

List of Figures

- 3.1** Simulation model for unique performance model of Varian Clinic 600 separated into three parts using BEAMnrc-DOSXYZnrc code **47**
- 3.2** Comparison of the MC calculated and the measured central-axis depth-dose data Using a 0.2 cm FWHM, 5.7 MeV Electron Beam for different field sizes. **49**
- 3.3** Comparison of the Monte Carlo calculated and the measured profile data for a field size of $10 \times 10 \text{ cm}^2$ at different depths. **51**
- 3.4** Comparison of the Monte Carlo calculated and the measured profile data for a field size of $20 \times 20 \text{ cm}^2$ at different depths. **52**
- 3.5** Central axis Photon fluence spectra calculated for radius $0 < r < 2.25$ & energy bin of 0.25 MeV for different field sizes . **53**
- 3.6** photon average energies distribution for large open fields at SSD 100 cm, scored in annular bins. **56**
- 3.7** Central axis photon energy fluence spectra for a field size of $10 \times 10 \text{ cm}^2$ with radius $0 < r < 2.25$ cm & energy bin size used 0.25 MeV. **58**
- 3.8** Central axis electron fluence spectrum calculated for radius $0 < r < 2.25$ & energy bin of 0.25 MeV beam for different field sizes. **60**
- 4.1** Simulation model for Varian Linac split into three parts. **70**
- 4.2** Comparison of relative depth dose curves calculated for MLC blocked and jaw define open fields for 6MV photon beams for different field sizes. **73**
- 4.3** Photon fluences per initial electron on the target, at the top of the water phantom

	as a function of energy (MeV) for field size $20 \times 20 \text{ cm}^2$.	74
4.4	Photon average energy distribution for the MLC blocked and jaw define open fields as a function of off axis distance for a field size of $20 \times 20 \text{ cm}^2$ and SSD of 100 cm.	75
4.5	Electron fluences per initial electron on target, at the top of the water phantom as a function of off axis distance for $20 \times 20 \text{ cm}^2$ field size calculated for both MLC and Jaw define field.	76
5.1	6 MV Varian Linac simulation model separated into three parts	85
5.2	A comparison of measured and calculated depth doses curves of the 6MV photon beam for 20×20 , 10×10 and $5 \times 5 \text{ cm}^2$ field sizes .	86
5.3	A comparison of measured and calculated beam profiles of the 6MV photon beam at a depth of 10 cm for 20×20 , 10×10 and $5 \times 5 \text{ cm}^2$ field sizes.	88
5.4	Comparison of the MC calculated Percentage depth Dose for flattened and unflattened Beam for different Field sizes	91
5.5	Photon fluences per initial electron on the target, at the top of the water phantom as a function of Photon energy E (MeV) for $20 \times 20 \text{ cm}^2$ field size calculated for with and without a flattening filter in beam line .	93
5.6	Photon fluences per initial electron on the target at the top of the water phantom as a function of the off-axis distance for a field size of $20 \times 20 \text{ cm}^2$ calculated with and without a flattening filter in the beam line .	94
5.7	Photon average energy distribution of the filtered and unfiltered 6-MV beams as a function of the off axis distance for $20 \times 20 \text{ cm}^2$ field size.	95
5.8	Electron fluences per initial electron on target, at the top of the water phantom as a function of energy E (MeV) for $20 \times 20 \text{ cm}^2$ field size calculated for with and without a	

flattening filter in beam line .	96
5.9 Electron fluences per initial electron on target at the top of the water phantom as a function of the off-axis distance for a field size of $20 \times 20 \text{ cm}^2$ calculated with and without a flattening filter in the beam line .	97
5.10 Comparison of lateral profile for 6MV photon beams delivered with and without a flattening filter in beam line at a depth of 10 cm for field size of $10 \times 10 \text{ cm}^2$.	100
5.11 Comparison of lateral profile for 6MV photon beams delivered for with and without a flattening filter in beam line at a depth 10 cm for different field sizes.	102
5.12 Comparison of Lateral dose profiles for a $5 \times 5 \text{ cm}^2$ field size at a depth of 5 cm.	103
5.13 Comparison of the lateral profiles for 6-MV photon beams with and without a flattening filter at a depth of 10 cm for different field sizes.	110
6.1 Varian Linac simulation model.	121
6.2 Lateral profile for 6MV photon beams delivered with and without a flattening filter in beam line at a depth of 10 cm for different field sizes	123
6.3 Lateral profile comparison for 6MV photon beam for a field size of $20 \times 20 \text{ cm}^2$ at 10 cm depth .	126
6.4 Lateral profile comparison for 6MV photon beam for a field size of $10 \times 10 \text{ cm}^2$ at 10 cm depth .	127
6.5 Lateral profile comparison for 6MV photon beam for a field size of $5 \times 5 \text{ cm}^2$ at 5 cm depth .	128
6.6 Photon fluences per initial electron on the target, at the top of the water phantom as a function of energy (MeV) for $20 \times 20 \text{ cm}^2$ field size calculated for with and without a flattening filter in beam line.	129

- 6.7** Photon energy fluences per initial electron on the target, at the top of the water phantom as a function of off axis distance for a field size of $20 \times 20 \text{ cm}^2$ calculated for flattened and unflattened beam. **130**
- 6.8** Photon average energy distribution of the filtered and unfiltered beams as a function of off-axis distance for $20 \times 20 \text{ cm}^2$ field size and 100 cm source to surface distance. **132**
- 6.9** Electron fluences spectra per initial electron on target, at the top of the water phantom as a function of energy for a field size of $20 \times 20 \text{ cm}^2$ for both flattened and unflattened beam . **133**
- 6.10** Electron energy fluences per initial electron on target, at the top of the water phantom as a function of off axis distance calculated for a field size of $20 \times 20 \text{ cm}^2$. **134**
- 6.11** Comparison of relative depth dose curves calculated for with and without flattening filter for different field sizes. **136**