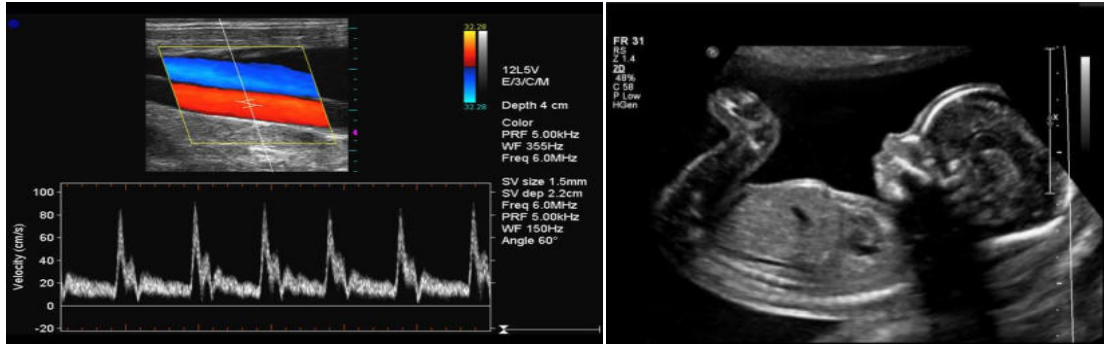
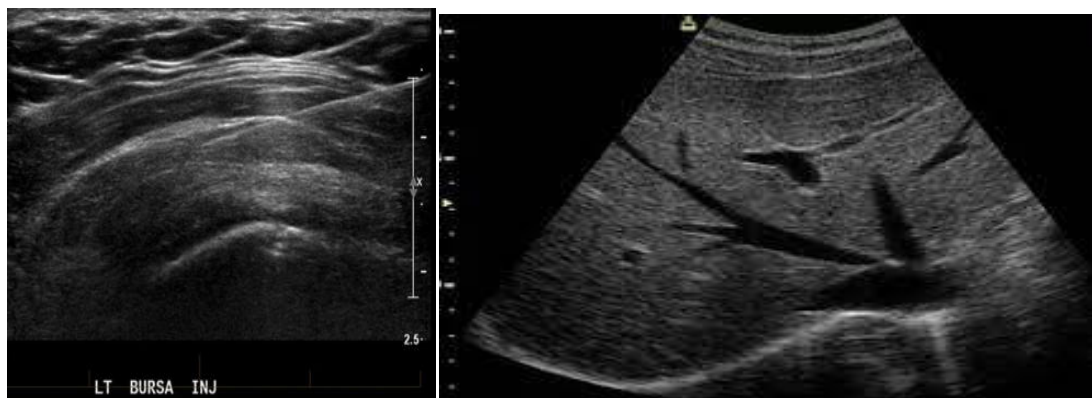


National University-Sudan
Faculty of Graduate Studies and Scientific Research
Faculty of Radiography and Medical Imaging Sciences



M.Sc. Diagnostic Medical Ultrasound



M.Sc. Diagnostic Medical Ultrasound

Introduction

Diagnostic Medical Ultrasound is an entry-to-practice program. It qualifies specialists in medical sonography (ultrasound sonologists) to provide trusted accurate diagnosis for prevention and treatment of diseases. For this, the program has adopted hands-on practical learning module. The module integrates clinical applications, ultrasound physics, sonographic identifications of: anatomy, physiology, pathology and pathophysiology of human body.

General objective

Qualify critical mass of Ultrasound specialists to work in health care units universities and in research centers.

Specific objectives

The program qualifies the students to:

- Identify the normal and abnormal anatomy patterns in Ultrasound images
- Use Ultrasound instrumentations
- Utilize advanced technologies in Ultrasound
- Apply quality control measures in Ultrasound
- Implement strategies to minimize Ultrasound dose to patients.
- Efficiently teach, learn and communicate with peers and other healthcare colleagues.
- Conduct health and health-related research.

Expected learning outcomes

Upon completion of the program, successful graduates should be able to:

- Provide physician with apt anatomic, pathologic, and/or physiologic reports.
- Record, analyze, and process diagnostic data and other pertinent observations made during the Ultrasound exam.
- Demonstrate appropriate communication skills with patients and colleagues;
- Behave in a professional and ethical manner;
- Apply good health Ultrasound practices.

Admission requirements

- Applicants must satisfy the general regulations set by the faculty of graduate studies and scientific research of National University for registration for master degrees.
- Eligible candidates are:
 - (a) Holders of B.Sc. Radiology Sciences: Diagnostic Imaging, Nuclear Medicine, Radiotherapy with grade C at least and pass an interview.

- (b) Holders of B.Sc. Radiology Sciences in: Diagnostic Imaging, Nuclear Medicine, Radiotherapy with grade C at least with cGPA 2.5, out of 4.0 or 3.5 out of 5.0 and pass an interview

Study program

Semester One

Code	Course	Credit hours	Contact hours	
			Theory	Practical
US-511	Advanced Medical Education	1(1+0)	1	0
US-512	Applied Anatomy	3(2+1)	2	2
US-513	Applied Physiology	2(1+0)	2	0
US-514	Applied Pathology	2(2+0)	2	0
US-515	Ultrasound Physics and Instrumentation	2(2+0)	2	0

Semester Two

Code	Course	Credit hours	Contact hours	
			Theory	Practical
US-521	Abdominal Ultrasound	3(3+0)	3	0
US-522	Obstetric Ultrasound	2(2+0)	2	0
US-523	Gynecology Ultrasound	2(2+0)	2	0
US-524	Ultrasound Clinical Practices	4(0+4)	0	12
US-525	Ethics in Medical Imaging	1(1+0)	1	0

Semester Three

Code	Course	Credit hours	Contact hours	
			Theory	Practical
US-631	Doppler Ultrasound	3(3+0)	3	0
US-632	Musculoskeletal Ultrasound	2(2+0)	2	0
US-633	Small Parts Ultrasound	2(2+0)	2	0
US-634	Ultrasound Clinical Practices	5(0+5)	0	10
US-635	Research Methods	2(2+0)	2	0

Semester Four

Code	Course	Credit hours	Contact hours	
			Theory	Practical
US-641	Ultrasound Clinical Practices	5(0+5)	0	10
US-642	Dissertation	4(0+4)	0	8

Courses contents

US-511 Advanced Medical Education

Health profession education; Adult learning theories; Learning outcomes and skills acquisition; Instructional design (models); Instructional design (micro teaching); Formative Assessment; Communication in multidisciplinary teams; Simulation in multidisciplinary teams; Purposeful assessment; Reflection and feedback; Learning portfolios and Mentorship.

US-512 Applied Anatomy

Cardiovascular system; Lymphatic system; Respiratory system; Digestive system; Urinary system; Peritoneum; Developmental anatomy; Nervous system; General and special senses and autonomic nervous system.

US-513 Applied Physiology

Homeostasis; Body fluid; Cardiac cycle; Cardiac output; Blood; Respiratory; Platelets; Renal physiology; GIT physiology; Endocrine physiology; Male and female genital physiology.

US-514 Applied Pathology

Cell Injury; Apoptosis and necrosis; Adaptation to cell injury; Acute Inflammation; Sequel of acute inflammation; Inflammatory mediators; Intracellular accumulation; Chronic inflammation; Healing and repair; Neoplasia-1; Neoplasia-2; Carcinogenesis; Laboratory diagnosis of cancer o Genetic.

US-515 Ultrasound Physics and Instrumentation

Sound waves; Acoustic variables; Speed of sound; Amplitude; Continuous pulsed wave and duty factor; Wave interference; Attenuation; Sound transmission and echo reflection; Terminology associated with image characteristics; Ultrasound transducers; Sound beams; Pulse echo instruments; Principles of pulse echo imaging; Artifacts; Bio-effects and safety.

US-521 Abdominal Ultrasound

Liver; Gall bladder biliary system; Pancreas; Spleen; Appendix; Aorta; Lymphnodes; Urinary bladder; kidney; prostate.

US-522 Obstetric Ultrasound

Early pregnancy (First, second and third trimester); Gestational age (First: CRL, BPD, EDD, GS, MSD, anomalies, Nuchal translucency, blighted ova, molar pregnancy, trisomy, position of gestational sac, ectopic pregnancy, number of GS, luteal cyst , hematomas, Second trimester (number, BPD, FL, AC, HC, EDD); Placenta position; Grading and anomalies; Liquor measurement and amount (polyhydroamios and oligohydroamios); IUGR; AFI macro and micro size of fetus; Fetal position and weight equation; Third trimester measures (FL, AC, HC, AC, BPD); Fetal weight at birth; Placenta localization and type of previa; EDD; Fetal biophysical profile; Doppler.

US-523 Gynecology Ultrasound

GYN preparation (TVS,TAS); Urinary bladder as window; Uterus shape; Uterus anomaly; Fibroid; Ectopic pregnancy; Uterus anatomy physiology; Endometrium; Pouch of Douglas; Ovaries anatomy, and physiology and pathology; Grading of follicle and cycle; Ovarian cyst and mass; IUCD positioning and type; Cervix; Biophysical uterine; Doppler.

US-524 Ultrasound Clinical Practices

Knobology of ultrasound; Positioning of patients for ultrasound; Patient preparation for Ultrasound; Normal sonographic appearance of organs: abdomen, obstetrics and gynecological; Examination protocols of abdomen, obstetrics and gynecological; Evaluation of abnormalities; Writing diagnostic reports.

US-525 Ethics in Medical Imaging

Introduction to Ethics; Medico-legal issues in radiology; Principles of ethics; ARRT standard of ethics; Confidentiality; Informed consent and negligence.

US-631 Doppler Ultrasound

Physics of Doppler; Color Doppler; Power Doppler; Blood flow indices measurement; Signal; Carotid; Abdomen; Venous and artery normal and abnormal; DVT; Pathology vacuolar; Vacuolar anatomy and pathology; Renal doppler; Upper and lower venous and artery; Vistula; Sub-clavian shunt; AV Vistula.

US-632 Musculoskeletal Ultrasound

Musculoskeletal anatomy; Physiology and pathology; Shoulder; Elbow; wrist; Knee; Ankle and Foot; Pediatric hip joint; Nerves and muscle scan normal and abnormalities.

US-633 Small Parts Ultrasound

Breast; Scrotum; Thyroid; Parathyroid; Penis; Eye; Brain of infant and neonate; Doppler.

US-634 Ultrasound Clinical Practices

Knobology of Doppler ultrasound; Positioning patients for ultrasound; Patient preparation for ultrasound; Normal sonographic appearance of organs: vascular, small parts and musculoskeletal; Examination protocols of vascular, small parts and musculoskeletal; Evaluation of abnormalities; Writing diagnostic reports.

US-635 Research Methods

Layout of thesis; definition and importance of research; Characteristics of research; Classification of health research; Identify a research topic: Introduction (problem of the study, objective, significance and overview), Literature review (theoretical background and previous studies); Materials and methods (materials, design, population, sample, method of data collection and analysis, ethical approval); Research proposal, Results, discussion and conclusion; References citation and bibliography; Central tendency and dispersion; Association; Tests of significance; Statistical decision theory.

US-641 Ultrasound Clinical Practices: Advanced Doppler and clinical applications of Ultrasound in medicine.

RAD-642 Dissertation Scientific writing of dissertations: Preliminaries; Introduction; Literature Review; Materials and Methods; Results; Discussion; References; Appendices.

Human resource and facilities

Teaching staff: One professor
Two associate professors
Four assistant professors
One lecturer

Facilities

Rooms: One lecture room: 42 seats

Laboratories: Radiology Lab: 15 seats

Hospitals: Alraqi University Hospital; Primary Health care (PHC); Royal Care International Hospital; Dar Elag Hospital; Alribat Teaching Hospital; Omar Sawie Hospital; Military Hospital; Antalya Medical Centre; Alemtiaz Hospital; Alneeelen Diagnostic Centre

Libraries: National University Main Library: 400 seats

E- Library: 250 seats

Duration of the program: Four semesters: 52 weeks

Teaching modules: Lectures, group discussion, workshops

Examination regulations

- Abide by the examinations rules of the general regulations of the graduate studies of the National University-Sudan
- A student failing any supplementary examination should repeat the course.
- Duration of the dissertation shall be 16 weeks. If need be, an extension of 4 weeks is allowed if approved by the program coordinator.
- Exceeding the aforementioned period the student has to settle a one semester fees to allow her/him an extension of four weeks.
- Expiring the extension periods without completing the dissertation, the student shall be dismissed from the program.
- A student scoring less than 60% in the dissertation oral examination will be allowed only one chance for oral defense. In such case the student should settle 50% of one semester fees.

Assessment:	Continuous assessment	25%
	Mid examination	25%
	Final examination	50%

Grading system: A⁺ (≥ 85) A (80- 84) B⁺ (70- 79) B (65-69) C (60-64) F (< 60)

Award of the degree

The Scientific Council of the National University, based on the recommendation of the board of the Faculty of Graduate Studies and Scientific Research, shall award the successful candidate

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