



قسم الهندسة الحيوية الطبية  
Biomedical Engineering Department



## Research topics for the Medical Imaging course

Dear 3<sup>rd</sup> year students;

Please select one of the below research topics to be used as an evaluation method to what you have studied in the Medical Imaging course and the state of art in this field.

Regards,

**Course coordinators**

**Dr. Walid Al-Atabany**

**Dr. Ayman Khalifa**



## **Research Topic 1**

### **Interventional Radiology**

During your course study you have learned that Medical Imaging Techniques are non-invasive methods for looking inside the body without opening up the body surgically. It is used to assist diagnosis or treatment of different medical conditions. There are many medical imaging techniques; every technique has different risks and benefits.

These Medical Imaging techniques play a great role in one of the most important medical subspecialty which is the Interventional radiology (IR). IR performs various minimally-invasive procedures using one of the medical imaging modalities as guidance, such as x-ray fluoroscopy, computed tomography, magnetic resonance imaging, or ultrasound.

There are two types of IR; diagnostic and therapeutic. Both of them performs the intervention procedure through very small incisions or body orifices.

#### **Project Requirement:**

- Differentiate between the two types of IR
- What are the different medical imaging modalities that can be used in each type
- What are the limitations of each one of the different IR modalities
- Give examples for the different manufacturers of each modality.

#### **Notes:**

- Choose only two modalities for each type of the IR to talk about (i.e. maximum number of modalities is four for the two types).
- Your research report length should not be less than 7 pages and not more than 10 pages.

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## Research Topic 2

### Role of Medical Imaging equipment in LINAC

During your course study you have learned that Medical Imaging Techniques are non-invasive methods for looking inside the body without opening up the body surgically. It is used to assist diagnosis or treatment of different medical conditions. There are many medical imaging techniques; every technique has different risks and benefits.

These Medical Imaging techniques play a great role in one of the most important medical subspecialty which is radiation therapy treatment. One of the radiation therapy equipment is the Linear Accelerator (LINAC) which delivers high-energy x-rays or electrons to the region of the patient's tumor to destroy cancer cells.

Data from Medical Imaging equipment are used to build the treatment plan for the patient through the Radiation Therapy Planning System.

#### Project Requirement:

- Discuss in brief the theory of the LINAC
- What kind of Medical Imaging equipment is used to help in developing the treatment plan?
- Talk briefly about the MRI-Guided Linear Accelerator (MRI-LINAC)
- Give examples for the different manufacturers of LINAC equipment.

**Note:** Your research report length should not be less than 7 pages and not more than 10 pages.

#### **Course coordinators**

**Dr. Walid Al-Atabany**

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