONAL STRATEGY

The teacher should lay stress on general characteristics of bacteria, morphological features, nomenclature of bacterial for common use. The students should be made familiar with common names of bacteria and stress on correct use of bacterial pronunciation and spellings. The students should be taught with illustrations/audio-visual aids.

RECOMMENDED BOOKS

1. Textbook of Medical Microbiology by Satish Gupta; JP Brothers, New Delhi
2. Practical Book of Medical Microbiology by Satish Gupta; JP Brothers, New Delhi
3. An Introduction to Medical Laboratory Technology by FJ Baker; Butterworth – Heinemann; Oxford
4. Textbook of Medical Laboratory Technology by Praful B Godkar; Bhalani Publishing House, Mumbai
5. Medical Laboratory Technology by Kanai Lal Mukherjee; Tata McGraw Hill, New Delhi
6. Medical Laboratory Manual for Tropical Countries Vol. I and II by Monica Cheesbrough; Cambridge University Press; UK

7. Text Book of Microbiology by Ananthanarayan and Paniker; Orient Longman, Hyderabad
8. Text book of Medical Microbiology by Cruickshank Vol. I
9. Textbook of Medical Microbiology by Greenwood, ELBS
10. Medical Laboratory Science by Jockie and Kolhatkar, Tata McGraw Hill.
11. Text book of Microbiology by A. Chakraborty

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	26	50
2	06	15
3	06	15
4	10	20
Total	48	100

2.5 HAEMATOLOGY - II

L T P
3 - 4

RATIONALE

The training in haematology is imparted to enable the students to know the principle of tests, methodology of routine as well as advanced procedures being carried out in the laboratory by using routine as well as sophisticated instruments. Stress is also given in use of safety measures in the laboratory

DETAILED CONTENTS

Theory

- | | | |
|---|---|----------|
| 1 | Haemoglobinometry | (12 hrs) |
| | 1.1. Formation of haemoglobin, function and its degradation | |
| | 1.2. Types of haemoglobin | |
| | 1.3. Various methods of estimation with specific reference to cyanmethaemoglobin method | |
| 2 | Haemocytometry | (18 hrs) |
| | 2.1. Various counting chambers | |
| | 2.2. Methods of counting of RBC, WBC and platelets, their calculation and reference values. | |
| | 2.3. Errors involved in haemocytometry and means to minimize them | |
| 3 | Differential leucocyte counting (DLC) | (06 hrs) |
| | 3.1. Preparation and staining of blood film | |
| | 3.2. Performance of DLC | |
| | 3.3. Normal values and significance of DLC | |
| | 3.4. Blood cell morphology in health and disease (Peripheral blood film) | |
| 4 | Quality Assurance in haematology such as accuracy, precision etc. | (06 hrs) |
| 5 | Automation in haematology | (06 hrs) |
| | 5.1. Various types of Blood cell counter | |
| | 5.2. Principle and operation of the automated blood cell counters | |

LIST OF PRACTICALS

1. Preparation of peripheral blood film.
2. Preparation and standardization of stains (leishman and giemsa)

3. Preparation of thick and thin blood smear
4. Haemoglobin Estimation by Sahli's method, Oxy-Haemoglobin and Cyanmethaemoglobin method
5. Counting of RBC
6. Counting of WBC
7. Platelet counting
8. Absolute eosinophil counting
9. Study of morphology of normal RBC and WBC with the help of stained slide
10. To study abnormal morphology of RBC with the help of stained slide
11. To study abnormal morphology of WBC with the help of stained slide
12. To study abnormal morphology of platelet with the help of stained slide

RECOMMENDED BOOKS

1. Medical Laboratory Technology Vol. 1 by KL Mukherjee; Tata McGraw Hill Publishers, New Delhi
2. An Introduction to Medical Laboratory Technology by FJ Baker; Butterworth Heinmann, Oxford
3. Medical Laboratory Manual for Tropical Countries by Monica Cheesbrough; Cambridge University Press, UK
4. Textbook of Medical Laboratory Technology by Praful B Godkar; Bhalani Publishing House, Mumbai
5. Practical Haematology by JV Decei; ELBS with Curchill Living Stone; UK
6. Medical Laboratory Science Theory and Practical by J Ochei and A Kolhatkar, Tata McGraw Hill Publishing Company Ltd., New Delhi 2000 Ed.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	12	24
2	18	40
3	06	12
4	06	12
5	06	12
Total	48	100

2.6 CLINICAL BIOCHEMISTRY - II

L T P
3 - 4

RATIONALE

The students are imparted basic training of theoretical and practical aspects in the field of clinical biochemistry. The students are made to learn the technique of collection of clinical samples and their processing along with recording of data. The student will also obtain the basic knowledge of chemistry and metabolism of various metabolites which are routinely estimated in different diseases so that a clear understanding of the different tests is obtained. The students are also given basic training in safety measures, quality control and automation

DETAILED CONTENTS

Theory

1. Blood glucose/ sugar estimation, screening test and glucose tolerance test (GTT) (12 hrs)
 - 1.1 Metabolism of Glucose
 - 1.2 Principle and methods of estimation
 - 1.3 Reference values
 - 1.4 Renal threshold
 - 1.5 Importance and Performance of ST/GTT
 - 1.6 Clinical importance of blood sugar, ST/GTT
2. Blood urea (8 hrs)
 - 2.1 Formation and excretion of urea
 - 2.2 Principle and procedures of different methods of urea estimation
 - 2.3 Reference values
 - 2.4 Clinical Importance
3. Serum Creatinine (4 hrs)
 - 3.1 Principle and procedure of various estimation methods
 - 3.2 Reference values
 - 3.3 Clinical importance
4. Serum proteins (8 hrs)
 - 4.1 Definition and types
 - 4.2 Different methods of estimation including principles and procedures
 - 4.3 Reference values
 - 4.4 Clinical importance

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|----|---|----------|
| 5. | Electrolytes and trace elements | (8 hrs) |
| | 5.1 Principles and procedures of estimation of Na^+ , K^+ , Cl^- . | |
| | 5.2 Reference values | |
| | 5.3 Clinical importance | |
| 6. | Uric Acid | (4 hrs) |
| | 6.1 Principles and procedures various estimation methods | |
| | 6.2 Reference values | |
| | 6.3 Clinical Importance | |
| 7. | Quality Assurance in Biochemistry as per National Standards | (4 hrs) |
| | 7.1. Internal quality assurance | |
| | 7.2. External quality assurance | |

LIST OF PRACTICALS

1. Preparation of reagents (stock and working)
2. Estimation of blood glucose/sugar (Folin-Wu method, O-toluidine method and enzymatic method)
3. Performance of ST/GTT
4. Serum urea estimation
5. Serum creatinine estimation
6. Serum uric acid estimation
7. Plasma and serum protein estimation
8. Estimation of electrolyte levels of Na^+ , K^+ and Cl^- by colorimetric method

RECOMMENDED BOOKS

1. A Procedure Manual for Routine Diagnostic Tests Vol. I and III by KL Mukherjee; Tata McGraw Hill Publishers, New Delhi
2. A Textbook of Medical Laboratory Technology by P Godkar; Bhalani Publishing House, Mumbai

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	12	22
2	08	16
3	04	10
4	08	16
5	08	16
6	04	10
7	04	10
Total	48	100

ECOLOGY AND ENVIRONMENTAL AWARENESS CAMP

A diploma holder must have knowledge of different types of pollution caused due to industries and constructional activities so that he may help in balancing the eco system and controlling pollution by pollution control measures. He should also be aware of environmental laws related to the control of pollution.

This is to be organized at a stretch for 3 to 4 days. Lectures will be delivered on following broad topics. There will be no examination for this subject.

1. Basics of ecology, eco system and sustainable development
2. Conservation of land reforms, preservation of species, prevention of advancement of deserts and lowering of water table
3. Sources of pollution - natural and man made, their effects on living and non-living organisms
4. Pollution of water - causes, effects of domestic wastes and industrial effluent on living and non-living organisms
5. Pollution of air-causes and effects of man, animal, vegetation and non-living organisms
6. Sources of noise pollution and its effects
7. Solid waste management; classification of refuse material, types, sources and properties of solid wastes, abatement methods
8. Mining, blasting, deforestation and their effects
9. Legislation to control environment
10. Environmental Impact Assessment (EIA), Elements for preparing EIA statements
11. Current issues in environmental pollution and its control
12. Role of non-conventional sources of energy in environmental protection