

# **ADVANCED RADIATION PHYSICS INC.**

2888 NW 30<sup>th</sup> Street, Boca Raton, FL 33434; Phone: 561-789-6642

## **Treatment Planning & Dosimetry**

### **Course fee:**

- \$900.00
- A non-refundable fee of \$500 is required
- \$100 discount per course for Veterans and Military personnel.
- \$100 discount per person for a group of 4 or more.
- Remaining balance due two weeks before the class starts
- Use PayPal or send check to:

Advanced Radiation Physics Inc.

2888 NW 30<sup>th</sup> Street  
Boca Raton, FL 33433-2432

- Send registration form by email to [registration@thearpi.com](mailto:registration@thearpi.com)

### **Course fee will include:**

- Weekly class: 5:30 PM to 8:00 PM
- Binder, CD, or electronic file with the course material
- Class offered online via webinar
- Study group organized from the first day of the course, with proposed structured schedule.

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### **Course details:**

- Webinars offered at weekly
- You can hear all of us, see the teacher and the presentation constantly during the webinar
- Webinars are recorded and you can have them and listen as many times as you wish.
- Chat and documents will be shared by all the attendants from the first class of the year till the last one of the same year

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## **Texts:**

- *Treatment Planning in Radiation Oncology*; Faiz M. Khan, Roger A. Potish,
- User manuals: *Eclipse, Pinnacle, BrainLab, Oncentra, Variseed, and Cyberknife*

## **References:**

- **American Association of Physicist in Medicine (AAPM) – all TG reports,**
- *Treatment Planning & Dose Calculation in Radiation Oncology*; G. C. Bentel, Radiation Therapy Planning, G. C. Bentel,
- *Brachytherapy Applications and Techniques*; P. M. Devil
- *Intensity Modulated Radiation Therapy*, J. Palta
- *Practical Essentials of Intensity Modulated in Radiation Therapy*; K.S. C. Chao
- *Stereotactic Body Radiation Therapy*; B.D. Kavanagh & R. D. Timmerman
- *Image-Guided Radiation Therapy of Prostate Cancer*; R. K. Valicenti, A. P. Dicker, D. A. Jaffray
- *Medical Dosimetry Certification Study Guide*; K. N. Godiva Rajan
- *Basic Clinical Radiobiology*; G. Gordon Steel

## **Course description:**

- Course covers the physics and clinical application external beam photon therapies with emphasis on planning, idodose calculations, Dose Volume Histogram development and evaluations

## **Course objectives:**

- At the end of this course the students should have a good understanding of the Megavoltage X-rays treatment planning and dosimetric evaluation

## **Course outline:**

- Biological effect of radiation therapy, tumor control probability, normal tissue complications probability, fractionation protocol
- Pathological classifications of tumors: staging, grading, prognosis factors, Influence of other treatments on radiotherapy

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- Volume definition for planning (ICRU 50, 62 & 71), GTV, CTV, PTV, Organs at risk, Treated volume, Irradiated volume
- Data acquisition: CD, CT scanner, MRI, PET, another planning system, immobilization devices
- Image processing: Importing images from different devices, image registration, artifacts, clips
- Contouring: Defining CTV, PTV, organs at risk, normal tissue
- 3D planning techniques: Beam placement, MLC placement, fluence editing, electronic compensators, physical and dynamic wedges, field in field technique
- IMRT, IGRT planning: Preparing the contours for optimization, optimization techniques, constraints, techniques for DVH optimization, techniques for biological effectiveness optimization, protocols for specific cases
- SRS, SRT, SBRT: BrainLab planning with mini MLC, protocols for specific cases
- Brachytherapy planning for: High Dose Rate: Savi, Contoura, Multilumen Mammosite, Leipzig, Freiburg flap, Tandem and Ovoids, Miami GYN, Mupit; IPSA for: prostate, breast, and endometrial; Low Dose Rate: Prostate implants an planning, GYN with Cs-137; Protocols for specific cases
- Introduction to Proton therapy
- Plan evaluation: analyzing the goodness of the contours, DVH analysis, Organs at risk evaluation
- Treatment planning systems: Operating, Commissioning, beam acquisition and modeling, quality assurance, acceptance testing
- Planning algorithms
- Biological effects of radiation and radiation safety
- Medical physicist ethics

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## **List of Topics by week:**

- Week 1: Biological effect of radiation therapy, fractionation protocols
- Week 2: Tumor control probability, Normal tissue complications probability
- Week 3: Volume definition for planning, Data acquisition, Image processing
- Week 4: Structures segmentation, defining CTV, PTV, organs at risk, preparing the structures for IMRT optimization
- Week 5: 3D planning techniques: beams placement, MLC placement, Electronic compensators, and physical and dynamic wedges
- Week 6: IMRT planning techniques: definition of PTV optimization, defining the ring and the avoidance areas, optimization techniques
- Week 7: IMRT planning techniques (continuation): Criteria of optimization, techniques of DVH optimization, Techniques of biological effectiveness optimization
- Week 8: IMRT planning techniques (continuation): Criteria of beams placement, DVH analysis, RTOG protocols for different cases. Planning algorithms, commissioning of a treatment planning system, commissioning for IMRT and for SRS
- Week 9: SRS, SRT, & SBRT planning techniques: Criteria of selecting a tumor for SRS or SBRT, placing the beams.
- Week 10: Brachytherapy, biological effect HDR versus LDR, versus External, generating PTV-evaluation, catheter reconstruction for different applicators, dwell positions activation, planning for prostate, breasts (all applicators)
- Week 11: HDR (cont.), Freiburg flap, Leipzig applicator, generating 3D dose, DVH analysis, exporting the plan to the treatment console.
- Week 13: LDR pre-implant planning, types of seeds used, placement of the seeds, DVH analysis, ordering the seeds. Post implantation planning. Proton therapy introduction in planning
- Week 14: Radiation safety and radiation protection rules and regulations
- Week 15: Medical and Medical Physicist ethics

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