

Kingdom of Saudi Arabia
Ministry of Higher Education
King Saud University
College of Applied Studies and Community Service



Diagnostic Radiology

*Diploma
Curriculum*

Introduction:

Diagnostic Radiography is an invaluable aid to physicians and surgeons in the diagnosis of disease, and the radiology technician is an essential member of the health care team. Responsibilities of radiographers include accurately positioning the patient, producing quality diagnostic images, good patient care and communication skills.

This is a ٢-semester diploma program (٦٦ credit hours) designed for high school graduates (science branch). The aim of this program is to prepare qualified persons in radiography (X-ray) and provide them with the basic knowledge in modern imaging modalities to cover the need of the hospitals and health care centers of the governmental and private health sectors.

١. Objectives of the Program:

This program aims to help students to gain different technical skills and provide them with the optimum scientific principles in the field of Radiography. *The objectives are stated briefly below:*

- ١) Students will understand the basic physical principles of X-ray production, the electrical and electronic properties of its production, and interaction of X-ray with matter.
- ٢) They will understand the principles of:
 - Image production.
 - Different ways of image recording.
 - Film faults and artifacts,
 - Remedy of these faults
- ٣) Students will be able to carry out successful radiographic examinations in the X-ray department for different parts and systems of the body such as locomotive, urinary, digestive, and

circulatory systems including the use of different types of contrast media.

- ٤) Students will also be able to assist radiologists in conducting advanced techniques.
- ٥) The program will inculcate into the students the health team concept in medicine.
- ٦) Students will be encouraged to keep themselves up-to-date with advances in radiography including the various techniques of imaging and imaging systems.

٣. Entry Requirements:

- High school graduate (Science section)
- Physically fit to work as a radiographer
- Authorized Medical examination
- Ability to work in health care field
- Passes entry exams and interview

٤. Teaching and Learning Methods:

Teaching students the material of each course should be according to the best-known educational techniques. Examples of teaching methods include, but should not be limited to, the following: (as they apply to each course)

- Classroom Lectures.
- Demonstrations using models and phantoms.
- Tutorials.
- Reports, logbooks, and presentations.
- Computers and Audio/ visual instruments.
- Hospital visits

٥. Examinations and Assessment:

The method of students' evaluation during their study will be according to the rules and regulations set by the Kind Saud University. This should include quizzes, mid-term exams, practical exams, and reports, in addition to the final written exam. The final exam must carry at least ٤٠% of the total mark for theoretical courses, and courses that have a practical part. The pass mark for any individual course must not be less than ٦٠%.

٦. Summary of Courses, Prerequisites, and Co-requisites:

Course Code & No.	Course little	Prerequisites
Chm.١١٠١	General Chemistry	Admission requirement
Zoo ١١٠١	General Biology	Admission requirement
Com.١١٠٣	Introduction to Computer	Admission requirement
Ter.١١٠٢	Medical Terminology	Admission requirement
Islam.١١٠١	Islamic Culture	Admission requirement
Eng.١١٠٣	English Language	Admission requirement
Rad ١١٠١	Radiographic Anatomy	Ter ١١٠٢
Rad ١١٠٢	Radiographic Physiology	-----
Rad ١١٠٣	X- Ray physics	-----
Rad ١١٠٤	Image Recording Techniques	-----
Rad ١٢٠٢	Radiographic Equipment and safety	Rad ١١٠٣
Rad ١٢٠٣	Patient Care in Radiology Department	Ter ١١٠٢
Rad ١٢٠١	Radiographic Technique (١)	Rad ١١٠١ + Rad ١١٠٤
Rad ١٢٠٤	Radiographic Technique (٢)	Rad ١١٠١ + Rad ١١٠٤
Rad ١٣٠١	Radiographic Technique (٣)	Rad ١١٠٢ + Rad ١٢٠١
Rad ١٣٠٢	Radiographic Technique (٤)	Rad ١١٠٢ + Rad ١٢٠١
Rad ١٣٠٣	Accident and Emergency Radiography	Rad ١٢٠١
Rad ١٣٠٤	Mobile Radiographic	Rad ١٢٠٢ + Rad ١٢٠١ + Rad ١٢٠٤
Rad ١٤٠١	Radiographic Image Interpretation	Rad ١٣٠١ + Rad ١٣٠٢
Rad ١٤٠٢	Practicum	Rad ١٣٠١ + Rad ١٣٠٢ + Rad ١٣٠٣

٨. Description of Program Courses:

English Language	
Course No.	Eng. ١١٠٣
Credit hour	٣ (Theoretical)
Prerequisite	None

Course Objectives:

At the end of the course, the student should be able to:

١. Understand differences between nouns, verbs, and other words in the sentence.
٢. Understand simple written and spoken English.
٣. Speak simple English with no grammatical mistakes.
٤. Write correctly with no spelling mistakes.

Course Description:

This course is designed to promote the standards of English and develop reading, writing, listening, and speaking skills. Class discussion should be encouraged, and oral conversations should be practiced daily. The topics discussed should carefully be selected to suit the field of the students' specialization.

Tests and Mid-term exams:

English tests should be held every two weeks; the test should cover the area taught in the last two weeks. Students also should be evaluated into the last two weeks. Usually some marks are taken from the tests and added to the mid-term exam marks, and that should be based on a certain percentage, this of course acts as a motivation for students to work hard throughout the academic year. Oral exam is held weekly, so that the skill of speaking is elevated.

Recommended Course Contents:

Headway: Consists of more than six books and each one is designed especially for a certain level of students, after the replacement test it will be easier to select the suitable course. Students usually are classified into the following levels:

- i) True Beginners: Those who never heard of English before and should be given the first course that is "Head Start".
- ii) False Beginners: Those who know some of the language and have received and learned some vocabulary and grammar rules but forgot much of what they learned. And the best course for such students is "Headway Elementary".
- iii) Pre-Intermediate Students: Those who can read and understand simple texts and say simple words but those are entitled to develop.
- iv) Intermediate students: Those are much more advanced than the previous ones.
- v) Upper and Advanced Students: Students should at least maintain pre-intermediate level that will also enable them to be instructed in English.

Instructional Methods:

- Lecture.
- Discussion.
- Demonstration.
- Case studies.
- Tutorials.

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Headway Pre-Intermediate
- Headway Intermediate
- Work Books for both courses

General Biology	
Course No.	Zoo.١١٠١
Credit hour	٣ (٢ Theoretical +١ Practical)
Prerequisite	None

Aims & Objectives of the course:

This course is intended to provide the beginning student with a background in the fundamentals of the Biological Sciences which helps in preparing them for careers in medical technology.

The course introduces basic biological principles, stressing the chemistry of life processes with particular references to man. It includes cell structure and function; digestive system; respiratory system, blood circulatory system; maintenance of body fluids (fluid and electrolyte balance). The course will also cover, cell structure and function, body control systems (nervous and endocrine), locomotion system (musculoskeletal), human reproduction.

The practical part is intended to provide the beginning student with selected laboratory experiences concerning the fundamentals of Biological Science. The focus of the lab exercises will be organic molecules, and cell structure and function. Upon successful completion of this course, the student should demonstrate approved techniques of handling laboratory specimens and equipment. He should be able to record data accurately and in proper form and describe the characteristics and properties of cellular structures and biomolecules and different systems studied in the laboratory.

Syllabus:

Lecture Topics should include:

١. The basic principles and terminologies held in common among the diversity of Biological Sciences.
٢. Inorganic and biological chemistry principles to cell biology, metabolism
٣. The characteristics of microorganisms: prokaryotes, viruses, protists, and fungi.
٤. Cell's structure, function, metabolism and energetic.
٥. Biochemical systems (maintenance of body fluids (fluid and electrolyte balance).
٦. Human reproduction and development
٧. Digestive systems
٨. Respiratory systems
٩. Circulatory systems
١٠. Immunity system.
١١. Endocrine systems and hormone action
١٢. Nervous systems

Instructional Methods:

- Lecture.
- Discussion.
- Demonstration.
- Case studies.
- Tutorials.

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Basic Biology

General Chemistry	
Course No.	Chm. ١١٠١
Credit hour	٣ (٢ Theoretical + ١ Practical)
Prerequisite	None

Aims & Objectives of the course:

This course is designed to provide the student with an adequate background in the fundamental concepts of chemistry such as classify matter, perform calculations related to density, specific gravity, and perform calculations related to the mole concept.

Organic chemistry part will cover the structure, nomenclature, reactions, and synthesis of the main types of organic compounds especially aromatic and carbonyl compounds and the understanding of the basics of lipids, carbohydrates, amino acids, proteins, and nucleic acids.

In practical part of this course, the student will gain the ability to demonstrate approved techniques in handling laboratory equipment; record data accurately and in proper formats; Make and use measurements to calculate descriptive properties of matter such as: density, mass, volume, concentration, chemical formulas.

For the practical organic chemistry part, the student should demonstrate the ability to follow laboratory procedures for separation, purification, and identification of organic compounds. He should also be able to give complete structures from the names; determine the structure of compounds from experimental data; understand how functional group structure determines chemical reactivity as well as determining the mechanism of a reaction based upon the structure of the functional group.

Syllabus:

Lecture Topics should include:

١. For the General Chemistry Part.
٢. Classify matter.
٣. Perform calculations related to density, specific gravity, specific heat, kinetic energy.
٤. Chemical bonding and the differences between Ionic, Polar covalent and Non-Polar covalent bonding.
٥. Writing the formulae for chemical compounds and molecules.
٦. Balancing chemical equations and using chemical equations to calculate weight or volume relationships in chemical reactions.
٧. The use of the mole concept in solving chemical problems and calculating the concentration of a solution in percent and molarity.
٨. The concept of chemical equilibrium.
٩. Describing the shape of S and P orbital.
١٠. Draw electron-dot structures for molecules.
١١. Gather and use information from the periodic table such as the calculation of the atomic weight of an atom.
١٢. Distinguish between endothermic and exothermic reactions.
١٣. Some conceptual models used in -describing atomic and molecular structure, chemical bonding.
١٤. The acid-base theory and distinguish between weak and strong acids and bases.
١٥. Explain chemical equilibrium and calculate the pH and pOH of a solution.

As for the Organic Chemistry part, lectures should include:

١. Structure, nomenclature, reactions, and synthesis of the main types of organic compounds.
٢. Discussion of physical properties and transformations of organic molecules, especially aromatic and carbonyl compounds.
٣. Studying and recognizing poly functional compounds and natural products.
٤. Studying and recognizing Lipids.
٥. Studying and recognizing Carbohydrates
٦. Studying and recognizing Amino acids and proteins.
٧. Studying and recognizing Nucleic acids, preparations and qualitative organic analysis.

Instructional Methods:

- ▶ Lecture.
- ▶ Discussion.
- ▶ Demonstration.
- ▶ Case studies.
- ▶ Tutorials.

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Chemistry By: Raymond Chang ISBN: ٠ - ٠٧٣٦٥٦٠١١
- Organic Chemistry By: H. C. Hart ISBN: ٠ - ٣٩٥٩٠٢٢٥٨

Islamic Culture	
Course No.	Islam. ١١٠١
Credit hour	١ (Theoretical)
Prerequisite	None

Aims & Objectives of the course:

This course is designed to provide the student with the Islamic views on human, the family, his rights and duties towards the other members of the community and the governing system.

Syllabus:

The course content includes:

١. General Islamic culture knowledge regulating the individual's action in the community.
٢. Familiarizing the students with the common Islamic views regarding science and scientists.
٣. Identifying some of the common problems seen in our community and trying to understand the method of recovery.
٤. The Islamic overview of the human being.
٥. The family relations.
٦. Marriage and the Islamic laws and regulations.
٧. The governing laws under the Islamic umbrella.
٨. The authority and government elements from an Islamic point of view.
٩. The human rights in Islam.
١٠. Freedom and rights and duties in Islam.
١١. Awarding and punishment from an Islamic point of view and its implementation in the community in order to keep security and justice.

Instructional Methods:

- Lecture.
- Discussion.
- Demonstration.
- Case studies.
- Tutorials.

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Medical ethics in Islamic

Introduction to Computer	
Course No.	Com. ١١٠٣
Credit hour	٢ (١ Theoretical + ١ Practical)
Prerequisite	None

Course Description

The course introduces students to personal computers and applications. It also describes the use of computers and data processors in the Radiology Department.

Course Objectives:

At the end of the course, the student should be able to:

- I. Define the components of the computer and their functions.
٢. Use computer software. e.g. database and spread-sheets.
٣. Understand various operation systems.
 ٤. Understand the use of computer in Radiology Department.
 ٥. Use the Internet.

Course Contents:

١. The number system and binary logics
٢. Computer & Microprocessor
 - Operation system
 - Computer hardware
 - Memory and data storage.
٣. Computer applications in Radiology Department
 - Administration system
 - Control and monitoring
 - Film *processor* control.
٤. **Microsoft Windows**
 - Basics.
 - Work with windows
 - Multi tasks.
 - File management.
 - Windows shortcut.
 - Active Desktop.

- ٥. **Microsoft Applications**
 - Microsoft word processor
 - Spread-sheets
 - Database
- ٦. **Internet**

Instructional Methods:

- Lecture.
- Discussion.
- Demonstration.
- Case studies.
- Tutorials.

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Ramesh Banga, The complete Computer course, cyber tec.
Publications ISBN:٨١٧٨٨٤٠٦٦٩

Medical Terminology	
Course No.	Ter. ١١٠٢
Credit hour	٢ (Theoretical)
Prerequisite	None

Aims & objectives of the course:

This course deals with the fundamentals of expository writing based on general review of the English language for the non-native speakers. Extensive practice in writing expository essays focusing on the discovery and use of various linguistic devices which make an essay effective with stresses on English grammar, mechanics, and style. This course will also familiarize the student with the terminology used in the Health and Medical Sciences.

Course contents:

Upon successful completion, the student should be able to:

١. Read critically and evaluate literary selections and to apply the same techniques to the student's own writing.
٢. Write clear, coherent writing style, which will be effective in accomplishing the purpose with the audience.
٣. Experience practice in writing expository essays using rhetorical and writing techniques.
٤. Review topic sentence, paragraph and supporting details.
٥. Experience writing description, narration, analysis (definition and classification), comparison and contrast and argument and persuasion.
٦. Promote ideas and increase writing skills.

While the medical terminology part will cover:

١. Introducing and using the most common prefixes.
٢. Introducing and using the most common suffixes.
٣. The combining forms from which medical terms are derived.
٤. Medical abbreviations.
٥. Selected topics on the different Human systems.

Instructional Methods:

- Lecture.
- Discussion.
- Demonstration.
- Case studies.
- Tutorials.

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Understanding and Using English Grammar By: B. S. Azar
ISBN: ٠١٣٩٥٨٦٦١X
- Understanding and Using English Grammar: Workbook By: B. S. Azar

Radiographic Anatomy	
Course No.	Rad ١١٠١
Credit hour	٢ (Theoretical)
Prerequisite	Ter.١١٠٢
Co- request	None

Course Description:

This course deals with the study of the anatomy of the human body in relation to the plain radiographic film or when contrast media are used.

Course Objectives:

At the end of the course, the students should be able to:

١. Recognize and identify different anatomical parts on radiographic film.
٢. Describe the anatomy of different systems or examinations which may be examined using contrast media e.g. salivary gland, female and male reproductive systems, myelography, orthography ... etc.
٣. Evaluate the radiographic film according to the anatomic parts.

Course Contents:

١. Radiographic anatomy of bones and joints
٢. Radio anatomy of alimentary tract
 - Salivary gland
 - Esophagus
 - Stomach
 - Small and large intestines.
 - Rectum.
٣. Radio anatomy of Biliary Systems
 - P.T. •
 - Cholesystogram i
 - E.R.C.P
 - T. Tube Cholangioram.

٤. Radio anatomy of Respiratory System
 - Bronchogram.
٥. Radio anatomy of the urinary system.
 - I.V.P
 - Retrograde Pylo-Urethrography
 - Renal puncture.
٦. Radioanatomy of other systems, such as:
 - Lymphogram
 - Myelogram
 - Arthrogram.

Instructional Methods:

- Lecture.
- Discussion.
- Demonstration.
- Case studies.
- Tutorials.

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Weir, J. & Abrahams, P; An Atlas of Radiological Anatomy, Churchill Livingstone.
- Bell, The Basic Radiographic Anatomy, Harcourt Health Sciences Grp. ISBN : ٠٧٢١٦٩٩٨٣٩.

Radiographic Physiology	
Course No.	Rad. ١١٠٢
Credit hour	٢ (Theoretical)
Prerequisite	Admission
Co- request	None

Course Description:

This course is designed to enable the student to recognize or identify the anatomical structures and functions of the whole human body especially those which can be seen in the X-ray image and their relation to each other. It is designed to extend the students knowledge of anatomy and physiology in those areas relevant to the practice of diagnostic radiography. In addition, the course is designed to provide the student with the basic principles of human physiology especially of the body organs which have relationship with radiographic techniques.

Course Objectives:

By the end of the course the student will be able to:

١. Identify and describe the anatomical parts of the bones of the skeletal systems.
٢. Identify the important landmarks of the body and use them as a guide to produce diagnosable image.
٣. Identify the organs in each system of the body and the function of each organ or part.
٤. State the essential relationships of the body organs one to another.
٥. Relate the anatomical features of the organs studied to their physiological processes.
٦. Identify the surface marking of the body and relate them to the anatomical features below and above the appropriate vertebral levels.

Course Contents:

١. Surface anatomy and surface markings.
٢. The loco motor system: (skeleton, joints, and muscular system) structure and function.

The structure and function of the following systems:

١. The respiratory system
٢. The circulatory system
٣. The digestive system
٤. The biliary system
٥. The urinary system
٦. The brain and spine
٧. The reproductive system

Instructional Methods:

- Lecture.
- Discussion.
- Demonstration.
- Case studies.
- Tutorials.

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- E.P. Solomon; Introduction to Human Anatomy and Physiology.
- Anatomy and Physiology for Radiographer.

X- Ray physics	
Course No.	Rad ١١٠٣
Credit hour	٤ (٢ Theoretical + ٢ Practical)
Prerequisite	Admission
Co- request	None

Course Description:

The course is designed to provide the students with the basis of general physics including matter, energy, mechanics, heat, temperature, electricity, magnetism, electromagnetic induction and electric current circuits. And also covers wide range of topics in physics such as the nature of Matter, atom and its structure, ionizing radiation, production of X-ray, X-ray properties, interaction of X-ray with matter, radiation units.

Course Objectives:

At the end of the course, the student should be able to:

١. Identify the scientific terms and the fundamental physical concepts.
٢. Understand and explain the nature of matter, energy, force, work etc.
٣. Understand the concepts of heat and temperature and the methods of transferring heat.
٤. Describe the nature of electricity and electric circuits.
٥. Describe the nature of magnetism and the phenomenon of electromagnetism.
٦. Understand the nature of the matter, atom and its structure, the properties of matter.
٧. Describe the properties of matter.
٨. Understand and define the electromagnetic radiation.

٩. Describe the characteristics of conductors, semiconductors insulators.
١٠. Define radiation units.
١١. Matter structure and properties
١٢. Atom
 - Structure of atom
 - Mass number and atomic number.
 - Distribution of electrons in the atom.
 - Ionization of atoms.
١٣. Electromagnetic Radiation
 - Characteristics of electromagnetic radiation
 - Quantum theory
 - Production and detection of electromagnetic radiation.
١٤. X-ray tubes and the production of X-ray ^٥. Interaction of X-ray with matter
 - Compton Scatter.
 - Photoelectric absorption
 - Ion pair production.

Contents:

١- Matter and Energy

- Energy theories.
- Nature of matter.

٢- Mechanics

- Dynamics
- Momentum
- Acceleration, velocity, laws of motion.
- Force, work, power, mechanical energy.

٣- Heat & Temperature

- Specific heat capacity
- Thermal capacity
- Temperature scale
- Effect of heat
- Change of physical state
- Latent heat.
- Transfer of heat.

٤- Electricity

- Electric charges and force.
- Types of circuits
- Electric current; AC/DC
- Ohms Law
- Heating effects, electrical power.
- Capacitors, Conductors, Semi-conductors, Insulators.

٥- Electromagnetism

- Nature of magnetism
- Types of magnets
- Electromagnetism
- Electric motor principle.

٦- Electromagnetic induction

- General principles, mutual and self induction.
- General principles of Sinusoidal AC.
- Single phase and polyphase generation.

٧- Alternating Current Circuits

- Impedance, reactance, resistance series and parallel resonant circuits.
- Transformers.

Instructional Methods:

- Lecture.
- Discussion.
- Demonstration.
- Case studies.
- Tutorials.

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Curry T.S., Christensen's Introduction to the Physics & Diagnostic Radiography, Lea & Febiger.
- Freeman.Ira M., Physics made Simple. Doubleday
- Wilks, Robin; Principles of Radiological Physics, Churchill Livingstone. ISBN : ٠٤٤٣٠٢٠٣٥٣
- Stat Kiewicz—Sharer, M.A; Radiation Protection in Medical Radiography, Mosby, ISBN : ٠٨١٥١٢٨٩٦٧
- Ball, V.L. & Moore, A.P.; Essential Physics for Radiographers, Blackwell Science.

Image Recording Technique	
Course No.	Rad ١١٠٤
Credit hour	٤ (٢ Theoretical + ٢ Practical)
Prerequisite	Admission Requirements
Co- request	None

Course description:

This course introduces the students to the various types of recording materials or media. The student will be taught the principles of photography necessary to the production of satisfactory photographic or radiographic image, the control and manipulation of the exposure factors and processing procedures to produce high image quality and to appreciate the importance of an image quality control system and its utilization in the maintenance of image standard. The student will be introduced to all types of recording equipment and their applications including digital imaging. The student is also introduced to the processing area and various types of dark room, as well as day-light processing layouts. In addition, the course introduces the students to the common faults and artifacts in radiography (their causes and remedies). The course includes ten laboratory experiments and three tests.

Course Objectives:

By the end of the course the students will be able to:

١. Identify all types of films used in medical imaging and the application of each.
٢. State how an image is formed on a film.
٣. Demonstrate the ability to process the exposed film manually and automatically.

٤. Prepare the chemicals and maintain the processor.
٥. Perform duplication and subtraction techniques and various types of photographic procedures.
٦. Explain how the darkroom procedures influence the quality of the x-ray film.
٧. Modify the exposure factors in order to get high image quality.
٨. Identify image faults and artifacts (their causes and remedies).
٩. Explain the factors affecting image quality.
١٠. Identify the differences between conventional, day-light, and digital image production.

Outline of the course contents:

١. Revision of the x-ray production (production of useful x-ray beam)
٢. Recording materials (Films used in medical imaging and their applications).
X-ray films: Construction, Types, Sizes, Care of films.
٣. Processing principles.
Processing Cycle.
Manual and automatic processing
Chemicals, replenishment.
Day-light and *dry* processing
٤. Digital imaging systems

Course Lectures:

١. The recording system: Film Materials
 - a) Duplicate and single sided emulsion films, construction, common sizes of x-ray films.
 - b) Types of film used in medical imaging and their applications.
٢. The recording system: Film storage
 - a) Storage areas, expiry dates.
 - b) Care of film and storage conditions.
٣. The recording system: Film cassettes.
 - a) Ideal features of cassette.
 - b) X-ray cassette construction.
 - c) Types of cassette used and their applications.
 - d) Care of cassettes.
٤. Intensifying and fluoroscopic screens: Types, construction, types of phosphorus used in each and their applications.
٥. The x-ray exposure and the production of the invisible image. (Latent image)
٦. Film processing: manual and automatic, chemicals, chemistry, and replenishment.
٧. Silver recovery.
٨. Processing area:
 - a) Function of the processing area.
 - b) Darkroom design, construction, illumination, and darkroom equipment the viewing area.
 - c) Day-light processing.
٩. The influence of exposure factors.
١٠. Effects of scattered radiation and its control.

١١. Image quality: Factors affecting the image quality.
١٢. Image duplication and image subtraction techniques.
١٣. faults causes and remedies.
١٤. Special imaging techniques: digital imaging and PACS.

Instructional Methods:

- Lecture.
- Discussion.
- Demonstration.
- Case studies.
- Tutorials.

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Gunn C, Roberts D P, Smith N L; Radiographic Imaging: A Practical Approach. Churchill Livingstone. ISBN: ٠ ٤ ٤ ٣ ٠ ٧ ١ ١ ٥ ٢ .

Radiographic Technique (١)	
Course No.	Rad ١٢٠١
Credit hour	٤ (٢ Theoretical + ٢ Practical)
Prerequisite	Rad ١١٠١ + Rad ١١٠٤
Co- request	None

Course Description:

The students will learn how to operate a simple x-ray equipment to do basic radiographic examinations of the upper and lower extremities, thoracic cage, chest, abdomen, and pelvis. They will learn how to control the image quality by selecting suitable exposure factors with due regards to tube loading, radiation hazard and patient's condition. The student will learn how to modify the basic radiographic projections for example he will learn how to do alternative, additional and special projections of the above-mentioned regions.

Course Objectives:

By the end of the course the students will be able to:

١. Operate the simple *x-ray* equipment.
٢. Select suitable exposure factors for each part or region of the body.
٣. Describe the basic, additional, alternative, and special radiographic projections for the radiographic examinations of the upper and lower extremities, thoracic cage, chest, abdomen and pelvis.
٤. Carry out laboratory practice on phantoms for the radiographic projections of the above-mentioned regions.

- . Modify the radiographic techniques to suit the patient conditions.
- ٦. Calculate the exposure factors for the locomotors system, and make laboratory exposures under supervision.
- ٧. Begin to apply the knowledge and skills gained from the course in the clinic situation.

Course Contents:

1. introduction to radiography

- a) Radiography image production.
- b) Factors affecting the image production.

٢. Radiographic examination of: Fingers, thumb, hand and wrist.

- ١. Radius, ulna, elbow joint, humerus, shoulder, scapula, clavicles, acromio- and sterna-clavicular joints.
- ٢. Sternum and ribs.
- ٣. Toes, foot, calcaneum, and ankle joint.
- ٤. Upper and lower leg and knee.
- . Femur and hip joint.
- ٦. Pelvis and sacro-iliac joints.

Instructional Methods:

- Lecture.
- Discussion.
- Demonstration.
- Case studies.
- Tutorials.

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Clarke, K.C.; Positioning in radiography, volume ١; Heinemann M. Books, U.K.
- Bontrager, Kenneth L.; Textbook of Radiographic Positioning and Related Anatomy. Mosby.

Radiographic Equipment and Safety	
Course No.	Rad ١٢٠٢
Credit hour	٤ (٢ Theoretical + ٢ Practical)
Prerequisite	Rad ١١٠٣
Co- request	None

Course Description:

The course introduces the students to the theory of X-ray production and its utilization in diagnostic imaging. Students will also be introduced to simple X-Ray circuit and the various types of rectification and utilization of single phase and three-phase power supply. In addition, they will recognize the different parts of X-ray machines including: types of tubes, control panel, bucky table, chest stand, tomography units and other instruments and machines present in the X-ray room.

Course Objectives:

By the end of the course the students will be able to:

١. Understand the different equipment used in the production of X-ray.
٢. Identify the different types of X-ray tubes and the components of each type.
٣. Understand the electric circuit in X-ray machines.
٤. Understand the principles of X-ray production and image formation.
٥. Understand the different components of X-ray machines.

Outline of Course Contents:

١. Basic principles of electricity (DC)
٢. Alternating currents and the transformers.
٣. Circuit diagram of the X-Ray unit and rectification.
٤. Tubes, transistors, thynatron and control circuits.
٥. X-Ray production.
٦. Basic interaction of X-Rays with matter.
٧. Radiation hazards and protection.
٨. Physical principles of special X-Ray equipment.
٩. Verification of ohms' Law.
١٠. Use of oscilloscope to demonstrate types of rectification.
١١. Step-up and step-down transformer and their efficiency.
١٢. Stationary and rotating anode X-Ray tubes.
١٣. X-ray table, chest stand, control panel, tomography unit.

Instructional Methods:

- ▶ Lecture
- ▶ Discussion
- ▶ Demonstration
- ▶ Case studies
- ▶ Tutorials

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Chesney, D. N. and Chesney, M. O.; X-Ray Equipment for Student Radiographers.

Patient Care in Radiology department	
Course No.	Rad ١٢٠٣
Credit hour	٢ (٢ Theoretical)
Prerequisite	Ter.١١٠١
Co- request	None

Course Description:

The course will provide the students with necessary theoretical knowledge and practical tools which they need to meet their responsibilities towards the patients. This should include some knowledge of the first aid, the patient handling, hygiene in the X-ray department and how to deal with patients according to their situation: (stretcher patient, unconscious patient, and anaesthetized patient). The course gives the students some knowledge about drugs used in X-ray Department.

The course introduces the students to different types of patient care procedures and the best ways of creating good and healthy atmosphere for the patients.

Course Objectives:

By the end of the course the students will be able to:

١. Acquire the necessary knowledge and practical skills in care of patient.
٢. Assess the patient's vital signs.
٣. Apply the necessary method of moving the patient_
٤. Understand the different types of shocks and reactions.
٥. Properly deal with infected patients.
٦. Understand risks and hazards in the X-ray department.
٧. Properly handle sterilized objects.

Outline of the Course Contents:

١. Introduction: The hospital, the patient and the radiographer.
٢. The responsibilities of the radiographer.
٣. Features of general patient care.
٤. Drugs in the X-ray department.
٥. Sterilization and sterile techniques.
٦. Patient's general preparations of the abdomen and clothing.
٧. Special preparation of the patient.

Instructional Methods:

- Lecture
- Discussion
- Demonstration
- Case studies
- Tutorials

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- D.N.& M.O. Chesney, Care of The Patient in diagnostic radiography.

Radiographic Technique (٢)	
Course No.	Rad ١٢٠٤
Credit hour	٤ (٢ Theoretical + ٢ Practical)
Prerequisite	Rad ١١٠١ + Rad ١١٠٤
Co- request	None

Course Description:

This is the second part of the radiographic technique where students continue to learn how to perform radiographic examinations of the rest of the bony skeleton. Special emphasis is placed on radiography under varying conditions of the skull and spinal column including special projections. Student attention is drawn to the patient handling, maneuvering of the x-ray equipment, and selection of exposure factors and modification of the technique to suit the patient's condition. In addition to lectures and lab work with models and phantoms, students will be introduced to the radiology department in the hospital where they can observe the application of what they have learned on *real* patients

Course Objectives:

By the end of this course, the students will be able to:

١. Undertake all general examinations of the loco-motor system and bony cranium, including the facial bones and vertebral column under the supervision of the radiographic tutor or other qualified person.
٢. Communicate effectively with the patient in order to get his cooperation).
٣. Position the patient, film, and *x-ray* tube in relation to each other, depending on the x-ray examination being carried out.
٤. Select the necessary projections for the examinations.
٥. Select the correct exposure factors *for the* investigations.

Outline of Course Contents:

- ١) Abdomen projections, upper abdomen, K.U.B and gall bladder.
- ٢) Chest radiography: routine and special views
- ٣) Basic skull Projections.
- ٤) Special skull projections.
- ٥) Facial bones and jaws.
- ٦) Cervical spine general projections, special projection, and special projection including odontoid process C1, C٢ and C٢-T1 region.
- ٧) Thoracic spine.
- ٨) Lumbo-sacral spine.
- ٩) Lumbo-Sacral joint, sacrum and coccyx.
- ١٠) Hospital visits.

Instructional Methods:

- Lecture
- Discussion
- Demonstration
- Case studies
- Tutorials

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Clarke, K.C.; Positioning in radiography, volume ١; Heinemann M. Books, U.K.
- Bontrager, Kenneth L; Textbook of Radiographic Positioning and Related Anatomy. Mosby.

Radiographic Techniques (٣)	
Course No.	Rad ١٣٠١
Credit hour	٤ (٢ Theoretical + ٢ Practical)
Prerequisite	Rad ١١٠٢ + Rad ١٢٠١
Co- request	None

Course Description:

This course introduces the student to the equipment used in fluoroscopy examination for which fluoroscopy is particularly appropriate. The course deals with the techniques for the examination of the gastrointestinal tract, cystography, sialography, hysterosalpingography, arthrography the biliary tract and the location of pacemakers. Special emphasis is paid to the care of the patient before, during and after the examination.

Course Objectives:

By the end of this course, the students will be able to:

١. Understand the principle of fluoroscopic equipment.
٢. Describe the anatomy and physiology of organs examined by fluoroscopy.
٣. Describe the procedures of fluoroscopy examinations.
٤. Describe the indications and contraindications of performing fluoroscopy exams.
٥. Prepare the patient and room for such exams.
٦. Take care of the patient during and after the exam.
٧. Understand the performance of fluoroscopic equipment, image intensifiers and T.V. chain together with the associate image recording techniques.

Reference will be made to examinations most commonly undertaken with this equipment.

Outline of Course Contents:

١. Fluorescence and fluorescent materials in radiology.
٢. Equipment for conventional fluoroscopy:
 - Image intensifiers-construction and operation.
 - T.V. chain and the recording system.
٣. The gastro-intestinal tract:
 - Anatomy and physiology
 - Barium swallow, meal, follow through and enema.
٤. Salivary glands and ducts:
 - Anatomy and physiology
 - Sialography
٥. Urinary system:
 - Anatomy and physiology
 - Micturation cysto-urography
 - Excretion urography
 - Urethrography
٦. Biliary tract:
 - Anatomy and physiology
 - Cholecystography
 - Tube cholangiogram
٧. Hysterosalpingography + Anatomy and physiology
٨. Arthrography + Anatomy and physiology
٩. Myelography + Anatomy and physiology

Instructional Methods:

- Lecture
- Discussion
- Demonstration
- Case studies
- Tutorials

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Glenda Bryan, Diagnostic Radiography.
- Stephen Chapman, Radiographic Procedures.
- Bontrager, Kenneth L.; Textbook of Radiographic Positioning and Related Anatomy. Mosby.

Radiographic Techniques (٤)	
Course No.	Rad ١٢٠٢
Credit hour	٤ (٢ Theoretical +٢ Practical)
Prerequisite	Rad ١١٠٢ + Rad ١٢٠١
Co- request	None

Course Description:

This course familiarizes the student with the radiographic techniques necessary to demonstrate the soft tissue structures of the body. Types, characteristics, and hazards of using radiographic contrast agents will be discussed. The course gives the student an understanding of the principles of applications of these agents to various structures.

Course Objectives:

By the end of this course, the students will be able to:

١. Understand the term "soft tissue technique" and the requirements for this technique. And state its uses and the regions of the body usually involved.
٢. Classify different types of contrast agents and state the ones used for different examinations.
٣. State and identify various reactions to contrast media and the regions of the body usually involved.
٤. Discuss and perform radiographic examination of the urinary and biliary tracts.
٥. Understand the principle of tomography and its uses.

Course contents:

١. Contrast media chemistry and toxicity.
٢. Contrast media types and their uses.
٣. contrast media side effects and treatment.
٤. Soft-tissue radiography.
٥. Radiographic examination of the biliary and urinary tracts including: anatomy, physiology, indications and contraindications, techniques and views.
٦. principles of tomography machines: how they work, what they are used for.

Outline of Practical Schedule:

The practical session will start after two weeks from the beginning of the course (half-day). By the end of the practical work the student should be able to do x-ray examinations of abdomen, gall bladder, intravenous urography, oral cholecystography and tomography of kidneys. Weekly reports should be submitted.

Instructional Methods:

- Lecture
- Discussion
- Demonstration
- Case studies
- Tutorials

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Glenda Brayn, Diagnostic radiography.
- Stephen Chapman, Radiographic procedures.

Accidents and Emergency Radiography	
Course No.	Rad ١٣٠٣
Credit hour	٤ (٢ Theoretical + ٢ Practical)
Prerequisite	Rad ١٢٠١
Co- request	None

Course Description:

This course introduces the students to the special procedures followed in the accidents and emergency (A&E) department. The students spend part of this period working in the A&E unit under appropriate supervision so that they may increase their expertise in the adaptation of conventional radiography, petitioning to the needs of injured or acutely ill patients. Emphasis should be placed on types of emergencies and total patient care.

Course Objectives:

By the end of this course, the students will be able to:

- ١- Identify the differences between dealing with regular patients, in the main X-ray department and in the A&E.
- ٢- Identify the emergency situation and properly handle the involved patient.
- ٣- Modify and conduct the X-ray examination according to the patient's status.
- ٤- Carefully handle the patient and work in reasonably short time.

Outline of Course Contents:

١. Primary care of emergency patient. Transference to hospital and handling techniques.
٢. The emergency trolley contents and uses.
٣. Types of injuries and factures, complications and management.
٤. Shock: types, causes and management.
٥. Injuries especially blunt trauma to chest and abdomen.
٦. Head and spine injuries: types and complications.
٧. Acute medical conditions.
٨. Low backache.
٩. Emergency in obstetrical practice.

Instructional Methods:

- Lecture
- Discussion
- Demonstration
- Case studies
- Tutorials

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Ferry, Ted. Elements of accident investigations and care of the patient in diagnostic radiology. Blackwell U.K.

Mobile Radiography	
Course No.	Rad ١٣٠٤
Credit hour	٤ (٢ Theoretical + ٢ Practical)
Prerequisite	Rad ١٢٠٢ + Rad ١٢٠١ + Rad ١٢٠٤
Co- request	None

Course Description:

This course introduces the students to the construction and operation of the portable and mobile X-ray units as well as the C-Arm image intensifier unit. It covers bedside radiography of patients especially those with special conditions such as; intravenous drips oxygen therapy, respirators, traction, tube drainage and the I.C.U. patients. The students are also introduced to the radiographic technique of the operating theater, as well as the technique and the importance of sterilization.

Course Objectives:

By the end of this course, the students will be able to:

١. Identify the structure and features of different types of mobile X-ray units.
٢. Understand the need for the use of a mobile X-ray unit.
٣. Identify the differences between working with a mobile X-ray unit and in the main dept.
٤. Identify the advantages and disadvantages of mobile units
٥. Understand the need for sterilization.
٦. Understand the special procedures performed in the O.R. using mobile X-ray units.

Outline of Course Contents:

١. Construction of the portable, mobile, and C-Arm units.
٢. Indications for mobile radiography in the ward and operating theaters.
٣. The patient on I.V. Drips, respirator, oxygen.
٤. The patient on traction, tracheotomy, I_C.U.
٥. Isolation (Barrier) Nursing
٦. The patient in operating theater.
٧. Sterilization and sterile techniques.
٨. The unconscious patient; bums.
٩. First aid: shocks, arid other radiological emergencies.

Instructional Methods:

- Lecture
- Discussion
- Demonstration
- Case studies
- Tutorials

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Chesney, Equipment for diagnostic Radiography.
- Clarke, K.C.; Positioning in radiography, volume ١; Heinemann M.

Radiographic Image Interpretation	
Course No.	Rad ١٤٠١
Credit hour	٤ (٢ Theoretical + ٢ Practical)
Prerequisite	Rad ١٣٠١ + Rad ١٣٠٢
Co- request	None

Course Description:

Through a series of lectures, tutorials and practical sessions, students are taught about the formation of images by different image modalities. They are also introduced to the appearance of normal and abnormal structures in an image. In addition, they will be asked to identify different views and artifacts. The appearance of some simple pathology, such as fractures, will also be discussed.

Course Objectives:

By the end of the course, the students will be able to:

١. Understand and appreciate the formation of images by different modalities.
٢. Identify normal structures and abnormal artefacts on an image and find appropriate remedies.
٣. Suggest the appropriate modality for different examinations.
٤. Identify simple pathologies.

Outline of Course Contents:

١. The electromagnetic spectrum: in relation to imaging modalities.
٢. The radiographic image on an X-ray film: image production, definition of glossary: attenuation, contrast, density, magnification, distortion.
٣. Chest (lungs and heart): -normal radiographs in various views: anatomy, image quality.-abnormal radiographs: various techniques to demonstrate different pathologies.

٤. Bone: normal appearance, growth and development.
٥. Fractures: types, complications, the healing process. Other bone abnormalities.
٦. Vascular diseases.
٧. Other abnormalities: images with different pathologies from different modalities.

Instructional Methods:

- Lecture
- Discussion
- Demonstration
- Case studies
- Tutorials

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Armstrong P, Diagnostic Imaging. Palmer, Manual of Radiographic Interpretation, WHO, Geneva.

Practium	
Course No.	Rad ١٢٠٤
Credit hour	٤ (٢ Theoretical + ٢ Practical)
Prerequisite	Rad ١٣٠١ + Rad ١٣٠٢ + Rad ١٣٠٣
Co- request	None

Course Description:

This course enables the students to gain their first set of clinical experiences in the x-ray department.

After an introductory period where the students gain an overall view of the department as a whole, they will be assigned to the general and causality areas. At the first two weeks the students would observe and then, under supervision, carry out radiographic examination of the extremities, thorax, shoulder, pelvis, vertebral column, and hips. The students would be encouraged to participate in all radiographic procedures, analyze faults in techniques and processing, and suggest remedial action. This course also enables the students to gain further practical experience in fluoroscopy. Emphasis is placed on experiences in fluoroscopy examinations where contrast media are used, such as G.I. tract, hysterosalpingography, cystography, arthrography, the biliary tract and urethrography. The student gets practical experiences in setting the X-ray unit for examinations and exposure factors and giving the necessary assistance to patient and radiologist during examination.

Course Objectives:

By the end of the course, the students will be able to:

١. Describe the layout and function of a typical X-ray department
٢. Take routine radiographs of the upper and lower limbs, thorax, pelvis, vertebral column, and hips.
٣. Identify gross abnormality on the resultant radiographs.
٤. Modify the radiographic techniques of the above regions to suit the patient condition.
٥. Carry out darkroom procedures.
٦. Take care of patients before, during, and after the x-ray examination.
٧. Identify the different exams involving the use of C. M. and fluoroscopy.
٨. Participate and assist in radiographic exams involving the use of fluoroscopy and C.M
٩. Prepare the room and the patient for such exams.
١٠. Keep a log-book of exams attended.

Outline of Course Contents:

١. Week one and two: General orientation to the medical imaging department especially the x-ray department.
٢. Weeks three to fifteen: Rotation to the outpatient, main x-ray department, and casualty department.

Instructional Methods:

- Lecture
- Discussion
- Demonstration
- Case studies
- Tutorials

Suggested Method of Evaluation:

In-term examinations	٥٠ Marks
Attendance and participation	١٠ Marks
Final examination	٤٠ Marks
Total Marks	١٠٠ Marks

Student Resource Materials:

١. Internally prepared and produced Handouts.
٢. Corresponding homework exercises.
٣. Corresponding practical exercises.

Textbooks and References:

- Myer G, Radiographic index. Wright and sons, U.K.
- Bryan, Glenda; Diagnostic Radiography.
- Clarke, K.C.; Positioning in radiography, volume I; Heinemann M. Books, U.K.

FIRST - SEMESTER

Code	No	Title				
Chm		General Chemistry	(+)			
Zoo		General Biology	(+)			
Com		Introduction to Computer	(+)			
Ter		Medical Terminology				
Islam		Islamic Culture				
Eng		English Language				

SECOND - SEMESTER

Cod	No	Title				
Rad		Radiographic Anatomy				
Rad		Radiographic Physiology				
Rad		X – Ray Physics	(+)			
Rad		Image Recording	(+)			

THIRD - SEMESTER

Code	No	Title				
Rad		Radiographic Equipment and Safety	(+)			
Rad		Patient Care in Radiology Dept				
Rad		Radiographic Technique ()	(+)			
Rad		Radiographic Technique ()	(+)			

FOURTH - SEMESTER

Code	No	Title				
Rad		Radiographic Technique ()	(+)			
Rad		Radiographic Technique ()	(+)			
Rad		Mobile Radiography	(+)			
Rad		Accidents and Emergency Radiography	(+)			

FIFTH - SEMESTER

Code	No	Title				
Rad		Radiographic Image Interpretation	(+)			
Rad		Practicum	(+)			

Code	No	Title				
Chm		General Chemistry	(+)			
Zoo		General Biology	(+)			
Com		Introduction to Computer	(+)			
Ter		Medical Terminology				
Islam		Islamic Culture				
Eng		English Language				
Code	No	Title				
Rad		Radiographic Anatomy				
Rad		Radiographic Physiology				
Rad		X - Ray Physics	(+)			
Rad		Image Recording Techniques	(+)			
Code	No	Title				
Rad		Radiographic Equipment and Safety	(+)			
Rad		Patient Care in Radiology Dept				
Rad		Radiographic Technique ()	(+)			
Rad		Radiographic Technique ()	(+)			
Code	No	Title				
Rad		Radiographic Technique ()	(+)			
Rad		Radiographic Technique ()	(+)			
Rad		Mobile Radiography	(+)			
Rad		Accidents and Emergency Radiography	(+)			
Code	No	Title				
Rad		Radiographic Image Interpretation	(+)			
Rad		Practicum	(+)			