الدبلومة المهنية في تخصص تصوير الثدي

Professional diploma in Breast imaging(PDBI-429)

القسم المانح للدرجه: قسم الاشعه التشخيصيه-كليه الطب- جامعه المنصوره

Radiology Department- faculty of medicine-Mansoura University

الهدف:

تهـدف الدبلومـه المهنيـه فـي تخصـص تصـوير الثـدي الـي امـداد المهتمـين بهـذا الفـرع مـن الاشـعه التشخيصـيه بـاعلي درجـات المهنيـه والمهـاره فـي تصويروتشخيص امراض الثدي.

متطلبات الالتحاق بالدبلومه:

يحـق الإلتحـاق بالدبلومـه المهنيـه فـي تخصـص تصـوير الثـدي لكـل طالـب حاصـل علـي بكـالريوس الطـب والجراحـه سـواء مـن جامعـه المنصـوره او اي جامعـه اخـري علـى ان يكـون حاصـلا علـى دبلومـه او ماجسـتير او دكتـوراه او زماله مصريه او عربيه او ما يعادلها في الاشعه التشخيصيه.

عدد الساعات المعتمده: مقسمه الي فصلين دراسيين

فصل دراسي اول: ساعه معتمده

فصل دراسي ثاني: ساعه معتمده

الفصل الدراسي الاول (المقرر الاساسي في التصوير الطبي للثدي)

ومدتـه ١٥ اسبوع ويشـمل دراسـه التشـريح الراديولـوجي للثـدي، تقنيـه تصوير الثـدي بالمـاموجرام والمـاموجرام باسـتخدام الصـبغه، تقنيـه تصـوير الثـدي بالموجـات الصـوتيه والـرنين المغناطيسـي، المعلومـات الاساسـيه عـن الاجـراءات التداخليـه فـي اورام الثـدي، نظـره عامـه عـن بـاثولوجي الامـراض اللتي قد تصيب الثدي.

الفصـل الدراسـي الثـاني (المقـرر المتقـدم فـي تشـخيص امـراض الثـدي واسـتخدام الـرنين المغناطيسـي وتعلـم طـرق الاشـعه التداخليـه فـي اورام الثدي)

ومدتـه ١٥ اسبوع ويشـمل دراسـه كيفيـه تشـخيص امـراض الثـدي المختلفـه باسـتخدام الطـرق التشخيصـيه المختلفـه (المـاموجرام، الموجـات الصـوتيه والـرنين المعناطيسـي)، طريقـه تصـوير الثـدي بالمـاموجرام عـن طريـق الانبعـاث البـوزتروني، كمـا يشـمل دراسـه تفصيليـه عـن طريقـه تشـخيص امـراض الثـدي المختلفـه باسـتخدام الـرنين المغناطيسـي، كيفيـه تشـخيص الامـراض المرتبطـه بزراعـه الثـدي، الطـرق المختلفـه للاشـعه التداخليـه لاورام الثدي

Professional diploma in Breast imaging(PDBI-429)

القسم المانح للدرجه: قسم الاشعه التشخيصيه-كليه الطب- جامعه المنصوره

Radiology Department- faculty of medicine-Mansoura University

نظام الدراسه للدبلومه المهنيه لمده عام واحد

الفصل	اسم المقرر	course	Code	المقرر	الاجمالي
				ساعات معتمده	
الفصل الدراسي الاول	المقرر الاساسي (المقرر الاساسي في التصوير الطبي للثدي)	**Basic course** -Radiological anatomy of the breast. -Mammography and contrast enhanced mammography techniques and ACR BIRADS lexicon. -Ultrasound technique and ACR BIRADS lexicon. -Brief on MRI technique and ACR BIRADS lexicon -Basic interventional procedures. -Pathology overview on different breast lesions.	PDBI 429-B	2	10
	انشطه اكلينيكيه وتعلم ذاتي	**Clinical and self-learning**	PDBI -429-C1	8	
الفصل الدراسي الثاني	المقرر المتقدم (المقرر المتقدم في تشخيص امراض الثدي واستخدام الرنين المغناطيسي في التشخيص وكيفيه اخذ عينات من اورام الثدي)	**Advanced course** -Detailed classification on different breast lesions and their appearance using different breast imaging modalities. -Brief on Positron Emission Mammography (PEM). - Detailed MRI appearance of different breast lesions. - Types of breast implants and radiological imaging. - Different Interventional procedures.	PDBI 429-A	2	10
	انشطه اكلينيكيه وتعلم ذاتي	**Clinical and self-learning**	PDBI 429-C2	8	
اجمالي الساعات المعتمده					20

نظام الامتحان

الامتحان يتم في نهايه كل فصل دراسي علي النحو التالي:

المقرر	الدرجه				اجمالي
	تحريري	MCQ	شفهي	كلينيكال	
الفصل الدراسي الاول (المقرر الاساسي في التصوير الطبي للثدي)	20	20	20	20	80
الفصل الدراسي الثاني (المقرر المتقدم في تشخيص امراض الثدي واستخدام الرنين المغناطيسي وكيفيه اخذ عينات من اورام الثدي)	20	20	20	20	80

الرسوم المفروضه:

المصــريون: ١٠٠٠٠ (عشــرة الاف جنيــه مصــري نظيــر ٢٠ ساعة تـدريس معتمدة (٥٠٠ جنيه لكل ساعة معتمدة)

الاجانـب والوافــدون: ٦٠٠٠ (ستــة الاف دولار امريكــي نظيــر ٢٠ ساعة تدريس معتمدة (٣٠٠ دولار لكل ساعة معتمدة)

Course specification

professional diploma in Breast imaging

Faculty of Medicine- Mansoura University

A) Administrative information:

1)Program offering the course	professional diploma in Breast imaging
2)Department offering the program	Radiology department
3) Course director	Prof/ Seiza Samir Abdullah
4) Course coordinator	A.Prof.Dr. Mona Mahmoud Zaky
5) parts of the program	2 semesters in one year
6) Date of approval by the department council	3/2022
7) Date of last approval of program specification by faculty council	3/2021
8) Course title	Breast imaging and intervention
9) Course Code	PDBI-429
10) Total teaching hours	60 lectures (each lecture hour)-480 practical
Credit hours	20

Entry requirements

Bachelor degree of medicine and surgery of Mansoura University or other universities with:

Master's degree of Diagnostic Radiology, or MD degree in Diagnostic Radiology, or Arabic Board of Diagnostic Radiology, or Egyptian Fellowship of Diagnostic Radiology, or FRCR .

B) Professional information

Course aims:

- The primary purpose of this fellowship is to provide a full range of training in breast imaging.
- Know the different applications of digital mammogram and ultrasound, and their advanced applications.
- Interpret the different breast imaging modalities efficiently.
- Know a balanced differential diagnosis of breast diseases.
- Report a standardized structural report that correlates the different imaging modalities.
- Define the proper imaging to guide diagnostic interventional producers, and will be trained to perform.
- To observe/ actively participate in audit, and active clinical research.
- Recognize the importance of the multidisciplinary tumor board meetings to cooperate radiologists, surgeons, oncologist, and pathologists in taking the decision.
- Know the guidelines for screening mammograms and when to ask for callbacks.

Intended learning outcome (ILOs):

Intended learning outcomes are four main categories: knowledge and understanding to gained, intellectual qualities, professional/practical and transferable skills.

On successful completion of the course, the candidate will be able to:

A- Knowledge and understanding (10%)

A1- How to distinguish normal from abnormal breast tissue on digital mammogram 2D ultrasound & contrast enhanced MRI.

A2- How to reach proper diagnosis of different breast diseases.

A3- How to apply the Breast Imaging Reporting and Data System (BI-RADS) to characterize the different breast lesions.

B- Intellectual skills (10%):

B1- Interpret radiological and pathological reports for breast cases.

B2- Underline the suitable adjunctive methods for further work up or options for proper management.

B3- Differentiate invasive breast cancer from precancerous lesions and instiu carcinoma.

C- Professional/ Practical skills (75%):

C1- Clinical and practical skills: Assess the diagnoses of breast masses (biopsies and wire localization).

C2- Acquire the level of the skills which is needed: Working without supervision.

D- Communication and transferable skills (5%)

D1- Practice effective communication with patients and multidisciplinary
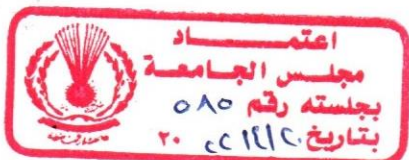
team of breast cancer (tumor board).

D2- Define the Egyptian community health needs for early detection of breast cancer.

> Academic standards

-Academic Reference Standards for Breast imaging specialized diploma degree of Mansoura Faculty of Medicine were compiled according to National Academic Reference Standards.

Intended Learning outcome of each semester:

Semester I:

A-Knowledge

- Knowing the embryology, anatomy, physiology of the breast, axilla, and associated structures in relation with age, hormonal status, pregnancy, and lactation.
- Knowing the common and uncommon benign breast diseases and how these diseases manifest, both clinically and on imaging, including congenital breast abnormalities in females and males and inflammatory breast diseases.
- Knowing the borderline or so-called high-risk breast lesions (those defined to imply an uncertain potential for malignancy) and of their clinical and imaging features, including associated current and prospective risk of ductal carcinoma in situ (DCIS) or invasive breast cancer.
- Knowing the common and uncommon malignant diseases of the breast, axilla, and associated structures and of their clinical and imaging features, including DCIS, invasive breast cancers, and inflammatory breast cancer as well as non-epithelial breast malignancies to the breast (e.g., primary breast sarcomas and lymphomas) and breast metastases originating from non-breast malignancies.
- Knowing the physical principles, techniques, indications and limitations of film-screen mammography and related techniques.
- Knowing the physical principles, techniques, limitations, and indications of digital mammography (DM), including standard and additional projections, digital breast tomosynthesis (DBT), and contrast-enhanced mammography.
- Knowing the physical principles, techniques, indications, and limitations of ultrasound (US) of breast and axilla, including methods for US guidance for needle sampling, color and power Doppler, and elastosonography.
- Knowing the methods for US evaluation of ipsilateral axilla in patients with a newly diagnosed breast cancer and for US-guided needle sampling of suspicious lymph nodes.

- To know US methods for exploring lymph nodes of the internal mammary chain in the case of newly diagnosed breast cancers, especially those located in the internal quadrants.
- To know principles, techniques, advantages and disadvantages of automated breast US.
- Knowing the physical principles, techniques, indications, and limitations of breast magnetic resonance imaging (MRI), including T2-weighted imaging, high-spatial resolution dynamic contrast-enhanced T1-weighted imaging, and diffusion weighted imaging (DWI).
- Knowing the method, advantages, and disadvantages of MR spectroscopy of the breast
- Knowing the general indications and contraindications to MRI and Gadolinium-based contrast materials and of differences among them in terms of safety and performance.
- To know principles, technique, indications, and limitations of nuclide-based techniques dedicated to breast imaging: breast-specific gamma imaging (BSGI), and positron emission mammography (PEM).
- Knowing the clinical meaning of nipple discharge, distinguishing between benign and suspicious discharge characteristics, as well as defining indications for mammography, US, ductogalactography, or MRI in patients with nipple discharge.
- Knowing the epidemiological data regarding breast cancer, including incidence, prevalence, and survival, with details regarding the country where breast imaging subspecialty is or will be practiced by the trainee.
- Knowing the role of risk factors for breast cancer regarding personal history, such as age at menarche, parity, body mass index, breast density, previous biopsies, diagnosis of high-risk lesions, and previous thoracic radiation therapy.
- Knowing the role of breast density in determining a masking effect for screening mammography, significantly reducing the sensitivity of the test.
- Knowing the role of breast density in determining a masking effect of malignant lesions, significantly reducing the sensitivity of mammography.

- To know the indications for genetic counselling for suspected high risk patients for breast cancer and the problems associated with genetic testing, including psychological issues and how to manage inconclusive results (i.e., negative BRCA1/2 testing) in high-risk families.
- Knowing the current debate on limitations of screening programs, including interval cancers, false positive rate, and over diagnosis of DCIS and invasive cancers.
- Knowing the indications, advantages, and disadvantages of image-guided techniques for presurgical localization, under any type of imaging guidance.
- Knowing the clinical presentation and imaging findings of benign and malignant breast diseases in children, adolescents, and pregnant and lactating women.
- Knowing and understanding the standardized lexicon/descriptors and diagnostic categories of breast imaging reporting with reference to lesion, breast, or patient (ACR BI-RADS® or other standardized classification methods)
- Knowing the legal liability in breast imaging, for both screening and clinical activity.
- Knowing the absolute and relative costs of the various imaging examinations utilized in the management of breast diseases and to be aware of principles of cost-effectiveness analysis.
- Knowing how to approach the BIRADS lexicons of breast imaging.
- Knowing about Mammography BI-RADS lexicon and usage.
- Knowing about ultrasound BI-RADS lexicon and usage.
- Knowing about molecular breast imaging and its clinical implications in patient's management and follow up after treatment.
- Knowing ultrasound and mammographic appearance of benign lesions of the breasts.
- Knowing ultrasound and mammographic appearance of probably benign lesions of the breasts.
- Knowing ultrasound and mammographic appearance of premalignant and
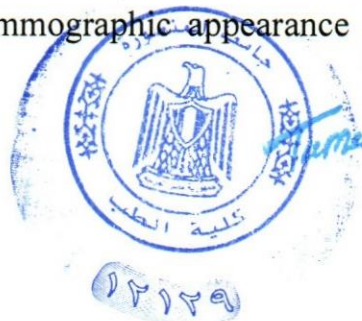
risk lesions of the breasts.

- Knowing ultrasound and mammographic appearance of locally aggressive lesions of the breasts.
- Knowing ultrasound and mammographic appearance of malignant lesions of the breasts.
- Knowing ultrasound and mammographic appearance of the nipple diseases.
- Knowing ultrasound and mammographic appearance of the skin diseases of the breast.
- Knowing ultrasound and mammographic appearance of the chest wall affection associated with breast diseases.

B- Intellectual skills:

- Interpret familial and personal history of women/patients as regard to disorders of the breast and risk factors for breast cancer.
- Investigate the imaging quality of mammograms performed by technologists and demonstrate how to obtain good views also in difficult situations.
- Construct the technician in performing breast MRI, suggesting the optimal sequence protocol and technical parameters.
- Interpret and report mammograms, breast US using a clear text using standardized descriptors such as those defined by the ACR BI-RADS®
  - ➤ To be able to choose the best biopsy system.
  - ➤ To correctly interpret a perioperative radiograph of a surgical specimen.
- Relate radiologic-pathologic correlation of benign and malignant breast lesions.
- Practice double reading of screening mammography obtaining levels of sensitivity and specificity compatible with regulations of local screening programs
- Practice communication to patients and telling them the results of imaging studies and of tissue sampling.
- Organize research related work related in the field of breast radiology.
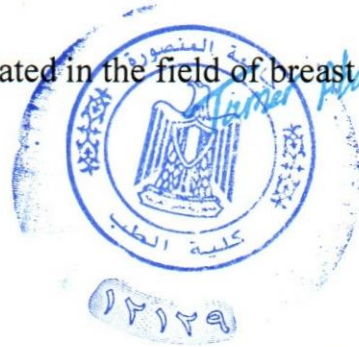
- Construct a research study, evaluate and present the results in a scientific manner.
- Knowing the potential impact of technological development and learn how to translate results of research into clinical practice.
- Construct a research study, and to evaluate and present the results in a scientific manner.
- Choose the best-suited method for evaluating disorders of the breast for common and uncommon clinical indications.
- Interpret and report ultrasound examinations using a clear and synthetic free text using standardized descriptors such as those defined by the ACR BI-RADS.
- Interpret and report mammography examinations using a clear and synthetic free text using standardized descriptors such as those defined by the ACR BI-RADS to use standardized diagnostic categories with defined operational indications such as those of the BI-RADS.
- Manage difficult cases in which it is appropriate to obtain a second opinion for interpreting and reporting clinical and imaging breast cases.
- Arrange interaction with other radiologists dedicated to breast imaging.
- Arrange interaction with other medical and non-medical members of the multidisciplinary breast care team, being an integral part of the team in planning investigations, treatment and in outcome review.

C. Practical skills:

- Manage communication with patient's relatives in order to explain the patient's status and the perspective of further diagnostic steps or treatment; to be particularly trained in communicating breaking bad news.
- Propose informed written consent from patients prior to interventional procedures of the breast, after explaining in details the procedure, the related risks, advantages, and limitations.
- Choose the best-suited method for evaluating disorders of the breast for common and uncommon clinical indications.
- Organize optimum relevant diagnostic imaging examinations and/or interventional procedures of the breast, including minimization of x-ray

exposure in mammography and choice of optimal imaging parameters for mammography, ultrasound, and MRI of the breast.

- Perform ductogalactography (if this examination is operated).
- Perform US examination of the breast and axilla, also in correlation with mammographic or findings (targeted US).
- Perform FNA under US guidance.
- Perform FNA of lymph nodes suspected.
- Perform or supervise the radiography of surgical specimens and communicate with the surgeon accordingly.
- Perform post-processing of breast MRI examinations, including temporal subtraction of dynamic contrast enhanced studies, region-of-interest based dynamic analysis and calculation of apparent diffusion coefficient from DWI acquisitions.
- Revise breast images obtained by technical staff and ensure that appropriate images of the breast are obtained.
- Use standardized diagnostic categories with defined operational indications such as those of the BI-RADS®.
- Manage difficult cases in which it is appropriate to obtain a second opinion for interpreting and reporting clinical and imaging breast cases.
- Know the potential impact of technological development and new results of research on breast imaging practice.
- Practice attending on a regular basis courses and meetings for a continuing professional development in breast care.
- Perform an ultrasound examination efficiently and confidently, and use all available options; Doppler, and elastography.
- Construct the technician in performing breast mammography, suggesting the optimal positioning and dose adjustment.
- Use the mammography workstation and its tools.

Semester II:

A-Knowledge

- Knowing ultrasound and mammographic appearance of the vascular diseases of the breast.
- Knowing ultrasound and mammographic appearance of the hormonal diseases of the breast.

- Knowing ultrasound and mammographic appearance of the pregnancy related diseases of the breast.
- Knowing ultrasound and mammographic appearance of the traumatic diseases of the breast.
- Knowing ultrasound and mammographic appearance of the bilateral multiple findings of the breast.
- Knowing ultrasound and mammographic appearance of the systemic diseases of the breast.
- Knowing ultrasound and mammographic appearance of the male breast.
- Knowing ultrasound and mammographic appearance of the infectious diseases of the breast.
- Knowing about contrast materials and differences among them in terms of safety and performance.
- Knowing clinical management and radiological evaluation of patients presenting with a palpable breast mass, mastalgia, breast trauma, inflammatory findings, nipple abnormalities, skin retraction, and axillary adenopathy.
- Knowing the molecular classification of breast cancers and its imaging and therapeutic implications.
- Knowing physical principles, techniques, indications, and limitations of breast magnetic resonance imaging (MRI), including T2-weighted imaging, high-spatial resolution dynamic contrast-enhanced T1-weighted imaging, diffusion weighted imaging (DWI), and methods for MR guidance for needle sampling and presurgical localization.
- Knowing methods, advantages, and disadvantages of MR spectroscopy of the breast.
- Knowing the general indications and contraindications to MRI and Gadolinium-based contrast materials and of differences among them in terms of safety and performance.
- Knowing the non-negligible probability of incidental extra-mammary findings on breast MRI.
- Knowing the potential advantages and disadvantages of systems for

computer assisted detection/diagnosis (CAD), applied to mammography and breast MRI.

- Knowing the dedicated sequence protocols for studying breast implants with MRI, including those which allow for silicone suppression, water suppression or selective excitation, fat suppression.
- Knowing the methods for radiologic-pathologic correlation of breast lesions.
- Knowing about genetic/hereditary predisposition for breast cancer, including phenotype of families with BRCA1 and BRCA2 deleterious mutations, and the role of other gene mutations in determining a higher breast cancer risk.
- Knowing the indications for genetic counselling for suspected high-risk patients for breast cancer and the problems associated with genetic testing, including psychological issues and how to manage inconclusive results (i.e., negative BRCA1/2 testing) in high-risk families.
- Knowing the clinical management and radiological evaluation of patients presenting with a palpable breast mass, mastalgia, breast trauma, inflammatory findings, nipple abnormalities, skin retraction, and axillary adenopathy.
- Knowing the principles, objectives, and limitations of population-based screening mammography, including lead time and length bias, difference between results for invited women and attending women, screening effect on disease-related mortality and quality-adjusted life years, differences in effect of screening according to age.
- Knowing the technique, indications and limitations of image-guided methods for needle sampling of breast tissue, including fine needle aspiration (FNA), core biopsy (CB), vacuum-assisted biopsy (VAB), and radiofrequency-based excision/biopsy systems, under any type of imaging guidance.
- Knowing the indications, advantages, and disadvantages of image-guided techniques for pre-surgical localization, under any type of imaging guidance.
- Knowing the radiological methods for evaluating tumor extent and searching for additional ipsilateral malignant lesions or contralateral malignant lesions, including potential advantages and disadvantages of pretreatment MRI.

- Knowing the indications and methods for neoadjuvant chemotherapy, hormonal therapy, and biological targeted therapy of breast cancer and the clinical relevance of early (during treatment) and final (after treatment) imaging evaluation of tumor response.

- Knowing the principles, indications, and technical variants of breast-conserving surgery, in details for what is relevant for breast imaging.

- Knowing the principles, indications, technical variants, and limitations of sentinel node biopsy.

- Knowing indications and methods for adjuvant chemotherapy, hormonal therapy, and biological targeted therapy of breast cancer, in regard to what is relevant for breast imaging.

- Knowing the effects of hormone replacement therapy, surgery (including breast reduction/augmentation as well as oncoplastic reconstruction), chemotherapy, hormonal therapy, and different options for radiation therapy on both clinical status and breast images obtained with mammography, US or MRI.

- Knowing the advantages and limitations of imaging techniques in detecting local recurrence of breast cancer.

- Knowing the imaging methods for extra-mammary staging of breast cancer and evaluation of distant metastases.

- Knowing the methods of standardized evaluation of the imaging-based oncologic status of breast cancer patients according to RECIST 1.1 criteria.

- Knowing the minimally invasive therapy options for distant metastases.

- Knowing the clinical presentation and imaging findings of benign and malignant breast diseases in children, adolescents, and pregnant and lactating women.

- Knowing the standardized lexicon/descriptors and diagnostic categories of breast imaging reporting with reference to lesion, breast, or patient (ACR BI-RADS or other standardized classification methods).

- Knowing the indications and limitations of therapeutic imaging-guided techniques (radiofrequency ablation, cryoablation, electroporation, focused US, etc.) of breast cancer or benign breast diseases.
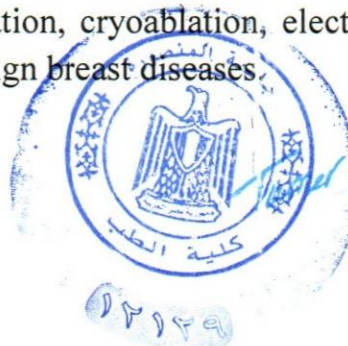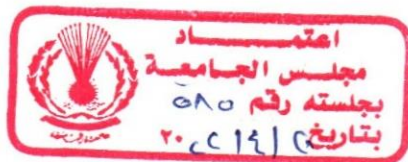
- Knowing international recommendations for the composition of the multidisciplinary team in planning investigations, treatment, and in outcome review for breast cancer patients, in particular those issued by the European Parliament.

B- Intellectual skills:

- Construct a research study, evaluate and present the results in a scientific manner.
- Choose the best-suited method for evaluating disorders of the breast for common and uncommon clinical indications.
- Interpret and report MRI examinations using a clear and synthetic free text using standardized descriptors such as those defined by the ACR BI-RADS.
- Use standardized diagnostic categories with defined operational indications such as those of the BI-RADS.
- Manage difficult cases in which it is appropriate to obtain a second opinion for interpreting and reporting clinical and imaging breast cases.
- Organize interaction with the other radiologists dedicated to breast imaging.
- Organize interaction with other medical and non-medical members of the multidisciplinary breast care team, being an integral part of the team in planning investigations, treatment and in outcome review.
- To attend multidisciplinary conferences and tumor boards for diseases of the breast, in the role of the radiologist responsible for the diagnostic process of the cases in discussion.
- To attend on a regular basis courses and meetings for a continuing professional development in breast care.
- To keep up to date with changes of breast imaging practice as a consequence of a lifelong learning process.
- To be prepared to support clinical trials in breast imaging and clinical trials which require breast imaging support.
- Practice attending multidisciplinary conferences and tumor boards for diseases of the breast, in the role of the radiologist responsible for the diagnostic process of the cases in discussion.
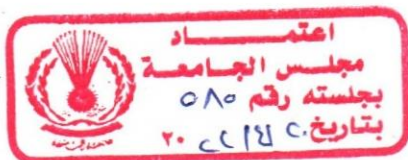
- Practice attending on a regular basis courses and meetings for a continuing professional development in breast care.
- To keep up to date with changes of breast imaging practice as a consequence of a lifelong learning process.
- To be prepared to support clinical trials in breast imaging and clinical trials which require breast imaging support.

C- Practical skills:

- Construct the technician in performing breast MRI, suggesting the optimal sequence protocol and technical parameters.
- Perform post-processing of breast MRI examinations, including temporal subtraction of dynamic contrast enhanced studies, region-of-interest based dynamic analysis and calculation of apparent diffusion coefficient from DWI acquisitions.
- Choose the best biopsy system and the best technique for biopsy guidance, taking into account patient comfort and cost-effectiveness principles.
- Perform FNA, CB, or VAB of breast lesions under mammographic, US, and MRI guidance.
- Perform FNA or CB of lymph nodes suspected as metastatic or also primary malignant.
- Perform image guided biopsy management of small breast lesions.
- Perform image guided localization of breast lesions before surgery (guide wire or charcoal localization).
- Perform image guided localization of breast lesions before neoadjuvant chemotherapy (Clipping or charcoal localization).
- Perform post-operatively radiologic-pathologic correlation directly interacting with the breast pathologist in difficult cases (e.g., multifocal/multicentric cancers, extensive DCIS or DCIS component).
- Recognize breast lesions also in cross-sectional images usually not used in breast imaging (e.g., computed tomography and whole-body positron emission tomography).
- Perform abscess management, clinically and by means of image-guided
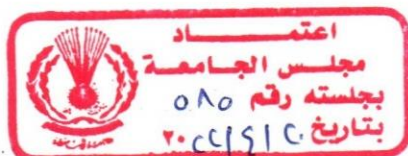
procedures.

- Organize communication with patients regarding the results of imaging studies and of tissue sampling, also explaining the level of uncertainty of particular cases (e.g., high-risk lesions).

- Perform and present research related work related to scientific questions and or evidence-based improvement and quality work in the field of breast radiology to critically review the literature and research articles in the field.

Course contents:

Subject	Code	Lectures	Training sessions
[I]Semester I:			
• The embryology, anatomy, physiology of the breast, axilla.		1	8
• The borderline or so-called high-risk breast lesions.		1	8
• The common and uncommon malignant diseases of the breast, axilla, and associated structures and of their clinical and imaging features.		1	8
• The physical principles, techniques, indications and limitations of film-screen mammography and related techniques.		1	8
• The physical principles, techniques, limitations, and		1	8

indications of digital mammography (DM).		
• The physical principles, techniques, indications, and limitations of ultrasound (US) of breast and axilla.	1	8
• The methods for US evaluation of ipsilateral axilla in patients with a newly diagnosed breast cancer and for US-guided needle sampling of suspicious lymph nodes.	1	8
• The US methods for exploring lymph nodes of the internal mammary chain in the case of newly diagnosed breast cancers.	1	8
• The principles, techniques, advantages and disadvantages of automated breast US.	1	8
• The physical principles, techniques, indications, and limitations of breast magnetic resonance imaging (MRI).	1	8
• The method, advantages, and disadvantages of MR spectroscopy of the breast.	1	8
• The general indications and contraindications to MRI and Gadolinium-based contrast materials.	1	8
• The principles, technique, indications, and limitations of nuclide-based techniques dedicated to breast imaging.	1	8
• Nipple discharge.	1	8
• The epidemiological data regarding breast cancer.	1	8
• The role of risk factors for breast cancer.	1	8
• The role of breast density in determining a masking effect for screening mammography.	1	8
• The indications for genetic counselling for suspected high-risk patients for breast cancer.	1	8
• The current debate on limitations of screening programs, including interval cancers, false positive rate, and over diagnosis of DCIS and invasive cancers.	1	8
• The indications, advantages, and disadvantages of image-guided techniques for presurgical localization, under any type of imaging guidance.	1	8
• The clinical presentation and imaging findings of benign and malignant breast diseases in children, adolescents, and	1	8

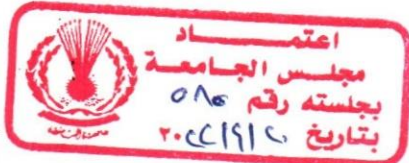|		
pregnant and lactating women.		
• The standardized lexicon/descriptors and diagnostic categories of breast imaging reporting with reference to lesion, breast, or patient (ACR BI-RADS® or other standardized classification methods)	1	8
• The legal liability in breast imaging, for both screening and clinical activity.	1	8
• Knowing about Mammography & ultrasound BI-RADS lexicon and usage.	1	8
• Knowing ultrasound and mammographic appearance of benign lesions of the breasts.	1	8
• Knowing ultrasound and mammographic appearance of probably benign lesions of the breasts.	1	8
• Knowing ultrasound and mammographic appearance of premalignant and risk lesions of the breasts.	1	8
• Knowing ultrasound and mammographic appearance of malignant lesions of the breasts.	1	8
• Knowing ultrasound and mammographic appearance of the nipple diseases.	1	8
• Knowing ultrasound and mammographic appearance of the skin diseases of the breast.	1	8
Total	**30**	**240**
[II] Semester II:		
• Knowing ultrasound and mammographic appearance of the pregnancy related diseases of the breast.	1	8
• Knowing ultrasound and mammographic appearance of the traumatic diseases of the breast.	1	8
• Knowing ultrasound and mammographic appearance of the bilateral multiple findings of the breast.	1	8
• Knowing ultrasound and mammographic appearance of the systemic diseases of the breast.	1	8
• Knowing ultrasound and mammographic appearance of the male breast.	1	8
	1	

• Knowing ultrasound and mammographic appearance of the infectious diseases of the breast.		8
	1	
• Knowing about contrast materials and differences among them in terms of safety and performance.		8
	1	
• Knowing clinical management and radiological evaluation of patients presenting with a palpable breast mass, mastalgia, breast trauma, inflammatory findings, nipple abnormalities, skin retraction, and axillary adenopathy.		8
	1	
• Knowing the molecular classification of breast cancers and its imaging and therapeutic implications.		8
	1	
• Knowing physical principles, techniques, indications, and limitations of breast magnetic resonance imaging (MRI), including T2-weighted imaging, high-spatial resolution dynamic contrast-enhanced T1-weighted imaging, diffusion weighted imaging (DWI), and methods for MR guidance for needle sampling and presurgical localization.		8
• Knowing the general indications and contraindications to MRI and Gadolinium-based contrast materials and of differences among them in terms of safety and performance.	1	8
• Knowing the non-negligible probability of incidental extra-mammary findings on breast MRI.	1	8
• Knowing the potential advantages and disadvantages of systems for computer assisted detection/diagnosis (CAD), applied to mammography and breast MRI.	1	8
• Knowing the methods for radiologic-pathologic correlation of breast lesions.	1	8
• Knowing the clinical management and radiological evaluation of patients presenting with a palpable breast mass, mastalgia, breast trauma, inflammatory findings,	1	8

اعتمــــاد
مجلس الجامعــة
بجلسته رقم ٥٨٥
بتاريخ ٢٠ cc۱۱٬

nipple abnormalities, skin retraction, and axillary adenopathy.		
• Knowing the principles, objectives, and limitations of population-based screening mammography, including lead time and length bias, difference between results for invited women and attending women, screening effect on disease-related mortality and quality-adjusted life years, differences in effect of screening according to age.	1	8
• Knowing the technique, indications and limitations of image-guided methods for needle sampling of breast tissue, including fine needle aspiration (FNA), core biopsy (CB), vacuum-assisted biopsy (VAB), and radiofrequency-based excision/biopsy systems, under any type of imaging guidance.	1	8
• Knowing the indications, advantages, and disadvantages of image-guided techniques for pre-surgical localization, under any type of imaging guidance.	1	8
• Knowing the radiological methods for evaluating tumor extent and searching for additional ipsilateral malignant lesions or contralateral malignant lesions, including potential advantages and disadvantages of pretreatment MRI.	1	8
• Knowing the indications and methods for neoadjuvant chemotherapy, hormonal therapy, and biological targeted therapy of breast cancer and the clinical relevance of early (during treatment) and final (after treatment) imaging evaluation of tumor response.	1	8

• Knowing the principles, indications, and technical variants of breast-conserving surgery, in details for what is relevant for breast imaging.	1	8
• Knowing the principles, indications, technical variants, and limitations of sentinel node biopsy.	1	8
• Knowing indications and methods for adjuvant chemotherapy, hormonal therapy, and biological targeted therapy of breast cancer, in regard to what is relevant for breast imaging.	1	8
• Knowing the effects of hormone replacement therapy, surgery (including breast reduction/augmentation as well as oncoplastic reconstruction), chemotherapy, hormonal therapy, and different options for radiation therapy on both clinical status and breast images obtained with mammography, US or MRI.	1	8
• Knowing the methods of standardized evaluation of the imaging-based oncologic status of breast cancer patients according to RECIST 1.1 criteria.	1	8
• Knowing the minimally invasive therapy options for distant metastases.	1	8
• Knowing the clinical presentation and imaging findings of benign and malignant breast diseases in children, adolescents, and pregnant and lactating women.	1	8
• Knowing about contrast materials and differences among them in terms of safety and performance.	1	8
• Knowing about diseases of nipple and different imaging modalities.	1	8
• Knowing international recommendations for the composition of the multidisciplinary team in planning investigations, treatment, and in outcome review for	1	8

		30	240
breast cancer patients, in particular those issued by the European Parliament			
Total		30	240

Program ILOS Matrix: Program ILOs are enlisted in the first row of the table (by their code number a1, a2, a3,......) then the program topics are enlisted in the first column. An "x" mark is inserted where the respective topic contributes to the achievement of the program ILOS in Question.

[I] Program ILOS Matrix of semester 1:

Topic	A1	A2	A3	B1	B2	B3	C1	C2	D1	D2
1- Embryology, anatomy, physiology of breast and axilla.										
2- Common and uncommon benign, borderline, locally-aggressive, Malignant diseases(pathology, clinical, Us and mammography)				×					×	
3- The physical principles, techniques and indications of film screen mammography, digital mammography, Ultrasound, automated Ultrasound, MRI and nucleide imaging.				×					×	
4- Methods of US evaluation of ipsilateral axilla including US guided biopsy.									×	
5- Nipple discharge (Pathology, clinical,Us and Mammography)									×	
6- Skin diseases (Pathology, clinical,Us and Mammography)									×	

#	Topic										
7-	Epidemiology of breast cancer, Role of risk factors of breast cancer.			×							×
8-	Indications of genetics counceling.									×	×
9-	Screening programes										×
10-	Pre-surgical evaluation, under any type of image guidance.										
11-	Benign, pre-maligant, malignant diseases of children, adolecents, pregnant and lactating females.									×	
12-	BIRADS Lexicon(mammography, US)										
13-	Molecular subtypes of breast cancer, hormonal imaging.										
14-	Traumatic, bilateral multiple findings, systemic diseases, infectious diseases.									×	
15-	Male diseases									×	

[II] Program ILOS Matrix of semester 2:

Topic	A 1	A 2	A 3	B 1	B 2	B 3	C 1	C 2	D 1	D 2
1- Molecular subtypes of breast cancer										
2- The physical principles, techniques, indications and contraindications of MRI.				×					×	
3- CAD applied to different imaging modalities.									×	
4- Breast implants.									×	
5- Genetic predisposition of breast cancer (BRCA1/2)									×	
6- Clinical management and radiological assessment of breast masses, mastalgia, breast trauma, inflammatory changes, nipple discharge.				×						×
7- Different breast interventional methods.									×	×

|											
8- Indications of breast conservative surgery, sentile LN biopsy.											
9- Pre-treatment MRI assessment.											×
10- Indications of NAC, hormonal and targeted biological therapy with imaging evaluation.											
11- Advantages and limitation of imaging techniques in detecting local recurrence, extra-mammary findings, evaluation of distant metastasis.									×		
12- Methods of standardized evaluation of image-based oncologic status according to RECIST 1.1 criteria.											

Program Regulation

During the entire training program, the candidate must be dedicated and fully responsible for patient care under supervision of fellowship trainers.

Trainees Duties and obligations

1- The trainees should attend and participate. Attendance and participation should not be less than 75% of the total number of activities within any training rotation / period including:

    1.1. Sonomamography clinics.

    1.2. Breast MRI clinics.

    1.3. MDT discussions and meetings.

    1.4. Observation and assistance in a full range of imaging procedures.
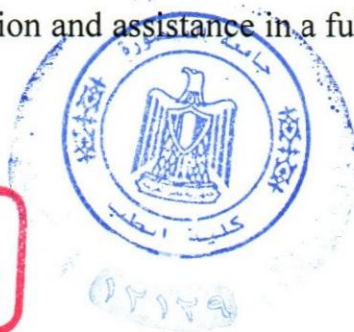
1.5. Supervised or independent performance of interventional procedures.

1.6. Educational activities.

1.7. Participation in clinical research.

1.8. Access to patient's records.

Teaching methods:

1- Lectures.

2- Training skill sessions in different radiological methods for breast imaging and intervention.

3- Cases assessment in MDT and planning management of breast cancer patients.

4- Self-learning.

5- Multi-diciplinary meetings.

6- E-Learning.

Teaching resources: Facilities required for teaching and learning

1- PACS.

2- Ultrasonography.

3- Mammography.

4- MRI images.

5- CDs.

6- Videos.