SYLLABUS FOR THE FIRST YEAR DIPLOMA IN OPERATION THEATRE AND ANESTHESIA TECHNOLOGY COURSE UNDER ALLIED HEALTH SCIENCES

Subjects – Teaching hours

Anatomy, Physiology and Lab Sciences	**-**	**80 hours**
Communication skills in English	**-**	**80 hours**
Computer Skills	**-**	**80 hours**
Principles of Management	**-**	**30 hours**
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		270 hours

Hospital Orientation & Training		**1665 hours**

BASIC ANATOMY

THEORY

Introduction to Anatomy

Basic Anatomical terminology

Osteology- Upper limb – clavicle, scapula, humerous, radius, ulna
Lower limb - femur, hipbone, sacrum, tibia, fibula
Vertebral column

Thorax – Intercostal space, pleura, bony thoracic cage, ribs sternum & thoracic vertebrae

Lungs – Trachea, bronchial tree

Heart – Surface anatomy of heart, chambers of the heart, valves of the heart, major blood vessels of heart, pericardium, coronary arteries.

Skeleto-muscular system – Muscles of thorax, muscles of upper limb (arm & fore arm) Flexor and extensor group of muscles (origin, insertion, action)

Excretory sytem – Kidneys**,** ureters, bladder

PRACTICALS

Mannequins to be provided for Teaching

Osteology – Bones identification (right and left side) and prominent features and muscle attachment of the bone, clavicle, scapula, radius, ulna, humerous, femur,
hip bone, sacrum, tibia, fibula.
Surface Anatomy,
Radiology, X-ray Chest PA view

PHYSIOLOGY

THEORY

1) The Cell:

. Cell Structure and functions of the varies organelles.

. Endocytosis and exocytosis

. Acid base balance and disturbances of acid base balances (Alkalosis, Acidosis)

2) The Blood:

. Composition of Blood, functions of the blood and plasma proteins, classification and protein.

. Pathological and Physiological variation of the RBC.

. Function of Hemoglobin

. Erythrocyte Sedimentation Rate.

. Detailed description about WBC-Total count (TC), Diffierential count (DC) and functions.

. Platelets – formation and normal level and functions

. Blood groups and Rh factor

. Cardio-Vascular System:

(i) Physiology of the heart (ii) Heart sounds

(iii) Cardiac cycle, Cardiac output. (iv) Auscultatory areas.

(v) Arterial pressures, blood pressure (vi) Hypertension

(vii) Electro cardiogram (ECG)

4. Respiratory system:

(i) Respiratory movements.

(ii) Definitions and Normal values of Lung volumes and Lung capacities.

5. **Excretory system:**

(i) Normal Urinary output (ii) Micturation

(iii) Renal function tests, renal disorders.

6. Reproductive system:

(i) Formation of semen and spermatogenesis. (ii) Brief account of menstrual cycle.

7. Central Nervous system:

(i) Functions of CSF.

8. **Endocrine sytem:**
Functions of the pituitary, thyroid, parathyroid, adrenal and pancreatic Hormones.

9.Digestive system (for the students of Diploma in Scope Support Technology)
(i) Physiological Anatomy of the GIT.
(ii) Food Digestion in the mouth, stomach, intestine **(iii)** Absorption of foods
(iv) Role of bile in the digestion.

PRACTICAL

. The compound Microscope
. Determination of ESR-By westergren's method
. Determination of Blood Groups.
. Measurement of human blood pressure.
. Examination of Respiratory system to count respiratory rate and measure inspiration and respiration

BIO-CHEMISTRY

Carbohydrates
Glucose and Glycogen Metabolism

Proteins:
Classification of proteins and functions

Lipids:
Classification of lipids and functions

Enzymes:
Definition – Nomenclature – Classification – Factors affecting enzyme activity – Active site – Coenzyme – Enzyme Inhibition – Units of enzyme – Isoeznzymes – Enzyme pattern in diseases.

Vitamins & Minerals:
Fat soluble vitamins(A,D,E,K) – Water soluble vitamins – B-complex vitamins- principal elements(Calcium, Phosphorus, Magnesium, Sodium, Potassium, Chlorine and sulphur)- Trace elements – Calorific value of foods – Basal metabolic rate(BMR) – respiratory quotient(RQ) Specific dynamic action(SDA) – Balanced diet – Marasmus – Kwasoirkar

Acids and bases:
Definition, pH, Henderson – Hasselbalch equation, Buffers, Indicators, Normality, Molarity, Molality

BIOCHEMISTRY SYLLABUS FOR PRACTICALS 1 Benedict's test
2. Heat coagulation tests

PATHOLOGY

. 1.Cellular adaptation, Cell injury & cell death.

. Introduction to pathology.

Overview: Cellular response to stress and noxious stimuli. Cellular adaptations of growth and differentiation. Overview of cell injury and cell death.

Causes of cell injury.

Mechanisms of cell injury.

Reversible and irreversible cell injury. Examples of cell injury and necrosis

. 2.Inflammation.

General features of inflammation

Historical highlights

Acute inflammation

Chemical mediators of inflammation

Outcomes of acute inflammation

Morphologic patterns of acute inflammation

Summary of acute inflammation

Chronic inflammation

3. Immunity disorders.

General features of the immune system

Disorders of the immune system

4. Infectious diseases.

General principles of microbial pathogenesis

Viral infections

Bacterial infections-Rheumatic heart disease.

Fungal infections

Parasitic infections

. 5. Neoplasia.

. Definitions

. Nomenclature

Biology of tumor growth benign and malignant neoplasms Epidemiology

Carcinogenic agents and their cellular interactions Clinical features of tumors

. 6. Environmental and nutritional disorders. Environmental and disease

Common environmental and occupational exposures Nutrition and disease.

Coronary artery disease.

PRINCIPLES OF MANAGEMENT

(a): PRINCIPLES OF MANAGEMENT

Development of Management: Definitions of Management – Contributions of F.W. Taylor, Henry Fayol and others

Functions of Management: Planning – Organizing – Directing – Controlling

Planning: Types of planning – Short–term and long plans – Corporate or Strategic Planning – Planning premises – Polices – Characteristics and sources – principles of policy making – Strategies as different from policies – Procedures and methods – Limitations of planning

Organizing: Importance of organization – Hierarchy – Scalar chain – Organization relationship – Line relationship – Staff relationship - Line staff relationship – Functional relationship - Committee organization – Management committees – Departmentation

Motivation: Motivation theories – McGregor's theory X and theory Y – Maslow's and Herzberg's theory – Porter and Lawler model of complex view of motivation
– Other theories – Diagnostic signs of motivational problems – Motivational Techniques

Communication: Types of communication – Barriers of effective communication – Techniques for improved communication

Directing: Principles relating to Direction process – Principles and theories of leadership – Leadership Styles – Delegation of authority

Controlling: Span of control – Factors limiting effective span of control – Supper management, General managers, Middles managers and supervisors – Planning and controlling relationships – Management control process – Corrective measures

- Strategic control points – Budgetary control – Types of budgets

Co-ordination: Co-ordination and co-operation – Principles of co-ordination – Techniques of co-ordination charts and records – Standard procedure instructions

(b): PERSONNEL MANAGEMENT

Objective of Personnel Management – Role of Personnel Manager in an organization – Staffing and work distribution techniques – Job analysis and description – Recruitment and selection processes – Orientation and training – Coaching and counseling – disciplining – Complaints and grievances – Termination of employees – Performance appraisal – Health and safety of employees - Consumer Protection Act as applicable to health care services

(c): FINANCIAL MANAGEMENT

Definition of financial Management – Profit maximization – Return maximization
– wealth maximization – Short term Financing – Intermediate Financing – Long term Financing – leasing as a source of Finance – cash and Security Management
– Inventory Management – Dividend policies – Valuations of Shares – Financial Management in a hospital – Third party payments on behalf of patients.
Insurance – health schemes and policies

ENGLISH

Communication:-

Role of communication
Defining Communication
Classification of communication
Purpose of communication
Major difficulties in communication
Barriers to communication
Characteristics of successful communication – The seven Cs
Communication at the work place
Human needs and communication “Mind mapping”
Information communication

Comprehension passage:-

Reading purposefully
Understanding what is read
Drawing conclusion
Finding and analysis

Explaining:-

How to explain clearly
Defining and giving reasons
Explaining differences
Explaining procedures
Giving directions

Writing business letters:-

How to construct correctly
Formal language
Address
Salutation
Body
Conclusion

Report writing:-
Reporting an accident
Reporting what happened at a session
Reporting what happened at a meeting

BASICS OF COMPUTER

COURSE CONTENT:

Introduction to computer – I/O devices – memories – RAM and ROM – Different kinds of ROM – kilobytes. MB, GB their conversions – large computer – Medium, Micro, Mini computers – Different computer languages – Number system – Binary and decimal conversions – Different operating system – MS DOS – Basic commands – MD, CD, DIR,TYPE and COPY CON commands – Networking – LAN, WAN,MAN(only basic ideas)

Typing text in MS word – Manipulating text – Formatting the text – using different font sizes, bold, italics – Bullets and numbering – Pictures, file insertion
– Aligning the text and justify – choosing paper size – adjusting margins – Header and footer, inserting page No's in a document – Printing a file with options – Using spell check and grammar – Find and replace – Mail merge – inserting tables in a document.

Creating table in MS-Excel – Cell editing – Using formulas and functions – Manipulating data with excel – Using sort function to sort numbers and alphabets
– Drawing graphs and charts using data in excel – Auto formatting – Inserting data from other worksheets.

Preparing new slides using MS-POWERPOINT – Inserting slides – slide transition and animation – Using templates – Different text and font sizes – slides with sounds – Inserting clip arts, pictures, tables and graphs – Presentation using wizards.

Introduction to Internet – Using search engine – Google search – Exploring the next using Internet Explorer and Navigator – Uploading and Download of files and images – E -mail ID creation – Sending messages – Attaching files in E-mail – Introduction to "C" language – Different variables, declaration, usage – writing small programs using functions and sub – functions.

PRACTICAL

Typing a text and aligning the text with different formats using MS-Word Inserting a table with proper alignment and using MS-Word

Create mail merge document using MS-word to prepare greetings for 10 friends Preparing a slide show with transition, animation and sound effect using MS-Powerpoint

Customizing the slide show and inserting pictures and tables in the slides using MS-powerpoint

Creating a worksheet using MS-Excel with data and sue of functions Using MS-Excel prepare a worksheet with text, date time and data Preparing a chart and pie diagrams using MS-Excel

Using Internet for searching, uploading files, downloading files creating e-mail ID

Using C language writing programs using functions

DIPLOMA IN OPERATION THEATRE AND ANESTHESIA TECHNOLOGY
COURSE EXAMINATION PATTERN – I YEAR

Sl. No.	Subject Title	I A		University Exam		Practical		Viva Voce	
		Max	Min	Max	Min	Max	Min		
1.	Paper I -Basic Sciences* (Anatomy, Physiology, Biochemistry & Pathology	50	25	100	50	100	50	50	25
2.	Paper II- English**	50	25	100	50	-	-	-	-
3.	Paper III – Computer science**	50	25	100	50	-	-	-	-

*Marks in Basic sciences to be allotted as Anatomy- 30% - Physiology -30% - Biochemistry – 20% & Pathology – 20%

* *English and Computer science are Internal Papers – Marks to be sent to the University. There will no University Examination for English and Computer Science.

Internal Assessment :

Paper I & III Theory	- 20 Marks
Practical	– 30 Marks
Paper – II Theory	- 20 Marks
Communication Skills	– 20 Marks
Seminar/Presentation	– 10 Marks

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Diploma in Operation Theatre and Anaesthesia Technology

II year - Syllabus

Main Syllabus

1. Applied Anatomy and Physiology
2. Clinical Pharamacology
3. CSSD Procedures
4. Principles of Anaesthesia
5. Basic Anaesthetic techniques
6. Regional Anaesthetic techniques

1. APPLIED ANATOMY AND PHYSIOLOGY RELATED TO ANAESTHESIA

I. RESPIRATORY SYSTEM

A. Structure and function of the respiratory tract in relation to respiratory system

Nose - Role in humidification

Pharynx - Obstruction in airways

Larynx - Movement or vocal cords, Cord palsies.

Trachea & Bronchial tree - vessels, nerve supply, respiratory tract, reflexes, bronchosparm

Alveoli - Layers, Surfactants

B. Respiratory Physiology

- Control or breathing
- Respiratory muscles - diaphragm,intercostals
- Lung volumes - dead space, vital capacity, FRC etc.
- Pleural cavity - intrapleural pressure, pneumothorax.
- Work of breathing - airway resistance, compliance

- Respiratory movements under anaesthesia.
- Tracheal tug - signs, hiccup

C. Pulmonary Gas Exchange And Acid Base Status

- Pulmonary circulation - Pulmonary oedema,
  - pulmonary hypertension
- Pulmonary function tests.
- Transfer of gases - oxygen & Carbondioxide
- Acid base status, definitions, acidosis types, Alkalosis types, buffers in the body.

D. Oxygen: properties, storage, supply, hypoxia

E. Respiratory failure, type, clinical features, causes.

II. CARDIOVASCULAR SYSTEM

Anatomy - Chambers of the heart, major vasculature.

Coronary supply, innervation.

Conduction system.

Cardiac output - determinants, heart rate, preload, after load.

Coronary blood flow& myocardial oxygen supply

ECG

- arrhythmias cardiovascular response to anesthetic & surgical procedures.

Hypotension - causes, errects, management.

Cardio pulmonary resuscitation.

Myocardial infarction, hypertension.

III. FLUIDS AND ELECTROLYTES

- Body Fluids - Composition
- Water, sodium and potassium balance
- I.V. Fluids - composition & administration
- I.V. Cannulation.\

IV. BLOOD TRANSFUSION

Blood grouping, storage, administration

2. Clinical Pharmacology

ANTISIALAGOGUES

Atropine, Glycophyrrolate

SEDATIVES *I* ANXIOLYTICS

Diazepam, Midazolam, Phenergan, Lorazepam, Chloropromazine,Trichlophos

NARCOTICS

Morphine, Pethidine, Fentanyl, Pentazozine

ANTIEMETICS

Metaoclopramide,Ondanseteron, Dexamethasone

INDUCTION AGENT

Thiopentone , Diazepam, Midazolam, Ketamine, Propofol, Etomidate.

MUSCLE RELAXANTS

Depolarising - Suxamethonium,

Non depolar:sing -Pancuronium, Vecuronium, Atracurium, rocuranium

INHALATIONAL GASES

Gases - 02, N20, Air

Agents - Ether-, Halothane, Isofllurane, Saevoflurane, Desflurane

REVERSAL AGENTS

Neostigmi*ne*, Glysopyrrolate, Atropine,

Nalorphine, Naloxone, Flumazenil (Diazepam)

LOCAL ANAESTHETICS

Xylocaine, Preparation, Local – Bupivacaine - Topical,

Prilocaine-jelly, Emla - Ointment, Etidocaine. Ropivacaine

EMERGENCY DRUGS

- Adrenaline : Mode or administration, dilution, dosage,
- effects, Isoprenaline
- Atropine, bicarbonate, calcium, ephedrine, xylocard,
- Ionotropes : dopamine, dobutamine, amidaron
- Aminophylline, hydrocortisone, antihistamlnics, potassium.
- Cardlovascular drugs
- Antihypertensives
- Antiarhythmics
- Beta - Blockers
- Ca - Channel blockers.
- Vasodilators - nitroglycerin & sodium nitroprusside
- Respiratory system - Bronchodilators, respiratory stimulants
    - Bronchiolytic agents
- Renal system - Diuretics,furosemide,mannitol

3. CSSD Procedures

1. Waste disposal collection of used items from user area, reception protective clothing and disinfections sage gaurds,
2. use of disinfectionts sorting and classification of equipment for cleaning purposes, sharps, blunt lighted etc. contaminated high risk baby care - delicate instruments or hot care instruments,
3. cleaning process - use of detergents. Mechanical cleaning apparatus, cleaning instruments, cleaning jars, receivers bowls etc. trays, basins and similar hand ware utensils. Cleaning of catheters and tubings, cleaning glass ware, cleaning syringes and needles.
4. Materials used for wrapping and packing assembling pack contents. Types of packs prepared. Inclusion of trays ahd galliparts in packs. Method of wrapping and making use of indications to show that a pack of container has been through a sterilization process date stamping.
5. General observations principles of sterlization. Moist heat sterlization. Dry heat sterlization. EO gas sterlization. H202 gas plasma vapo sterlization.

4. PRINCIPLES OF ANAESTHESIA

1. MEDICAL GAS SUPPLY

- Compressed gas cylinders
- Colour coding
- Cylinder valves; pin index.
- Gas piping system
- Recommendations for piping system
- Alarms & safety devices.

2. ANAESTHESIA MACHINE

- Hanger and yoke system
- Cylinder pressure gauge
- Pressure regulator
- Flow meter assembly
- Vapourizers - types, hazards, maintenance, filling and draining, etc.

3. BREATHING SYSTEM

- General considerations: humidity & heat
- Common components - connectors, adaptors, reservoir bags.
- Capnography ; etc02
- Pulse oximetry
- Methods of humidification.
- Classification of breathing system
- Mapleson system - a b c d e f
- Jackson Rees system, Bain circuit
- Non rebreathing valves - ambu valves
- The circle system
- Components
- Soda lime, indicators

4. FACE MASKS & AIRWAY LARYNGOSCOPES

- Types, sizes
- Endotracheal tubes - Types, sizes.
- Cuff system
- Fixing, removing and inflating cuff, checking tube position complications.

5. ANAESTHESIA VENTILATOR AND WORKING PRINCIPLES.

6. MONITORING

- ECG
- Sp02
- Temperature
- IBP
- CVP
- PA Pressure
- LA Pressure

5. BASIC ANAESTHETIC TECHNIQUES

HISTORY OF ANAESTHESIA

- First successful clinical demonstration:
- Pre - historic (ether) era
- Inhalational anesthetic era
- Regional anesthetic era
- Intravenous anesthetic era
- Modem anesthetic era
- Minimum standard of anesthesia
- Who should give anesthesia

PRE-OP PREPARATION:

Pre anesthetic assessment~ History – , past history - disease / Surgery / and personal history - Smoking / alcohol
General physical assessment, systemic examination – CVS, RS, CNS

INVESTIGATIONS

Routine
- Haematological - their significance
- Urine
- E.C.G.
- Chest X - ray

Special
-Endcorine, hormonal assays
- Echocardiography
- Angiography
- Liver function test
- Renal function test
- Others

Case acceptance: ASA grading - I, II, III, IV. V

PRE - ANAESTHETIC ORDERS:

Patient
- Informed consent
- Npo
- Premedication - advantages, drugs used
- Special instructions - if any

Machine
- Checking the machine
  02, N20, suction apparatus
  Laryngoscops, et tubes, airways
- Things for IV accessibility
- Other monitoring systems

Drugs
- Emergency drugs
- Anesthetic drugs

INTRAOPERATIVE MANAGEMENT

- ConfIrm the identification of the patient
- Monitoring - minimum
- Noninvasive & Invasive monitoring
- Induction - drugs used
- Endotracheal intubation
- Maintenance of anesthesia
- Positioning of the patient

- Blood / fluid & electrolyte balance
- Reversal from anesthesia - drugs used
- Transferring the patient
- Recovery room – set up and things needed

POST OPERATIVE COMPLICATIONS & MANAGEMENT

6. Regional Anesthetic techniques.

a. Local anaesthetic technique

b. Nerve blocks

c. Spinal Anaesthesia

d.Epidural anaesthesia

Diploma Course in Allied Health Sciences

EXAMINATION PATTERN – II YEAR

Diploma Course in Operation Theatre and Anaesthesia Technology

Sl. No.	Subject Title	I A		University Exam		Practical		Viva Voce	
		Max	Min	Max	Min	Max	Min		
1.	Paper I - Applied Physiology & Pharmacology	50	25	100	50	50	25	50	25
2.	Paper II- Sterilization Procedures	50	25	100	50	50	25	50	25
3.	Paper III - Principles of Anesthesia	50	25	100	50	50	25	50	25

Question paper pattern:

Essay	3 x 10 = 30 Marks
Short Notes	10 x 5 = 50 Marks
Short Answers	10 x 2 = 20 Marks
Total	100 Marks

Internal Assessment:

Paper I, II & III – Theory - 20 Marks

Practical - 20 Marks

Log book - 10 Marks

Practical Exam Pattern:

Paper – I

5 Spotters – Write 3 lines about each.

1) Drugs

2) I.V Fluid

3) Transfusion Set,

4) Pulmonary Function Test

5) ECG

6) Local Anesthetic Agent.

Paper – II

5 Spotters – Write 3 lines about each.

1) Auto Clave

2) Sterilization Procedures

3) Hot Air Oven

4) Disinfectant

5) Types of packs

6) Contaminants

7) Detergents

Paper – III

5 Spotters – Write 3 lines about each.

- Capnography ; etc02
- Pulse oximetry
- IBP
- CVP
- O2, N2O
- Suction apparatus
- Laryngoscops
- Et tubes
- Airways
- Things for IV accessibility.

POSTINGS DURING 6 MONTHS INTERNSHIP

1. Sterilisation room - 3 months

2. Operation theatre - 3 months including
   (General Surgery OT – 1 month
   Obstetrics & Gynaecology OT – 1 month
   Paediatric OT – 15 days
   Others – 15 days).

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