

STUDENT HANDBOOK

BACHELOR OF MEDICAL IMAGING (HONOURS)

SESSION 2020/2021

SCHOOL OF MEDICAL IMAGING

FACULTY OF HEALTH SCIENCES

UNIVERSITI SULTAN ZAINAL ABIDIN



PDF version



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UniSZA/Rad/SMI/Student Handbook

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2.0 PROGRAMME INFORMATION

Medical imaging or diagnostic imaging refers to a technique, process or an art of creating visual representations of body for clinical analysis and medical intervention. The main purpose is to reveal the conditions of internal structures without surgical intervention. Diploma in Radiography is a programme related to the science of imaging and diagnostic which encapsulate the production of radiographic images of internal organs by using ionizing or non-ionizing radiation, such as X-rays, gamma rays, high frequency sound waves and magnetic field.

The main aim of this programme is to produce proficient and competent radiographers with world class ranking. Therefore, various activities in the area of education, practical and skills development are included.

A radiographer is responsible to provide safe, fast and accurate radiographic examinations with the use of a wide range of imaging modalities. These include the conventional and digital radiography (C/DR), Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Ultrasonography (US), Angiography, Mammography and Radionuclide Imaging (RNI). In addition, aspects of image recording and processing, patient care and safety, communication and handling issues, human anatomy and pathology, instrumentation management and handling and radiation safety principles are also included.

2.1 Objectives

To provide the students with the sufficient knowledge and skills in the field of radiography with regards to the Islamic values.

2.1.1 Programme Education Outcomes (PEO)

To produce graduates who can:

- i. use knowledge and practical skills of medical imaging to produce quality images and to handle imaging modalities ethically and professionally.
- ii. communicate effectively with clients, staff and public and demonstrate good leadership skills in an organization.
- iii. apply entrepreneurship and problem solving skills, good management and planning in healthcare services.
- iv. apply life-long learning skills and show interest in current based practice and advanced knowledge in medical imaging sciences update for career development.

2.2 Duration and Type of Study

- | | | | |
|-------|-------------------|---|---|
| 2.2.1 | Type of Study | : | Full-time only |
| 2.2.2 | Duration of Study | : | Min 4 years (8 semesters + 2 short semesters)
Maximum 6 years (12 semesters) |

2.3 Career Opportunities

2.3.1 Clinical/Healthcare personnel

Work as a diagnostic radiographer at government or private institutions (hospitals, clinics, medical centres, etc.).

2.3.2 Industrial

Work as an application imaging specialist at international leading medical companies such as Siemens Medical, PHILIPS healthcare, GE Healthcare etc.

2.3.3 Management

By years, will climb up to become a chief, manager or head of department.

2.3.4 Academics

Opportunity to further study at postgraduate levels to become a university lecturer.

2.4 Programme Learning Outcomes

Upon completion of this programme, students should be able to:

- i. Demonstrate fundamental knowledge in medical imaging. (MQF1)
- ii. Perform radiographic procedures competently. (MQF2)
- iii. Demonstrate critical thinking and decision making related to medical imaging. (MQF6)
- iv. Communicate effectively both in written and verbal at the professional and community level. (MQF5)
- v. Function individually and as a team in the organization and the community. (MQF3/MQF5)
- vi. Adhere to the legal, ethical principles and the professional code of conduct in medical imaging. (MQF4)
- vii. Interpret and manage information as well as be able to recognize life-long learning for career development. (MQF7)
- viii. Demonstrate self-motivation and recognize entrepreneurial opportunity in the field of radiography. (MQF8)
- ix. Demonstrate leadership qualities in the organization of medical imaging. (MQF5)

3.0 ACADEMIC CALENDAR (SESSION 2020/2021)

MINGGU	TARIKH	
SEM I SESI 2020/21		
M1-M7	21/10/20 - 08/12/20	KULIAH / LECTURES
	9/12/20 - 12/12/20	MIDTERM BREAK
M8-M14	13/12/20 - 30/01/21	KULIAH / LECTURES
	31/01/21 - 02/02/21	REVISION WEEK
	03/02/21 - 29/02/21	EXAM WEEK
	21/02/21 - 06/03/21	END SEMESTER BREAK
SEM II SESI 2020/21		
M1-M7	07/03/21 - 24/04/21	KULIAH / LECTURES
	25/04/21 - 01/05/21	MIDTERM BREAK
M8-M14	02/05/21 - 19/06/21	KULIAH / LECTURES
	20/06/21 - 22/06/21	REVISION WEEK
	23/06/21 - 10/07/21	EXAM WEEK
	11/07/21 - 31/07/21	END SEMESTER BREAK

3.1 Courses Offered by Semester

****(TO BE REFERRED FOR REGISTERING COURSES EVERY SEMESTER)*

SESI PENAWARAN: SEM I 2020/2021 (Semester 1)

BIL	KOD KURSUS	NAMA KURSUS	KOMPONEN	KUMPULAN	JAM KREDIT
1	MPU33012	ILMU WAHYU DAN SAINS (for MUSLIM only)	Kursus Universiti	Kumpulan 1	2
2	MPU33022	MORAL DAN ETIKA II (for NON-MUSLIM only)	Kursus Universiti	Kumpulan 1	2
3	MPU33032	ILMU WAHYU DAN KEMASYARAKATAN (for MUSLIM only)	Kursus Universiti	Kumpulan 2	2
4	MPU33042	PERBANDINGAN AGAMA II (for NON-MUSLIM only)	Kursus Universiti	Kumpulan 2	2
5	MPU31042	BAHASA MELAYU ASAS (for INTERNATIONAL Students)	Kursus Universiti	Kumpulan 3	2
6	MPU31072	PENGHAYATAN ETIKA DAN PERADABAN (for ALL students)	Kursus Universiti	Kumpulan 3	2
7	ASING1	KURSUS BAHASA ASING I	Kursus Universiti	Kursus Bahasa Asing	2
8	KOKO	KURSUS KOKURIKULUM	Kursus Universiti	Kursus Kokurikulum	3
9	MPU31062	FALSAFAH DAN ISU SEMASA	Kursus Universiti	Tiada Opsyen	2
10	MPU32092	ASAS PEMBUDAYAAN KEUSAHAWANAN	Kursus Universiti	Tiada Opsyen	2
11	PBI10102	ENGLISH FOR COMMUNICATION I	Kursus Universiti	Tiada Opsyen	2
12	PBI10202	ENGLISH FOR COMMUNICATION II	Kursus Universiti	Tiada Opsyen	2
JUMLAH JAM KREDIT SEMESTER					19

SESI PENAWARAN: SEM II 2020/2021 (Semester 2)

BIL	KOD KURSUS	NAMA KURSUS	KOMPONEN	KUMPULAN	JAM KREDIT
1	DBP10103	HUMAN ANATOMY AND PHYSIOLOGY I	Kursus Teras Program	Tiada Opsyen	3
2	DBP10203	FUNDAMENTAL OF PHYSICS	Kursus Teras Program	Tiada Opsyen	3
3	DBP10303	IMAGING TECHNIQUE I	Kursus Teras Program	Tiada Opsyen	3
4	DBP10402	PATIENT CARE IN RADIOGRAPHY I	Kursus Teras Program	Tiada Opsyen	2
5	DBP10702	PATIENT CARE IN RADIOGRAPHY II	Kursus Teras Program	Tiada Opsyen	2
6	DBP21402	BASIC PATHOLOGY	Kursus Teras Program	Tiada Opsyen	2
7	DBP21803	MEDICAL IMAGING INSTRUMENTATION	Kursus Teras Program	Tiada Opsyen	3
JUMLAH JAM KREDIT SEMESTER					18

SESI PENAWARAN: SEM PENDEK 2021/2022 (Semester 3)

BIL	KOD KURSUS	NAMA KURSUS	KOMPONEN	KUMPULAN	JAM KREDIT
1	DBP11007	CLINICAL PRACTICE I	Kursus Teras Program	Tiada Opsyen	7
JUMLAH JAM KREDIT SEMESTER					7

SESI PENAWARAN: SEM I 2021/2022 (Semester 4)

BIL	KOD KURSUS	NAMA KURSUS	KOMPONEN	KUMPULAN	JAM KREDIT
1	DBP10503	HUMAN ANATOMY AND PHYSIOLOGY II	Kursus Teras Program	Tiada Opsyen	3
2	DBP10603	RADIATION PHYSICS	Kursus Teras Program	Tiada Opsyen	3
3	DBP10803	IMAGING TECHNIQUE II	Kursus Teras Program	Tiada Opsyen	3
4	DBP10903	RADIOBIOLOGY AND RADIATION PROTECTION	Kursus Teras Program	Tiada Opsyen	3
5	DBP21703	IMAGING PROCESS	Kursus Teras Program	Tiada Opsyen	3
6	DBP22502	BASIC RADIOGRAPHIC ANATOMY AND IMAGE EVALUATION	Kursus Teras Program	Tiada Opsyen	2
7	DBP22703	ADDITIONAL RADIOGRAPHIC PROCEDURES	Kursus Teras Program	Tiada Opsyen	3
JUMLAH JAM KREDIT SEMESTER					20

SESI PENAWARAN: SEM II 2021/2022 (Semester 5)

BIL	KOD KURSUS	NAMA KURSUS	KOMPONEN	KUMPULAN	JAM KREDIT
1	DBP21002	HEALTH CARE INFORMATION SYSTEM	Kursus Teras Program	Tiada Opsyen	2
2	DBP21502	ADVANCED PATHOLOGY	Kursus Teras Program	Tiada Opsyen	2
3	DBP21603	INTERVENTIONAL IMAGING	Kursus Teras Program	Tiada Opsyen	3
4	DBP21903	COMPUTED TOMOGRAPHY	Kursus Teras Program	Tiada Opsyen	3
5	DBP22103	ULTRASONOGRAPHY	Kursus Teras Program	Tiada Opsyen	3
6	DBP22402	BASIC HUMAN PSYCHOLOGY	Kursus Teras Program	Tiada Opsyen	2
7	DBP22602	INTER. RADIOGRAPHIC ANATOMY & IMAGE EVALUATION	Kursus Teras Program	Tiada Opsyen	2
JUMLAH JAM KREDIT SEMESTER					17

SESI PENAWARAN: SEM PENDEK 2022/2023 (Semester 6)

BIL	KOD KURSUS	NAMA KURSUS	KOMPONEN	KUMPULAN	JAM KREDIT
1	DBP22207	CLINICAL PRACTICE II	Kursus Teras Program	Tiada Opsyen	7
JUMLAH JAM KREDIT SEMESTER					7

SESI PENAWARAN: SEM I 2022/2023 (Semester 7)

BIL	KOD KURSUS	NAMA KURSUS	KOMPONEN	KUMPULAN	JAM KREDIT
1	DBP30502	SECTIONAL ANATOMY	Kursus Teras Program	Tiada Opsyen	2
2	DBP30803	COMPARATIVE IMAGING	Kursus Teras Program	Tiada Opsyen	3
3	DBP31103	MAGNETIC RESONANCE IMAGING	Kursus Teras Program	Tiada Opsyen	3
4	DBP31203	NUCLEAR IMAGING	Kursus Teras Program	Tiada Opsyen	3
5	DBP31303	QUALITY ASSURANCE IN MEDICAL IMAGING	Kursus Teras Program	Tiada Opsyen	3
JUMLAH JAM KREDIT SEMESTER					14

SESI PENAWARAN: SEM II 2022/2023 (Semester 8)

BIL	KOD KURSUS	NAMA KURSUS	KOMPONEN	KUMPULAN	JAM KREDIT
1	DBP30103	BIOSTATISTICS	Kursus Teras Program	Tiada Opsyen	3
2	DBP30203	DIGITAL IMAGE PROCESSING	Kursus Teras Program	Tiada Opsyen	3
3	DBP31402	RESEARCH PROJECT I	Kursus Teras Program	Tiada Opsyen	2
4	DBP31502	RESEARCH METHODOLOGY	Kursus Teras Program	Tiada Opsyen	2
5	DBP31602	WRITING FOR SCIENTIFIC PURPOSE	Kursus Teras Program	Tiada Opsyen	2
JUMLAH JAM KREDIT SEMESTER					12

SESI PENAWARAN: SEM I 2023/2024 (Semester 9)

BIL	KOD KURSUS	NAMA KURSUS	KOMPONEN	KUMPULAN	JAM KREDIT
1	DBP40105	CLINICAL PRACTICE III	Kursus Teras Program	Tiada Opsyen	5
2	DBP41005	CLINICAL PRACTICE IV	Kursus Teras Program	Tiada Opsyen	5
3	DBP41105	CLINICAL V	Kursus Teras Program	Tiada Opsyen	5
JUMLAH JAM KREDIT SEMESTER					15

SESI PENAWARAN: SEM II 2023/2024 (Semester 10)

BIL	KOD KURSUS	NAMA KURSUS	KOMPONEN	KUMPULAN	JAM KREDIT
1	DBP40302	EVIDENCE BASED PRACTICE IN HEALTH	Kursus Teras Program	Tiada Opsyen	2
2	DBP40502	ETHICS AND LAW IN HEALTH SCIENCES	Kursus Teras Program	Tiada Opsyen	2
3	DBP40602	HEALTHCARE MANAGEMENT	Kursus Teras Program	Tiada Opsyen	2
4	DBP41206	RESEARCH PROJECT II	Kursus Teras Program	Tiada Opsyen	6
JUMLAH JAM KREDIT SEMESTER					12

4.0 STUDENT ASSESSMENT METHOD

4.1 Types of Assessments

4.1.1 Formative Assessment (Tutorials/Lab Activities)

Formative assessment is conducted to monitor student learning progress during learning process. The feedback from this assessments is used to identify areas or topics that need more attention and does not affect the grading of the **FINAL** marks.

4.1.2 Continuous Assessment (Conass)/ Presentation

Continuous assessments are given to assess and evaluate student's performance and level of understanding for each course. These high-stakes assessments contribute for 40-50% of the total **FINAL** marks.

4.1.3 Summative Assessment

Summative assessment includes written 'Final Examination' or 'Objective Structured Practical/Clinical Examination (OSPE/OSCE)' at the end of the semester. This assessment contribute 50-60% of the total **FINAL** marks.

Total Marks of Written Final Examination (Summative Assessment)

CREDIT HOUR	DURATION	TOTAL MARKS
1	1 hour	50%
2	2 hours	70%
3	2 hours 30 minutes	100%
4	2 hours 30 minutes	100%

4.2 Clinical Practice Evaluation

4.2.1 Components of Clinical Practice Evaluation may include:

- Records of clinical practice (logbook).
- Assessment of professional attitude.
- Clinical workbook.
- Clinical assessments (refer 4.2.2 for types of radiographic examinations being assessed)
- Objective Structured Practical Examination (OSPE).

4.2.2 Types of Examinations

- Chest
- Upper and lower extremities
- Abdomen
- Vertebra column
- Skull
- Ward (portable/mobile)
- Intravenous Urography
- Non-ambulant

Clinical assessment takes into account the complexity of the radiographic procedures. These will be examined based on the scoring criteria to assess student's clinical competence. Students should complete and record at least 90% of cases required in logbook for each semester.

4.2.3 The Clinical Practice Evaluation are intended to enable the trainees to:

- use the basic knowledge and skills needed by a radiographer in the evaluation of patients and treatment in a practical environment.
- develop and acquire skills to assess, consider and solve clinical problems in radiography with creative, critical and flexible approach.
- develop self-management skills in medical imaging organization.

4.2.4 Compulsory requirements of Clinical Practice Evaluation.

- Student must pass in the OSPE.
- If the student fails, he/she will be allowed to re-sit. However, the total marks of workbook will be deducted by 10%.
- If the student fails again, grade 'F' will be given.

5.0 SCORING GRADES

5.1 Scoring Grade for Core Courses

Scores	Grade	Grade Point	Mean
80 – 100	A	4.00	Excellent
75 – 79	A-	3.67	
70 – 74	B+	3.33	Good
65 – 69	B	3.00	
60 – 64	B-	2.67	Medium
55 – 59	C+	2.33	
50 – 54	C	2.00	
47 – 49	C-	1.67	Failed
44 – 46	D+	1.33	
40 – 43	D	1.00	
39 and below	F	0.00	

5.2 Scoring Grade for University Courses

Scores	Grade	Grade Point	Mean
80 – 100	A	4.00	Excellent
75 – 79	A-	3.67	
70 – 74	B+	3.33	Good
65 – 69	B	3.00	
60 – 64	B-	2.67	Medium
55 – 59	C+	2.33	
50 – 54	C	2.00	
47 – 49	C-	1.67	Minimum Achievement
44 – 46	D+	1.33	
40 – 43	D	1.00	
39 and below	F	0.00	Failed

6.0 ACADEMIC REGULATIONS

6.1 Assessment of Students' Performance

- Students with CGPA ≥ 2.00 are considered **PASSED** and are allowed to proceed to the next semester.
- Students with CGPA between 1.70 and 2.00 are considered **CONDITIONAL PASSED (*Lulus Bersyarat – LB*)** and placed under academic probation period. Students may be allowed to continue their studies until they achieve CGPA of 2.0 and above. If NOT, the status of **GB (*Gagal Berhenti*)** will be given.
- Students with CGPA < 1.70 are considered **FAILED** and will be terminated.
- Students who **FAILED** in any of the same subjects 3 times in a row will be given the status of **GB**.

6.2 Compulsory requirements for Diploma

A student must meet all of the following requirements to be awarded with a Diploma in Radiography;

- Achieve a minimum PNGK/CGPA of 2.00.
- Has completed the 112 credit hours.
- Has completed Clinical Practice I to VI.

7.0 LIST OF COMMON TEXTBOOKS

ANATOMY AND PHYSIOLOGY I & II

1. W. Anne & Grant A. (2011) *Ross and Wilson Anatomy and Physiology in Health and Illness*. (11th Ed.) Churchill Livingstone: Elsevier.
2. Tortora G. J., Derrickson B. H. (2011) *Introduction to the Human Body*. Wiley.
3. Elaine N. M. & Katja H. (2012) *Human Anatomy & Physiology* (9th Ed.) Benjamin Cummings.
4. Applegate E. J. (2009) *The Sectional Anatomy Learning System: Concepts and Applications*. (3rd Ed.) Saunders.

PATHOLOGY I & II

1. Kowalczyk, N. & Mace, J.D. (2009) *Radiographic Pathology for Technologists* (5th Ed.) St Louis: Mosby.
2. Eisenberg, R. L. & Johnson, N. M. (2011) *Comprehensive Radiographic Pathology* (5th Ed.) St Louis: Mosby.
3. Kumar V., Abbas A.K., Fausto N., Mitchell R. (2012) *Robbins Basic Pathology: With Student Consult Online Access* (8th Ed.) Philadelphia: Saunders.

APPLIED PHYSICS & RADIATION PHYSICS

1. James Johnston, Terri L. Fauber EdD RT (2011) *Essentials of Radiographic Physics and Imaging*, (1st Ed.) Mosby.
2. Ken Holmes, Marcus Elkington, Phil Harris (2013) *Clark's Essential Physics in Imaging for Radiographers* (1st Ed.) CRC Press.
3. Stewart C. Bushong, (2012) *Radiologic Science for Technologists: Physics, Biology, and Protection* (10th Ed.) Radiologic Science for Technologists: Phys, Biol & Protection: Elsevier.

PATIENT CARE IN RADIOGRAPHY I & II

1. Ehrlich, R.A. (2012) *Patient Care in Radiography: with an Introduction to Medical Imaging* (8th Ed.) Mosby, Portland.

MEDICAL IMAGING

1. Kenneth L. Bontrager & John Lampignano (2013) *Text book of Radiographic Positioning and Related Anatomy* (8th Ed.) Mosby.
2. Ruth Sutherland, (2003) *Pocketbook of Radiographic Positioning*. Elsevier Health Sciences.
3. Swallow R.A. & Naylor, E. (2013) *Clark's Positioning in Radiography* (12th Ed.) CRC Press
4. Eugene D. Frank, Bruce W. Long, Barbara J. Smith (2011) *Merill's Atlas of Radiographic Positioning & Procedures* (12th Ed.) Mosby.

5. Kathy McQuillen Martensen, (2010) *Radiographic Image Analysis* (3rd Ed.) Saunders.
6. Bontrager K. L. (2014) *Textbook of Radiographic Positioning and Related Anatomy*, Mosby.
7. Frank E. D. (2007) *Merrill's Atlas of Radiographic Positioning and Procedures: 3-Volume Set* (12th Ed.) Mosby.
8. Whitley A. S., Sloane C., Hoadley S., Moore A. D., Alsop C.W. (2005) *Clark's Positioning in Radiography* (12th Ed.) CBS Publishers.
9. McQuillen-Martensen (2011) *Radiographic Image Analysis* (3rd Ed.) Saunders.
10. Ruth Sutherland (2003) *Pocketbook of Radiographic Positioning*, Elsevier Health Sciences.

SPECIALIZED IMAGING II

1. Bontrager K. L. (2014) *Textbook of Radiographic Positioning And Related Anatomy*, Mosby.
2. Frank E. D. (2007) *Merrill's Atlas of Radiographic Positioning and Procedures: 3-Volume Set* (12th Ed.) Mosby.
3. Whitley A. S., Sloane C., Hoadley S., Moore A. D., Alsop C.W. (2005) *Clark's Positioning in Radiography* (12th Ed.) CBS Publisher
4. P.E.S Palmer. (2002) *Manual Of Diagnostic Ultrasound*, WHO

GENERAL RADIOGRAPHIC INSTRUMENTATION, SPECIALIZED RADIOGRAPHIC INSTRUMENTATION & CONVENTIONAL IMAGING PROCESS

1. Carlton, R. R. & Adler, A.M., (2012). *Principles of Radiographic Imaging: An Art and A Science* (5th Ed.) Delmar: Cengage Learning
2. Stewart C. Bushong, (2012) *Radiologic Science for Technologists: Physics, Biology, and Protection* (10th Ed.) Elsevier
3. Jerrold T. Bushberg (2012) *The Essential Physics of Medical Imaging*, (3rd Ed.) Lippincott Williams & Wilkins.
4. David Dowsett, Patrick A Kenny R Eugene Johnston (2006) *The Physics of Diagnostic Imaging* (2nd Ed.) CRC Press.
5. James Johnston, Terri L. Fauber (2011) *Essentials of Radiographic Physics and Imaging* (1st Ed.) Mosby.
6. Carter P H et al, (1994) *Chesney's Equipment for Student Radiographers*, Blackwell Science.

DIGITAL IMAGING PROCESS

1. Bourne, R. (2010) *Fundamentals of Digital Imaging in Medicine*, Springer London.
2. Carlton, R., & Adler, A. (2013) *Principles of Radiographic Imaging: An Art and A Science* (5th Ed.) Cengage Learning.
3. Lanca, L., & Silva, A. (2013) *Digital Imaging Systems for Plain Radiography*, Springer New York.
4. Jerrold T. Bushberg (2011) *The Essential Physics of Medical Imaging* (3rd Ed.)

Lippincott Williams & Wilkins

5. Stewart C. Bushong (2012) *Radiologic Science for Technologists: Physics, Biology, and Protection* (10th Ed.) Radiologic Science for Technologists: Phys, Biol & Protection: Elsevier
6. Carroll, Q. B. (2007) *Practical Radiographic Imaging*, Charles C Thomas Publisher.
7. Seutens, P. (2009) *Fundamentals of Medical Imaging*, Cambridge University Press.
8. Craig, T. Shepherd (2003) *Radiographic Image Production and Manipulation*, Columbus: McGraw-Hill.
9. Ball, J et al (2001) *Chesney's Radiographic Imaging*, Oxford: Blackwell Scientific Publication.
10. Sprawls, P (1995) *Physical principles of medical imaging*, Medical Physics USA: Aspen Publishers.

RADIATION PROTECTION

1. Malaysia Standard Ms 838 (2007) *Code Of Practice For Radiation Protection - Medical X-Ray Diagnosis*
2. IAEA, (2011) Basic Safety Standard
3. Mary Alice StatkiewiczSherer, Paula J. Visconti, E. Russell Ritenour, (2011) *Radiation Protection in Medical Radiography* (6th Ed.) Mosby.
4. Martin, Harbison, Beach, Cole (2012) *An Introduction To Radiation Protection* (6th Ed.) Hodder Arnold
5. Stewart C. Bushong (2012) *Radiologic Science for Technologists: Physics, Biology and Protection* (10th Ed.) Elsevier
6. Steve Forshier (2008) *Essentials of Radiation, Biology And Protection* (2nd Ed.) Delmar Cengage Learning
7. Abd Khalik, Azali (2006) *Handbook of Radiation Protection*

SECTIONAL ANATOMY

1. Applegate E. J. (2010) *The Sectional Anatomy Learning System* (3rd Ed.) Elsevier: Mosby.
2. Torsten B. Moeller & Emil Reif (2010) *Pocket Atlas of Radiographic Anatomy* (3rd Ed.) Flexibooks: Thieme.
3. Lorrie L. Kelley & Connie Peterson (2012) *Sectional Anatomy for Imaging Professionals* (3rd Ed.) Elsevier: Mosby.

RADIOGRAPHIC ANATOMY AND IMAGE ANALYSIS

1. McQuillen-Martensen (2015) *Radiographic Image Analysis*, Saunders
2. Kenneth L. Bontranger (2013) *Text book of Radiographic Positioning and Related Anatomy*, Mosby.
3. Vinita Merrill (2016) *Merill's Atlas of Radiographic Positioning & Procedures*, Mosby.
4. Swallow R.A and Naylor E (2015) *Clark's Positioning in Radiography*, CBS Publishers.

QUALITY ASSURANCE IN MEDICAL IMAGING

1. Andrea T.S, (2000) *Quality Management for Radiographic Imaging*, McGraw-Hil/Appleton & Lange
2. Jeffrey Papp (2010) *Quality Management in the Imaging Sciences* (4th Ed.) Mosby
3. Moores B et al, (1987) *Practical Guide to Quality Assurance in Medical Imaging*, John Wiley & Sons Ltd
4. Forster E, (1986) *Equipment for Diagnostic Radiography*, MTP Press.
5. Stockley S, (1986) *A Manual of Radiographic Equipment*, Churchill Livingstone.

BIOSTATISTICS

1. Yaacob, M. R. (2013) *SPSS 20 for Business and Social Science Students* (1st Ed.) Eduserve Resources.
2. Coakes (2012) *Analysis without Anguish with SPSS V20*, John Wiley & Sons Inc.
3. John W. C. (2013) *Crewell, Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th Ed.) SAGE Publications, Inc.
4. Belle, G., Kathleen F. K. (2012) *Design and Analysis of Experiments in the Health Sciences* (1st Ed.) Wiley.
5. Zamalia, M. (2009) *Handbook of Research Methodology: A Simplified Version*, University Publication Centre (UPENA).
6. Blaikie, N. (2000) *Designing Social Research: The Logic of Anticipation*, Cambridge: Ploty Press.
7. Dawson, B., Trapp, R.G., Trapp, R. (2004) *Basic & Clinical Biostatistics* (4th Ed.) New York: McGraw-Hill Medical.
8. Sekaran, U. (2002) *Research Methods for Business, A Skill Building Approach* (4th Ed.) New Delhi: Wiley-India.

BASIC HUMAN PSYCHOLOGY

1. Robert McEntarffer, Allyson J. Weseley, (2012) *Barron's AP Psychology* (5th Ed.) Barron's Educational SeriesDennis Coon, John O. Mitterer, (2010) *Psychology: A Journe* (4th Ed.) Cengage Learning.
2. Barbara Fredrickson, Susan Nolen-Hoeksema, (2009) *Atkinson & Hilgard's Introduction to Psychology* (15th Ed.) Cengage Learning.
3. Oliver, R.W, (1993) *Psychology and Health Care*, Bailliere Tindall, London.