



**Ministry of National Health Services**  
Regulation & Coordination, Government of Pakistan



**Health Services Academy (DAI)**  
**Islamabad**

Collaboration with

**Institute of Allied Medical Professions**

# **DIPLOMA IN MEDICAL DIAGNOSTIC SONOGRAPHY (DMS)**

## **Diploma in Diagnostic Medical Sonography (DMS)**

### **Executive Summary:**

The Diploma 02 years programs in Allied Health Sciences have been uniquely positioned to educate and equip highly qualified health care professionals committed to fulfilling the mission of improving the health and well-being of individuals and communities.

The Diploma in Diagnostic Medical Sonography (DMS) is one of the emerging areas of Allied Health Science revolutionized the way medical professionals diagnose diseases and detect abnormalities. It provides the medical community with the means to diagnose diseases without injections of radioactive material, making incisions, or introducing radiation to the patient. Diagnostic Medical Sonography (ultrasonography) is a medical technology using highly sophisticated, computer driven imaging devices to produce dynamic multi-dimensional visual images of organs, tissue, and blood flow.

As a radiation-free medical imaging modality, it provides important clinical information for the diagnosis and treatment of patients. The DMS Diploma holders shall work and contribute as a part of a medical team, which includes physicians, consultant, paramedics, and other healthcare professionals who provide essential clinical information that is used to plan treatment and patients care.

This Diploma DMS program will be based on structured training on normal and abnormal anatomy, physiology, and patient care, along with instrumentation usage and diagnostic techniques for more accuracy in clinical diagnosis and results. Due to the rapid, widespread acceptance of ultrasound as an imaging modality, a shortage of educated Sonographer has been created nationwide. There are several areas of specialization in the field of sonography which include obstetrics/gynecology, abdomen, echocardiography, Breast, and pediatric sonography. This technically challenging, patient focused field demands that sonographer demonstrate a high level of decision making, diagnostic responsibility and critical thinking skills. Sonographer usually

have extensive direct patient contact which includes performing invasive procedures and provide solutions for better treatment to eradicate the patients' diseases and its dangerous life-threatening effects in all critical illnesses.

Modern Medical Diagnostic Sonography (DMS) is a highly diversified and vast field consisting of such diverse areas such as – Diagnostic Radiology, Interventional Radiology, Radiation Therapy and Nuclear Medicine. It **is non-invasive Ultrasound** as they are commonly called, work in all these areas commonly of Sonographers discharging their duties often at tertiary level medical centers, teaching hospitals and academic research centers. These highly trained and specialized professionals work with patients undergoing procedures, they are a key part of health care delivery team in any modern hospital set up .Diploma in Diagnostic Medical Sonography(DMS) is milestone in their career. ,

**After Diploma** in Diagnostic Medical Sonography (DMS) eligibility to appear in Registry Examination ARDMS can work in one of the specialty independent in rural and remote area in Pakistan as well batter job prospectus around the world.

**The enrolled batch of Diploma** in Diagnostic Medical Sonography (DMS) Program shall complete its degree in **02** years comprising of **04** semesters.

The students shall be benefited from with varied curriculum that also include didactic clinical experience component to be catered from university affiliated Diagnostic and Research Training Centre / affiliated with Health Services Academy (DAI) with DHQ or private Medical Centers.

**Professional Fields:** For professional fields, the disciplinary requirements will be developed by the departments concerned in collaboration with the professional associations or learned councils.

#### **THE TWO-YEAR DIPLOMA (as per rules of Allied Health professions Council) Act 2022**

- **Transition to Semester System:** All HEIs offering the two-year Diploma in Diagnostic Medical Sonography will transition to the semester system per AHPC policy and guidelines. Act 2022
- **Overall:** Within the requirements given in the Framework (Section II above), to obtain Diploma in Diagnostic Medical Sonography (DMS) , students will have to complete the following:
- **Credits and Courses:** Every DMS student will complete at **least 36 credits**. The actual number of courses will depend on the credit hours for the courses taken. If all courses are of **3 credits**, they will have to take a **total of 20 courses**
- **Credits per Semester:** Ordinarily, students will complete **15 credits** in every semester by taking five courses of 03 credits each, or other combinations. However, a student may take more or fewer courses in a semester with permission in writing of the competent authority as specified in the rules.
- **Disciplinary Requirement:** The disciplinary course offerings for DMS will be determined by award the Diploma Health Services Academy (DAI) federal Charter Act 2018.
- **Practical Learning Requirement:** Students of DMS programs will have to fulfill a modified version of the Practical Learning requirement specified in Section VII below. The special provisions pertaining to Diploma in DMS students are as follows:

- **PLL: Practical Learning Requirement:** Diploma in Diagnostic Medical Sonography students will be allowed to fulfill the **PLL** requirement by signing up for an extracurricular “lab” of 4 hours a week for 2 semesters. A Diploma of the DMS program .
  - Total numbers of Credit hours **33+3= 36 Credit Hours**
  - Duration Course work Diploma **02 years**
  - Semester duration **16-18 weeks Semesters: 04**
  - Course Load per Semester **16-18 Cr Hrs.**
  - Average number of **courses per semester 04**  
(Not more than 3 lab/practical courses/semester)

**Sonographer Certification**

**RDMS®** Registered Diagnostic Medical Sonographer  
**RDCS®** *Registered* Diagnostic Cardiac Sonographer  
**RVT ®** Registered Vascular Technology Cardiac Sonographer

**Scheme of Studies**  
**Diploma in Diagnostic Medical Sonography(DMS)**

| <b>Prerequisite</b> |                                | <b>09</b>           |
|---------------------|--------------------------------|---------------------|
| <b>Course Code</b>  | <b>Course Name</b>             | <b>Credit Hours</b> |
| DMP401              | Fundamental Medical Physics    | 03(3,0)             |
| MTH 402             | Fundamental Calculus           | 03(3,0)             |
| SDP 403             | Standard of DICOM & PACS,HIPPA | 03(3,0)             |

**Basics Health Sciences Courses (04) 12**

| <b>Course Code</b> | <b>Course Title</b>                              | <b>Credit Hours</b> |
|--------------------|--|---------------------|
| DMS 201            | Basic Anatomy                                    | 03 (2,1)            |
| DMS 202            | Basic Physiology                                 | 03 (2,1)            |
| DMS 203            | Basic Pathology                                  | 03 (2,1)            |
| DMS 204            | Basic Abdominal Sonographic Anatomy and Protocol | 03 (2,1)            |

**Core Courses: 04 (Choice One Specialty) 12**

| <b>Course Code</b> | <b>Course Title</b>                           | <b>Credit Hours</b> |
|--------------------|---|---------------------|
| DMS 301            | Introduction to Diagnostic Medical Sonography | 03(3,0)             |
| DMS 302            | Sonography Physics and Instrumentation        | 03(3,0)             |
| DMS 303            | Abdominal sonography                          | 03(3,0)             |
| DMS 304            | Obstetrical and Gynecological sonography      | 03(3,0)             |
|                    |   | <b>12</b>           |

**Practicum (One Specialty) (01) 03**

| <b>Course Code</b> | <b>Course Title</b>                   | <b>Credit Hours</b> |
|--------------------|---------------------------------------|---------------------|
| DMS 101            | Introduction Sonography/Patient Care  | 03 (1,2)            |
| DMS 130            | Pelvic Sonography                     | 03 (1,2)            |
| DMS 140            | Abdominal Sonography                  | 03 (1,2)            |
| DMS 160            | Trimester Obstetric Sonography(1,2,3) | 03 (1,2)            |

|   |   |           |
|---|---|-----------|
| Total No. of Courses of the Program                                 | = | <b>36</b> |
| Total No. of Credit Hours of the Program including Clinical = 33 +3 | = | <b>36</b> |
| Total No. of Credit Hours Training: (Credits Hours 3)               | = | <b>03</b> |

**Fee Structure for**

**“B”**

**“Diploma in Diagnostic Medical Sonography” (D.M.S)**

(24 months)/ 04 Semesters (68 Credit Hours)

| S # | Particulars                  | Category     | Amount (PAK. RS) |
|-----|------------------------------|--------------|------------------|
| 1   | Admission Processing Charges | One Time     | 5000             |
| 2   | Admission Fee                | One Time     | 20,000           |
|     | <b>PER SEMASTER FEE</b>      |              |                  |
| 3   | Tuition Fee                  | Per semester | 100,000          |
| 4   | Registration Course Fee      | Per Semester | 15,000           |
| 5   | Examination Fee              | Per Semester | 10,000           |

**Note:** \* Per Semester fee is subject to revision. \*\* Practicum fee charges in 3<sup>rd</sup> & 4<sup>th</sup> Semesters

***Diploma in DIAGNOSTIC ULTRASOUND (D.D.U) & DMS***

Clinical Training, Lab, Practicum

**DMS 100**

**Introduction to Clinical Practicum**

**1 Credit (1)**

Introduction to working in the medical environment. Includes preparation for clinical internship and observation hours in the ultrasound department. Restricted to: DMS majors.

**DMS 101**

**Introduction Sonography/Patient Care**

**2 Credits (2)**

Introduction to the careers in sonography, terminology, medical ethics, scanning planes, applications of ultrasound, professional standards, and patient care. May be repeated up to 02 credits. Restricted to: DMS majors.

**DMS 116**

**Vascular Technology I**

**2 Credits (2)**

Review of basic ultrasound physics and principles, peripheral vascular anatomy, hemodynamics, Doppler evaluation, peripheral vascular scanning techniques, physiologic testing and the carotid arteries and the peripheral vascular system.

Restricted to: DMS majors

**DMS 116 L**

**Vascular Technology I Lab**

**1 Credit (2P)**

Includes protocol development, scanning techniques, recognition of anatomical relationships and the normal ultrasound appearance of the carotid arteries and peripheral vasculature utilizing real-time Sonographic equipment including Doppler.

Restricted to: DMS majors.

**DMS 130**  
**Pelvic Sonography**  
**1 Credit (1)**

Includes the anatomy, sectional anatomy, and normal physiology of the pelvic structures, including the uterus, ovaries, prostate, pelvic muscles, lower GI, appendix, and vessels as well as scanning techniques, Sonographic appearance and Doppler evaluation of the pelvis.

Restricted to: DMS majors.

**DMS 130 L**  
**Pelvic Sonography Lab**  
**1 Credit (2P)**

Includes protocol development, scanning techniques, recognition of anatomical relationships and the normal ultrasound appearance of the pelvic structures including the uterus, ovaries, prostate, lower gastrointestinal system, appendix, and pelvic muscles utilizing real-time Sonographic equipment including Doppler. Restricted to: DMS majors.

**DMS 140**  
**Abdominal Sonography**  
**03 Credits (3)**

Includes the anatomy, sectional anatomy and normal physiology of prevertebral vessels, liver, Biliary system, pancreas, upper gastrointestinal system, kidneys, adrenals, and spleen as well as scanning techniques, Sonographic appearance, and Doppler evaluation of the deep abdominal organs. Restricted to: DMS majors.

**DMS 140 L**  
**Abdominal Sonography Lab**  
**01 Credit (4P)**

Includes protocol development, scanning techniques, recognition of anatomical relationships and the normal ultrasound appearance of prevertebral vessels, liver, biliary system, pancreas, upper gastrointestinal system, kidneys and spleen utilizing real-time Sonographic equipment including Doppler. Restricted to: DMS majors.

**DMS 150**  
**Sonographic Principles and Instrumentation I**  
**01 Credit (1)**

Includes the fundamental properties and mathematical relationships between variables of wave parameters, acoustic variables, attenuation, pulsed wave operation, transducers, system operation, Doppler, and artifacts utilizing real-time Sonographic equipment. Restricted to: DMS majors.

**DMS 160**  
**1st Trimester Obstetric Sonography**  
**01 Credit (1)**

Includes the embryology, anatomy, sectional anatomy, normal physiology, biometrics, assessment, and Sonographic appearance of the 1st trimester fetus, placenta, uterus and adnexa as well as scanning techniques according to recognized protocols. Restricted to: DMS majors.

**DMS 165**  
**2nd/3rd Trimester Obstetric Sonography**

**01 Credit (1)**

Includes the anatomy, sectional anatomy, normal physiology, biometrics, assessment, and Sonographic appearance of the 2nd and 3rd trimester fetus, placenta, uterus, and adnexa as well as scanning techniques according to recognized protocols. Restricted to: DMS majors.

**DMS 170****Clinical Practicum I****02 Credits (8-10P)**

Development of technical and professional aspects of diagnostic ultrasound in a hospital or clinical setting at the developmental level. Ongoing reinforcement and broadening of knowledge base related to hospital procedures and policies. Continued observation, assistance and performance of patient care and Sonographic duties under direct supervision. Restricted to: DMS majors.

**DMS 180****Clinical Practicum II****05 Credits (30P)**

Development of technical and professional aspects of diagnostic ultrasound in a hospital or clinical setting at the beginner level. Ongoing reinforcement and broadening of knowledge base related to hospital procedures and policies. Continue observation, assistance and performance of patient care and Sonographic duties under direct supervision. Restricted to: DMS majors

**DMS 201****Applied Sonographic Procedures****01 Credit (8P)**

Advances scanning skills, system optimization, anatomic recognition of abdominal and pelvic structures utilizing real-time Sonographic equipment including Doppler. Includes Sonographic evaluation of the first trimester pregnancy and normal fetus. Restricted to: DMS majors.

**DMS 216****Vascular Technology II****02 Credits (2)**

Includes the pathology and pathophysiology of the vascular system, scanning techniques, clinical presentation, ultrasound appearance and Doppler evaluation seen with pathological conditions of the carotid arteries, deep and peripheral vascular systems. Restricted to: DMS majors.

**DMS 216 L****Vascular Technology II Lab****01 Credit (2P)**

Includes progressive development of skills following recognized protocols, scanning techniques, recognition of anatomical relationships with differentiation of normal and abnormal ultrasound appearance of the carotid arteries, deep and peripheral vascular systems utilizing real-time Sonographic equipment including Doppler. Restricted to: DMS majors.

**DMS 226****Sonographic Case Studies I****01 Credit (1)**

Includes integration of didactic knowledge, clinical presentation, laboratory values, Sonographic appearance and related medical imaging of a variety of pathological conditions through a variety of case analysis and presentations. Restricted to: DMS majors.

**DMS 227**

**Sonographic Case Studies II**

**01 Credit (1)**

Continuation of DMS 226, integration of didactic knowledge, clinical presentation, laboratory values, Sonographic appearance and related medical imaging of a variety of pathological conditions through a variety of case analysis and presentations. Restricted to: DMS majors

**DMS 230**

**Gynecologic Pathology**

**02 Credits (2)**

Includes the pathology, pathophysiology of the female reproductive system, scanning techniques, clinical presentation, ultrasound appearance and Doppler evaluation seen with pathological conditions of the uterus, ovaries, and adnexa. Restricted to: DMS majors.

**DMS 240**

**Abdominal Pathology I**

**02 Credits (2)**

Includes the pathology and pathophysiology of abdominal structures of the pre-vertebral vessels, liver, Biliary system, pancreas, spleen and gastrointestinal system, scanning techniques, ultrasound appearance, clinical presentation and Doppler evaluation seen with pathological conditions. Restricted to: DMS majors.

**DMS 245**

**Abdominal Pathology II**

**02 Credits (2)**

Includes the pathology and pathophysiology of abdominal structures of the genitourinary system, spleen, retro peritoneum, adrenal glands, abdominal wall and prostate, scanning techniques, ultrasound appearance, clinical presentation and Doppler evaluation seen with pathological conditions. Restricted to: DMS majors.

**DMS 248**

**Pediatric Sonography**

**02 Credits (2)**

Includes the anatomy of the brain, skull, spine, hips, and normal developmental changes as well as pathology and pathophysiology of specific conditions that affect the premature infant, newborn and pediatric population across a variety of body systems. Restricted to: DMS majors.

**DMS 250**

**Sonographic Principles and Instrumentation II**

**03 Credits (3)**

Includes properties of sound and its use in diagnostic imaging, artifacts, system operation, Doppler, basic hemodynamic, image optimization, bio effects, quality assurance, and new technologies in ultrasound imaging. Restricted to: DMS majors.

**DMS 255. Vascular Physics**

**02 Credits (2)**

Includes a review of sound properties and its use in diagnostic imaging, artifacts, system operation, Doppler, image optimization, bio effects, quality assurance, and in-depth application of fluid properties and hemodynamics in vascular ultrasound imaging. Restricted to: DMS majors.

**DMS 260**

**High Risk Obstetric Sonography**

**03 Credits (3)**

Includes congenital malformations of the developing fetus, high risk pregnancies, multiple gestation, maternal conditions and invasive procedures. Restricted to: DMS majors

**DMS 270**

**Clinical Practicum III**

**05 Credits (20P)**

Continued development of technical and professional aspects of diagnostic ultrasound in a hospital or clinical setting at an intermediate level. Ongoing reinforcement and broadening of knowledge base related to hospital procedures and policies. Continued observation, assistance and performance of patient care and Sonographic duties under limited supervision. Restricted to: DMS majors.

**DMS 280**

**Clinical Practicum IV**

**05 Credits (20P)**

Application of technical and professional aspects of diagnostic ultrasound in a hospital or clinical setting at a proficient level. Ongoing reinforcement and broadening of knowledge base related to hospital procedures and policies. Continued observation, assistance and performance of patient care and Sonographic duties under limited supervision. Restricted to: DMS majors.

**DMS 290**

**Small Parts & Superficial Structures**

**02 Credits (2)**

Includes anatomy, pathology and pathophysiology, protocol development, scanning techniques, recognition of anatomical structures and the normal and pathological ultrasound appearance of the breast, thyroid, neck, scrotum, non-cardiac chest and musculoskeletal ultrasound. Restricted to: DMS majors.

**DMS 291**

**Registry Preparation: OB/GYN**

**01 Credit (1)**

Registry preparation mock examinations over materials covered in Obstetric and Gynecological ultrasound. Students must pass this course with a 74% or better OR pass national certification in OB/GYN Sonography. Restricted to: DMS majors.

**DMS 292**

**Registry Preparation: Abdomen**



**01 Credit (1)**

Registry preparation mock examinations over materials covered in abdominal ultrasound including small parts and superficial structures. Students must pass this course with a 74% or better OR pass ARDMS national certification exam in Abdominal Sonography. Restricted to: DMS majors.

.

**DMS 293**

**Registry Preparation: Vascular**

**01 Credit (1)**

Registry preparation mock examinations over materials covered in vascular ultrasound. Students must pass this course with a 74% or better OR pass national certification in Vascular Technology. Restricted to: DMS majors.