Service Technician Level II Syllabus

Simac Lab 1:

RF Driver, Beam Loading, Bending Magnet, Klystron Pulse Voltage, Beam Finding, Beam Symmetry, Flattening Filter.
Learning objective: Introduction to linac components and how they are connected

Linac Safety Theory

Safety Concepts, Safe systems, system control, accidents, building safe systems
Learning objective: Understand the concepts for safe systems.

Linac Hazards

General electrical and linac safety. High voltage safety. Hazardous materials & SF6 safety. Transmission waveguide. Mechanical safety. Microwave tube safety, hot surfaces, Ozone
Learning objective: Understand the hazards in linear accelerators. Understand how the hazards affect the safety of the service technician, the patient, and the machine.

Review of important linac incidents

Incidents at Białystok, Poland, incident at Zaragoza, Spain, Therac 25 incidents, Varian symmetry upgrade.
Learning objective: Understand the causes for important linac incidents that have occurred.

Linac Interlocks

Review of incidents and the interlock systems used. Theory of safety and interlocks.
Learning objective: Understand how interlock systems function, and how they could be used to avoid linac incidents.

Physics QA

Maintaining quality of radiotherapy systems, Quality assurance protocols, frequency of quality assurance, Return to service, Water tank measurements, Beam flatness and symmetry, adjusting beam symmetry, Quality assurance tests, instruments for quality assurance.
Learning objective: Understand the purpose of linear accelerator quality assurance, understand quality assurance protocols, understand a process for return to service after repairs, understand quality assurance tests and the instruments used to measure linac properties. Understand flatness and symmetry errors and how to correct them.

Preventative and corrective maintenance

Typical operating values of modulator, gun, beam currents, bending magnet and other linac operating points. Recording of values, troubleshooting based on recorded machine values, troubleshooting process. Values recorded in the PMs and how to use these when troubleshooting.
Learning objective: Understand the purpose of preventative maintenance and its use in troubleshooting linac problems

Advanced Labs

1. *Beam Loading travelling wave*
2. *Beam Loading Standing wave*
3. *Steering 270-degree bend magnet*
4. *Steering slalom bend magnet*
5. *Electron beam angle of incidence on target*
6. *270-degree bend magnet*

7. *Slalom style bend magnet*

Learning objective: Understand the how components respond to changes to help in troubleshooting process