DOPS / OCE

	DOPS / OCE		Examples of evidence which may relate to this DOPS / OCE	Competencies which may share evidence with this DOPS / OCE
RADS DOPS	Module 1 (RADS1)	Assess existing shielding in a facility	•Worksheet detailing results of visual inspection, measurements and calculations of shielding •Report for detailing findings and appropriate recommendations	•RADS1-9
		Check engineering controls	•Critical examination report	•RADS2-14 and 15
		Calculate attenuation coefficients for different materials	•Shielding calculation and design •Assessment of PPE requirements for a facility	•RADS1-4 to 6 •RADS1-9
		Calculate shielding thickness for a new radiation facility	•Shielding calculation and design •Assessment of PPE requirements for a facility	•RADS1-4 to 6 •RADS1-9
		Assessment of shielding integrity in a new installation	•Worksheet detailing results of visual inspection, measurements and calculations of shielding •Report for detailing findings and appropriate recommendations	•RADS1-9
		Assess the integrity of a Brachytherapy source safe	•Worksheet detailing results of visual inspection, measurements and calculations of shielding •Report for detailing findings and appropriate recommendations	•RADS1-9
		Assess the shielding integrity of a nuclear medicine isolator cabinet	•Worksheet detailing results of visual inspection, measurements and calculations of shielding •Report for detailing findings and appropriate recommendations	•RADS1-9
		Measure the neutron radiation in a high energy linac maze	•Critical examination or other report	•RADS1-9
		Measure the attenuation coefficients for different materials	•Facility survey to compare measured and calculated shielding thicknesses •Assessment of shielding provided by existing structures or items of PPE	•RADS1-4 to 6 •RADS1-9
	Module 2 (RADS2)	Test leakage of an X-ray tube	•Review of literature (legislation and guidance for critical examination) •Worksheets containing results of measurements and calculations •Report of results (e.g. critical examination or acceptance testing report)	•RADS1-9 •RADS2-5, 9 and 15
		Beam quality assessment for a diagnostic X-ray machine	•Review of literature (legislation and guidance for critical examination) •Worksheets containing results of measurements and calculations •Report of results (e.g. critical examination or acceptance testing report)	•IIR-C-19 to 20 •RADS1-9 •RADS2-5 •RADS2-15
		Measure radiation output for a diagnostic X-ray machine	•Review of literature (legislation and guidance for critical examination) •Worksheets containing results of measurements and calculations •Report of results	•IIR-C-19 to 20 •RADS2-4 to 7
		Perform scattered dose rate measurements	•Report of results	
		Assess light field/radiation field alignment	•Worksheets containing results of measurements and calculations •Report of results	•IIR-C-19 to 20 •RADS2-4 to 7
		Calibrate and performance test a PACS reporting workstation	•Worksheets containing results of measurements and calculations •Report of results	•RADS2-6 and 7
		Assess the performance of an automatic exposure control system on a radiographic unit	•Literature review (guidance, dept work instructions etc.) •Worksheets containing results of measurements and calculations •Final report giving results and making suitable recommendations	•IIR-C-19 and 20 •RADS2-4, 5, 13 and 15
		Measure the radiation air KERMA for a mammography machine	•Literature review (guidance, dept work instructions etc.) •Worksheets containing results of measurements and calculations •Final report giving results and making suitable recommendations	•RADS2-6, 7 and 13
		Measure tube voltages on a CT scanner	•Worksheets containing results of measurements and calculations •Report of results	•RADS2-10, 11, 13 and 15
		Measure the focal spot on an x-ray machine	•Review definition of apparent focal spot size of an X-ray machine •Review methods of measuring focal spot size (e.g. pin-hole, start test pattern) •Review other literature, e.g. IEC standards (and limits) •Perform, record, and interpret measurements	•IIR-C-19 and 20 •RADS2-4, 5, 7 and 15
		Measure intensifier input dose rates in fluoroscopy and acquisition modes for continuous and pulse modes of operation	•Review of literature (legislation and guidance for critical examination) •Worksheets containing results of measurements and calculations •Report of results	•RADS2-8, 9 and 13
		Measure the scattered dose rate around a fluoroscopy X-ray unit	•Worksheets containing results of measurements and calculations •Report of results	•RADS2-8, 9 and 15
		Measure the radiation air KERMA for a bone densitometry machine	•Worksheets containing results of measurements and calculations •Report of results	
	Module 3 (RADS3)	Undertake $CTDI_w$ measurement	•Worksheets containing results of measurements and calculations •Report of results	•RADS2-10 and 11
		Discuss optimisation strategies with users and the installer during commissioning of diagnostic X-ray equipment	•Short report on optimisation strategies implemented during commissioning / applications training	•RADS2-5, 7, 8 and/or 11 •RADS3-3,4, 8, 9 and 10
		Assess image quality for a diagnostic X-ray machine using a simple test object	•Worksheets containing results of measurements and calculations •Report of results	•RADS2-4 to 11 •RADS3-3 and 4
		Undertake entrance surface dose measurements for a fluoroscopy system	•Worksheets containing results of measurements and calculations •Report of results	•RADS2-8 and 9 •RADS3-3, 4
		Analyse and interpret data from a multislice CT phantom	•Worksheets containing results of measurements and calculations •Report of results	•RADS2-10 and 11 •RADS3-3 and 4
		Use a (commercially available) software program to calculate a patient dose	•Samples of patient dose calculations	•RADS-C-25 •RADS3-5, 6 and 7 •RADS-7-7 to 9
		Measure the image quality in fluoroscopy and acquisition modes at varying pulse / frame rates on an image intensifier or flat panel screening system	•Worksheets containing results of measurements and calculations •Report of results	•RADS2-8 and 9 •RADS3-3 and 4
		Measure the image quality for a mammography unit using a variety of test objects	•Worksheets containing results of measurements and calculations •Report of results	•RADS2-6 and 7 •RADS3-3 and 4
	Module 4 (RADS 4)	Audit of clinical laser facilities	•Audit report highlighting any areas for rectification •Recommendation letter	•RADS5-1
		Measurement of laser output	•Worksheets containing results of measurements and calculations •Report of results	•RADS4-3
		Calculate NOHD for a clinical laser	•Collect and summarise relevant laser information •Calculation spreadsheet or report	•RADS4-4
		Measure the output from a blue light therapy unit	•Worksheets containing results of measurements and calculations •Report of results	•RADS5-7
		Measure the output from a diathermy unit	•Worksheets containing results of measurements and calculations •Report of results	•RADS5-7
		Measure the output from a lithotripter	•Worksheets containing results of measurements and calculations •Report of results	•RADS5-7
		Calibrate a thermal imager	•Worksheets containing results of measurements and calculations •Report of results	•RADS5-7

RADS DOPS	Module 5 (RADS5)	Assess the sensitivity/low contrast penetration of an ultrasound system	•Worksheets containing results of measurements and calculations •Report of results	•INIR-C-2 and 3
		Determine the slice thickness of an ultrasound transducer	•Worksheets containing results of measurements and calculations •Report of results	•INIR-C-2 and 3
		Assess the accuracy of Doppler ultrasound velocity measurement	•Worksheets containing results of measurements and calculations •Report of results	•INIR-C1
		Characterise an ultrasound field/pulse using hydrophone measurements	•Worksheets containing results of measurements and calculations •Report of results	
		Measure the output from a therapeutic ultrasound device	•Worksheets containing results of measurements and calculations •Report of results	•INIR-C4
		Perform B-field strength assessment in MRI	•Worksheets containing results of measurements and calculations •Report of results	•RADS5-7 and 10
		Make measurements of occupational exposure for a non-ionising source	•Worksheets containing results of measurements and calculations •Report of results	•RADS5-7 and 10
		Make audible noise assessments around an MRI facility	•Worksheets containing results of measurements and calculations •Report of results	
		Carry out a safety audit of a non-ionising facility	•Audit report highlighting any areas for rectification •Recommendation letter	•RADS5-1
	Module 6 (RADS8)	Carry out an environmental radiation survey	•Plan an environmental radiation survey taking into account likely areas of weakness in shielding •Obtain and analyse results •Worksheet and final report detailing analysis, final results and appropriate recommendations	•RADS8-1, 10 and 11
		Perform contamination monitoring and decontamination in Nuclear Medicine	•Department contamination monitoring / decontamination records	
		Measure of radiation dose from a radioactive source	•Worksheets containing results of measurements and calculations •Report of results	•RADS8-1
		Undertake dose rate measurements in radioactive stores	•Worksheets containing results of measurements and calculations •Report of results	•RADS8-1
		Undertake transport index measurement	•Review of national / international standards •Measurement and assessment outcome •Copy of transport documentation	
		Measure activation products in radiotherapy	•Worksheets containing results of measurements and calculations •Report of results	•RADS8-1
		Use a (commercially available) software program to calculate a patient dose	•Review of methods for calculating patient doses •Produce dose estimates comparing different methods and detailing assumptions behind the calculations •Compare against national and international values where appropriate	•RADS3-5 to 9 •RADS8-3
		Undertake Nuclear Medicine calibrator QA	•Department QA records	•RADS2-1,2 and 3
		Audit of X-ray facilities	•Audit report highlighting any areas for rectification •Recommendation letter	•RADS-C11 to 13 •RADS7-5 and 6
		Audit a radioactive waste management system	•Audit report highlighting any areas for rectification •Recommendation letter	•RADS-C11 to 13 •RADS7-5 and 6
		Audit and test engineering controls for a linear accelerator bunker	•Audit report highlighting any areas for rectification •Recommendation letter	•RADS-C11 to 13 •RADS7-5 and 6
		Audit PET or Nuclear Medicine facilities	•Audit report highlighting any areas for rectification •Recommendation letter	•RADS-C11 to 13 •RADS7-5 and 6
		Calibrate a contamination monitor	•Calibration records •Worksheets containing results of measurements and calculations	•RADS-C-6 •RADS2-1,2 and 3
		Undertake an ionisation chamber calibration or intercomparison	•Calibration records •Worksheets containing results of measurements and calculations	•RADS-C-6 •RADS2-1,2 and 3
		Perform dose rate meter calibration or intercomparison	•Calibration records •Worksheets containing results of measurements and calculations	•RADS-C-6 •RADS2-1,2 and 3
		Undertake Passive environmental dosimeter calibration or intercomparison	•Calibration records •Worksheets containing results of measurements and calculations	•RADS-C-6 •RADS2-1,2 and 3
	Module 7 (RADS7)	Audit radiation safety governance arrangements	•Audit report highlighting any areas for rectification •Recommendation letter	•RADS-C-11 to 13 •RADS7-5 and 6
		Give advice to a non-scientific manger on radiation safety governance	•Commentary on advice given •Recommendation letter •E-mail chain (if applicable) of queries and answers	•RADS-C-11 to 13 •RADS7-5 and 6
		Report a radiation incident following the organisations procedures	•Samples of patient dose calculations •Copy of report for organisation or regulator •Review of follow up actions	•RADS-C-25 •RADS7-7 to 9
		Provide IRMER training to Referrers	•Copy of slides •Commentary on training delivered	•RADS-C-11
		Meet with a radiation protection supervisor to discuss safe working practices in a department	•Commentary on discussions •Written records of advice	
		Provide a validation of Type A and/or excepted packaging	•Record of validation	•Module 6 DOPS 'Measure Transport Index'
		Select an appropriate radiation detector for a radiation emergency exercise or incident	•Major incident rehearsal report •Discussion of equipment selection	•RADS7-10 to 12
		Identify a radionuclide	•Records of identification •Incident report •Discussion of instruments / methods used	•RADS-C-23 •RADS7-10 to 12
		Undertake decontamination of an area or person during a radiation emergency exercise or incident	•Incident report •Discussion of instruments / methods used	•RADS-C-23 •RADS7-10 to 12
	Module 8 (RADS11)	Carry out QA checks on a piece of radiation safety software or a spreadsheet	•QA records •Short report	•RADS11-4
		Compose a spreadsheet to make a rapid assessment of personal doses for a radiation emergency exercise or incident	•Copy of spreadsheet •Discussion of method and standards used	•RADS7-10 to 12 •RADS11-4
		Demonstrate use of a piece of radiation safety software or a spreadsheet	•Copy of spreadsheet •Discussion of method and standards used	•RADS7-10 to 12 •RADS11-4
		Carry out an audit of risk for a clinical or radiation safety ICT process	•Audit report highlighting any areas for rectification •Recommendation letter	•RADS11-2 and 3
		Appraise or develop software for the production of risk assessments e.g. staff risks from nursing nuclear medicine patients	•Copy of spreadsheet or software •Discussion of method and standards used	•RADS11-4
		Appraise or develop software for the management of radioactive waste	•Copy of spreadsheet or software •Discussion of method and standards used	•RADS11-2 to 4

RADS OCE	Module 1 (RADS1)	Measure a radiation dose rate from a Nuclear Medicine patient	•Practical assessment	
		Explain the procedure to a patient prior to undergoing a nuclear medicine or PET scanning procedure	•Explain procedure to a patient •Practical assessment	•RADS8-11
		Present patient dose data to a multidisciplinary audience	•Presentation slides •Practical assessment	•RADS8-11
		Discuss optimisation strategies with users and the installer during commissioning of diagnostic X-ray equipment	•Review literature regarding optimisation strategies •Discuss strategies with users and the installer •Practical assessment	•RADS2-5, 7, 8 and/or 11 •RADS3-3,4, 8, 9 and 10
	Module 2 (RADS2)	Assess and interpret image quality and dose using a clinical phantom	•Perform and record measurements •Report containing results and appropriate recommendations •Practical assessment	•RADS2-4 to 11 •RADS3-3 and 4
	Module 3 (RADS3)	Explain $CTDI_w$ measurement to a clinical team member	•Practical assessment	•RADS3-12
		Present patient dose data to a multidisciplinary audience	•Presentation •Practical assessment	•RADS3-12 •RADS8-11
		Advise patients undergoing therapeutic isotope administration in Nuclear Medicine	•Reflective diary entry(s) •Practical assessment	•RADS3-12 •RADS8-11
		Calculate a patient dose for external radiation exposure and discuss the dose and risk with the patient	•Worksheet detailing calculations, or output from software •Report •Practical assessment	•RADS3-5, 6, 7 and 12 (dependant on circumstances) •RADS5-5 •RADS8-11
		Calculate patient dose for internal radiation exposure and discuss the dose and risk with the patient where possible	•Worksheet detailing calculations, or output from software •Report •Practical assessment	•RADS3-9, 11 and 12 (dependant on circumstances) •RADS5-5 •RADS8-11
	Module 4 (RADS 4)	Deliver a talk on laser or UV safety	•Presentation •Practical assessment	•RADS3-12 •RADS8-11
	Module 5 (RADS5)	Assess and interpret image quality	•Worksheet detailing results of visual inspection, measurements and calculations of shielding •Report for detailing findings and appropriate recommendations •Practical assessment	•RADS2-4 to 11 •RADS3-3 and 4
		Provide safety training to staff for a non-ionising radiation	•Practical assessment	•RADS3-12 •RADS8-11
		Undertake MRI safety screening of a patient or member of staff	•Practical assessment	•RADS3-12 •RADS8-11
		Communicate significance of UV (patient) dosimetry results to clinical staff	•Practical assessment	•RADS3-12 •RADS8-11
	Module 6 (RADS8)	Train Nuclear Medicine staff to communicate radiation risks to patients	•Practical assessment	•RADS3-12 •RADS8-11
	Module 7 (RADS7)	Rehearse contingency plans	•Practical assessment	•RADS3-12 •RADS8-11
		Input to a radiation safety training	•Practical assessment	•RADS3-12 •RADS8-11
		Give advice to a non-scientist during a radiation emergency exercise or incident	•Practical assessment	•RADS3-12 •RADS8-11
		Instruct staff on the decontamination of a radiation casualty	•Practical assessment	•RADS3-12 •RADS8-11
	Module 8 (RADS11)	Explain to non-scientific staff the governance arrangements for a complex clinical ICT system	•Practical assessment	•RADS3-12 •RADS8-11

CbD

	Examples of possible subjects for CbD. Note that these are not prescribed within the Learning Guide	Examples of possible evidence	Competencies which may share evidence with this CbD
Module 1	Discuss the design considerations for a complex diagnostic facility/nuclear medicine facility/Radiotherapy facility	•Summary of literature review highlighting key points and latest good practice •Summary of relevant specification for equipment to be used in the room •Calculations of shielding requirements •Recommendations for PPE •Final report detailing shielding requirements and other advice (e.g. layout as applicable)	•RADS1-4/5/6 •DOPS Module 1 (Calculate shielding thickness for a new radiation facility)
Module 2	Present the results of a routine or commissioning checks of a diagnostic X-ray unit that highlighted areas of concern or for further investigation	• Worksheets containing results and calculations •Final report including appropriate recommendations •Relevant e-mail chain and/or summary of discussions with technical representatives (e.g. manufacturer or service company) •Appropriate follow up e.g. further testing (e.g. following engineer intervention)	•RADS2-4 to 11 and 13 •RADS8-11 •Module 2 DOPS as applicable
Module 3	Present the results of a patient dose audit including a discussion of unusual results and opportunities for optimisation. Present the results of any optimisation work carried out (taking into account of dose and image quality), and the results of follow up dose audit	•Results of audit of patient dose data •Review imaging protocols/APR •Report containing an interpretation of the results, recommending local DRL's and highlighting opportunities for optimisation or further investigation as appropriate. •Worksheets detailing the results from optimisation work •Worksheets of results and report for follow up patient dose audit	•RADS3-2 to 8 and 10
Module 4	Discuss the measurements required for Artificial Optical Radiation Directive 2010 and the Control of Electromagnetic Field at Work Regulation 2016	•Work sheet containing measurements, calculations and Report containing results	•RADS5-1 to 10
Module 5	Discuss the PPE requirements for a facility, along with the options available and their specifications	•Worksheet showing calculations and results if applicable •Report summarising PPE specifications and the different options and making suitable recommendations	•RADS5-4
Module 6	Discuss the results of environmental monitoring carried out around a designated radiation area	•Worksheet showing results and calculations •Final report detailing analysis, results and appropriate recommendations	•RADS8-1, 10 and 11
Module 7	Feedback on the outcome of a rehearsal of a major incident	•Records and notes kept during the rehearsal	•RADS3-12 •RADS7-12 •RADS8-11 •Module 7 DOPS(Undertake decontamination of an area or person during a radiation emergency exercise or incident) •Module 7 OEC (Undertake decontamination of an area or person during a radiation emergency exercise or incident)

Competencies

Learning Outcome Subject	Code	Competency	Examples of evidence	Other competencies which may be demonstrated by this evidence
Module 1 - Risk Assessment and New Facilities	RADS1-1	Undertake risk assessment for a diagnostic radiology facility	•Literature review of requirements of a radiation risk assessment •Consider likely scenarios •Estimate likely exposure for likely scenarios •Produce a Risk assessment	•RADS1-10 •RADS2-12 •RADS2-14 •RADS2-15 •RADS3-9 •RADS6-10 •RADS-C-1
	RADS1-2	Undertake risk assessment for a nuclear medicine facility	•As above for NM	•RADS1-10 •RADS2-12 •RADS2-14 •RADS2-15 •RADS3-9 •RADS6-10 •RADS-C-1
	RADS1-3	Undertake risk assessment for a radiotherapy facility	•As above for Radiotherapy	•RADS1-10 •RADS2-12 •RADS2-14 •RADS2-15 •RADS3-9 •RADS6-10 •RADS-C-1
	RADS1-4	Undertake room design from first principles for a complex diagnostic x-ray facility (high-dose fluoroscopy or CT) and specify the radiation design features	•Literature review (including relevant guidance such as 'Radiation Shielding for Diagnostic X-rays' (BIR)) •Obtain required paperwork (e.g. architects/engineers drawings, equipment specifications, specifications for shielding materials etc.) •Determine intended use for the room (type of procedure) and estimate/predict workload of room •Calculate required shielding •Produce report detailing specification including above calculations and assumptions	•RADS6-10 •RADS-C-2 to 3
	RADS1-5	Undertake room design from first principles for a nuclear medicine facility and specify the radiation design features	•As above but for NM	•RADS6-10
	RADS1-6	Undertake room design from first principles for a radiotherapy (and/or brachytherapy) facility and specify the radiation design features	•As above for Radiotherapy	•RADS6-10
	RADS1-7	In conjunction with the user, develop the specification for the procurement of equipment to be used in a new facility	Write a specification with user taking into account- •Intended use •Requirements of legislation •Personal protective equipment •Recommendations in guidance notes, e.g. Medical and Dental Guidance Notes •IEC standards •Also evidence of discussions with other 'stakeholders' e.g. e-mails and minutes from meetings	•RADS1-4 •RADS1-8
	RADS1-8	Develop criteria for the selection of new equipment for a modality and participate in the procurement and evaluation process of a new facility	•Attend procurement meetings •Evaluation equipment through examining technical specifications and or carrying out measurements •Produce report/presentation of results of comparisons and evaluations (against each other and the specification in RADS-C-7) •Ideally for more than one modality	•RADS1-4 •RADS1-7
	RADS1-9	Devise and undertake a critical examination for amendments to shielding of the facility or a new facility	•Worksheet and report detailing results of visual inspection (lead in doors, labels on shielding equipment etc.) and of any measurements taken	•RADS-C-6 to 10
	RADS1-10	In conjunction with the user, and using the results of the risk assessment, develop the local rules for a new facility	•Produce a set of local rules for the new facility	•RADS1-1 to 3 •RADS1-11
	RADS1-11	Critically appraise the local rules for a number of different types of radiation installations	•Literature review of relevant legislation and guidance •Report critiquing local rules for range of installations	•RADS1-10
	RADS1-12	Write a detailed contingency plan for dealing with radiation incidents involving sealed and unsealed sources	•Review risk assessments for a range of likely incidents (including sealed and unsealed sources) •Produce a detailed contingency plan	•RADS1-1 to 3 •RADS1-10

Module 2 - Diagnostic Radiology: Equipment Performance	RADS2-1	Decide on appropriate tests to apply to the assessment of the measuring device to ensure that it is performing according to its specified standard	•Read specification and user manual for available dosimeters •Read relevant guidance [and work instructions if applicable] •Review intended use in light of the above •Summarise in a report	•RADS2-2 and 3
	RADS2-2	Undertake and/or arrange for tests to be carried out in an environment, and with facilities, that are appropriate and traceable to national standards.	•Undertake the tests following departmental work instructions OR •Review the standards of suitable calibration facilities •Arrange for dosemeter to be sent off to suitable facilities	•RADS2-1 •RADS2-3
	RADS2-3	Obtain and interpret the results of tests and calibrations and report on the performance of the equipment	•Review the results and take appropriate action •If undertaking the calibration, produce a suitable calibration report	•RADS2-1 and 2
	RADS2-4	Operate and perform routine quality assurance measurements safely on simple x-ray equipment for quality assurance (e.g. dental, mobile and general radiography), using a range of image detector technologies	•Read relevant guidance to QA of X-ray equipment (e.g. IPEM Report 91, IPEM Report 32 Series etc.,) and work instructions. •Produce a report summarising key points of the guidance and work instructions to demonstrate understanding of what is being inspected and why •Perform measurements including operating X-ray equipment and record and analyse the measurements and calculations in the correct worksheet. •Produce final written reports that are clear and accurate and with appropriate recommendations. •Repeat for a range of different units (e.g. rad, mobile, dental etc.) and for different detector technologies (CR, DDR, and film-screen if applicable) •Produce report with suitable recommendations	•RADS2-14
	RADS2-5	Perform commissioning and acceptance tests on simple x-ray equipment and detectors	•As above •Comparison of data against agreed specification (RAD-C-7 and RAD-C-8) •Produce report with appropriate recommendations •Establish baseline values for further routine QA	•RADS2-14 •RADS-C-30 and 31
	RADS2-6	Operate and perform routine quality assurance measurements safely on mammography equipment	•As for RADS-C-16 but for mammography	•RADS-C-26 •RADS3-3 and 4
	RADS2-7	Perform commissioning and acceptance tests on mammography equipment	•As for RADS-C-17 but for mammography	•RADS-C-26 •RADS3-3 and 4
	RADS2-8	Operate fluoroscopy systems and perform appropriate routine QA measurements safely	•As for RADS-C-16 but for fluoroscopy	•RADS-C-26 •RADS3-3 and 4
	RADS2-9	Perform commissioning and acceptance tests on fluoroscopy equipment	•As for RADS-C-17 but for fluoroscopy	•RADS-C-26 •RADS3-3 and 4
	RADS2-10	Safely operate CT systems and perform appropriate routine QA measurements	•As for RADS-C-16 but for CT	•RADS-C-26 •RADS3-3 and 4
	RADS2-11	Perform commissioning and acceptance tests on CT x-ray equipment	•As for RADS-C-17 but for CT	•RADS-C-26 •RADS3-3 and 4
	RADS2-12	Devise test schedule for a diagnostic imaging system new to the trainee	•Literature review •Produce a test schedule	
	RADS2-13	Instigate corrective action based on an evaluation of safety performance results	•Produce report with suitable recommendations •Attend with engineer if appropriate	•RADS2-4 to 11 •RADS2-15
	RADS2-14	Critically review safety performance programmes and make recommendations if appropriate	•Literature review of relevant guidance (e.g. IPEM report 91 and IPEM Report 32 series) •Produce report of critical review of safety performance programmes •Make appropriate recommendations	•RADS2-4 to 11
	RADS2-15	Devise and undertake a critical examination for complex equipment, for example a cardiac intervention suite or CT scanner	•Carry out a literature review (relevant legislation (e.g. IRR99) and guidance (e.g. IPEM Report 107, Medical and Dental Guidance notes etc.) •Assess function of the safety features etc. •Produce report •Ensure that RPA is involved	•RADS2-8,to 11
Module 3 - Patient Dose Assessment and Optimisation	RADS3-1	Review and critically appraise the patient dose measurement framework	•Literature review of relevant guidance (e.g. IPEM Report 88, PHE and predecessors publications, ICRP recommendations etc.)	•RADS3-2
	RADS3-2	Carry out an audit of patient dose looking at factors that influence the results, e.g. equipment, operators	•Worksheet of results of audit of patient dose data •Report including interpretation of results and highlighting opportunities for optimisation or further investigation as appropriate, and results of further investigations	•RADS3-1 •RADS3-8
	RADS3-3	Undertake measurements of patient dose/image quality in complex imaging systems	•Research available test objects and phantoms for different modalities (i.e. flour, mammo, CT, CR and DDR etc.) •Worksheet containing measurements and calculations •Report of results and recommendations	•RADS2-4 to 11 •RADS3-1 and 2 •RADS3-4
	RADS3-4	Review the outcome of patient dose/image quality measurements in a range of modalities and recommend optimisation strategies. Assess by simulation or measurement the effect of the optimisation suggested	•Report detailing results and making suitable recommendations for optimisation •Repeat of RADS-C-30 and 31 to evaluate efficacy of changes and/or recommendations •Where applicable simulate the effects on dose and/or image quality e.g. Monte Carlo dose modelling etc.	•RADS2-4 to 11 •RADS3-3 •RADS-C-14 and 16
	RADS3-5	Calculate patient doses for plain film radiography for a range of common clinical examinations	•Review of methods for calculating patient doses •Produce dose estimates comparing different methods and detailing assumptions behind the calculations •Compare against national and international values where appropriate	•RADS3-11 and 12
	RADS3-6	Calculate patient doses for women who have had mammography x-ray imaging	•Produce dose estimates using mammography dose calculation software •Include discussion of assumptions behind the calculations •Compare against national and international values where appropriate	•RADS3-11 and 12
	RADS3-7	Calculate patient doses for patients who have had CT x-ray imaging	•Review of methods for calculating patient doses •Produce dose estimates comparing different methods and detailing assumptions behind the calculations •Compare against national and international values where appropriate	•RADS3-11 and 12
	RADS3-8	Develop local DRLs based on patient dose calculations	•Recommend local DRLs for a range of X-ray examinations	•RADS3-2 •RADS3-10
	RADS3-9	Calculate organ and effective doses for a range of modalities, including nuclear medicine	•Review of methods for calculating patient doses including organ and effective doses •Produce dose estimates comparing different methods and detailing assumptions behind the calculations •Compare against national and international values where appropriate	•RADS3-11 and 12
Module 3 - Patient Dose Assessment and Optimisation	RADS3-10	Assist with the explanation of the significance of the results of a patient dose audit and make recommendations for action to reduce doses where appropriate	•Produce suitable reports •Attend meetings to discuss results (e.g. minutes from meetings)	•RADS3-1 and 2
	RADS3-11	Investigate the circumstances of an unusual patient dose	•Work with user/perform equipment safety measurements etc. to investigate cause of unusual patient dose •Produce report	•RADS3-5 to 7 •RADS3-9
	RADS3-12	Communicate actual and potential risks from patient exposures, in context, to other healthcare professionals and members of the public	•Calculate risks •Communicate these in appropriate formats	•RADS3-5 to 7 •RADS3-9
	RADS3-13	Participate in a dose and risk assessment for a research exposure, taking into account age, sex and life expectancy	•Review the research ethics application procedure •Review legislative requirements •Produce dose and risk assessments	•RADS3-5 to 7 •RADS3-9

Module 4 - Lasers and Ultraviolet Equipment	RADS4-1	Carry out an intercomparison of non-ionising radiation monitors	•Formal report, listing all meters e.g. UV, Laser, Gauss etc., detailing what is being measured, why the meters differ and how to choose the correct piece of equipment for the measurement to be made	
	RADS4-2	Perform QA and safety of UV systems, including eyewear	•Observe and participate QA, •Record measurements accurately in QA worksheet (including any calculations done)	
	RADS4-3	Perform QA and safety assessments of a laser in clinical use	•Observe and participate in QA, Formal report, QA worksheet including any calculations of MED, NODH and AORD Calculation •Risk Assessment including calculation values	
	RADS4-4	Calculate NOHD and advise on suitable eye protection	•Formal report OR excel worksheet detailing the British standards used to determine the calculations of MED, NODH and goggles needed and the calculations done	
Module 5 - Non-Ionising Sources: Radiation Risk, Safety and Bio effects	RADS5-1	Critically review policies and procedures for compliance with non-ionising radiation protection legislation and guidance	•Literature review and report	
	RADS5-2	Undertake a risk assessment for a clinical laser or UV practice and make recommendations regarding safe operating procedures	•Risk assessment including appropriate calculations for Lasers and UV	
	RADS5-3	Write local rules or guidance notes for a clinical laser and UV practice	•Literature review and written Local rules/advise on contents of local rules	•RADS5-10
	RADS5-4	Assess the requirements for PPE and make recommendations with regard to the specifications of PPE	•Safety calculations worksheet for Laser, UV, Blue light, red light. •Calculation worksheet for the correct PPE where appropriate •Report/e-mail etc. detailing recommendations	•RADS5-10
	RADS5-5	Collect data for the calculation of exposure to patients	•Literature review of the equipment manual •Observation of clinical practice to determine realistic scenarios	
	RADS5-6	Provide training to a relevant staff group on the implementation of radiation safety practices	•Prepare and deliver presentation	
	RADS5-7	Carry out measurements of occupational exposure for a source on non-ionising radiation	•Record (worksheets etc.) of measurements of UV, Blue light, Red light, Laser measurement, Gauss measurements.	•RADS5-10
	RADS5-8	Perform and report on non-ionising radiation protection audits	•Perform audit, formal report, audit worksheet, for UV, lasers, MRI, other light sources	
	RADS5-9	Critically appraise risk assessments and safe operating procedures for clinical MRI and ultrasound	•Perform Literature review •Critically appraise risk assessments for MRI and ultrasound •Produce formal report of the critical review	•RADS5-10
	RADS5-10	Demonstrate understanding in environmental exposure to non-ionising radiation	•Risk assessment of UV, Laser, Light sources, MRI	•RADS5-9
Module 6 - Assess, Audit and Interpret Radiation Dose Monitoring	RADS6-1	Plan and carry out environmental monitoring around a designated radiation area and assess any implications for staff, patients and/or public	•Familiarise with specification of available dosimeters •Produce a plan of where monitoring is required, and length of time monitoring is required for taking into account dosimeter sensitivity. •Carry out the environmental monitoring •Assess and interpret the results and produce a final report with suitable recommendations	
	RADS6-2	Determine a projected dose over a suitable period of time, taking into account likely occupancy of areas where there is an exposure risk	•Included in the above	
	RADS6-3	Assess potential doses from the use of sealed and unsealed sources and methods of ensuring safe practices	•General risk assessments for sealed and unsealed sources •Radiological impact assessment for unsealed sources •Risk assessment calculations for individual brachytherapy patients leaving hospital (sealed and unsealed sources)	•RADS1-2 and 3 •RADS6-5 and 6 •RADS6-10
	RADS6-4	Critically appraise the framework for controlling radioactive materials using best available techniques	•Review the BAT assessment for an organisation •Undertake an audit of the management of radioactive waste and its compliance with the BAT statement	•RADS7-5 and 6 •RADS-C-11 to 13
	RADS6-5	Assess the radiological impact of radioactive waste disposal	•Review or undertake a radiological impact assessment •Participate in an EPR permit /RSA authorisation variation	•RADS6-3
	RADS6-6	Identify the groups of staff, including vulnerable groups e.g. pregnant, who are likely to be exposed to radiation arising from a procedure and decide on appropriate system of dose assessment	•General risk assessments •Revision of personal monitoring requirements in local rules •Advice letter or report relating to personal monitoring	•RADS7-2 and 3 •RADS6-6 to 8 •RADS6-10
	RADS6-7	Review and critically appraise the personal dosimetry framework for the staff groups identified	•Included in the above	
	RADS6-8	Make recommendations with regard to routine dose monitoring, personal protection, classification and dose reduction	•Included in the above	
	RADS6-9	Review results of routine personal monitoring and investigate an abnormal result	•Summary of investigation	
	RADS6-10	Identify types of radiation likely to be involved in any exposure to the public, determine the means of assessment and make dose assessments where applicable	•General risk assessments for sealed and unsealed sources •Radiological impact assessment for unsealed sources •Risk assessment calculations for individual brachytherapy patients leaving hospital (sealed and unsealed sources) •Environmental dose surveys around radiation facilities •Facility shielding design	•RADS1-1 to 3 •RADS1-4 to 6 •RADS6-1 and 2 •RADS6-3 •RADS6-5
Module 7 - Radiation Governance Framework	RADS6-11	Communicate actual and potential risks from radiation, in context, to other healthcare professionals and members of the public	•Delivery of radiation safety training to staff •Letters or reports prepared for members of the public •Evidence to include reports and presentations given in the other competencies	
	RADS7-1	Critically appraise the organisation's radiation safety policies with reference to the current legislation	•Review of radiation safety policies	
	RADS7-2	Draft or critically appraise local rules and procedures for departments using radioactive materials, including contingency plans, consulting users where appropriate	•Review / re-write of existing local rules •Production of local rules for a new facility or technique	•RADS-C-4 •RADS-C-22-23 •RADS-C-26
	RADS7-3	Draft or critically appraise local rules and procedures for departments using equipment that generates radiation, including contingency plans, consulting users where appropriate	•Review / re-write of existing local rules •Production of local rules for a new facility or technique	•RADS-C-4 •RADS-C-22-23 •RADS-C-26
	RADS7-4	Draft or critically appraise Ionising Radiation (Medical Exposures) Regulations 2000 procedures for a department using ionising radiation or radioactive materials	•Review / re-write of existing IRMER procedures •Production of IRMER procedures for a new facility or technique	
	RADS7-5	Plan, prepare and undertake audits in a range of facilities, applying suitable methodology for the type of audit to be conducted	•Undertake an audit of compliance with radiation safety procedures (e.g. personal dosimetry, local rules) •Undertake an IRR99 compliance audit •Undertake an IRMER compliance audit •Undertake an audit of the management of radioactive waste and its compliance with the BAT statement	•RADS-C-11 and 12 •RADS6-4 •RADS7-4
	RADS7-6	Report findings of risk assessment audit, specify degree of compliance, recommendations for further action and date of follow-up review	•Undertake an audit of a risk assessment •Undertake an IRR99 compliance audit	•RADS-C-11 and 12 •RADS7-5
	RADS7-7	Participate in the investigation of a radiation incident	•Produce a dose report for a staff or patient dose greater than intended •Carry out a foetal dose assessment •Review most recent CQC annual IRMER report	•RADS-C-24 and 25
	RADS7-8	Perform measurements or calculations to establish the extent to which radiation exposure has taken place and therefore the risks posed	•Produce a dose report for a staff or patient dose greater than intended •Carry out a foetal dose assessment •Review most recent CQC annual IRMER report	•RADS-C-24 and 25

Module 7 - Radiation Governance Framework	RADS7-9	Report results of incident investigation in correct format and at required level of detail for target audience, including a recommended action plan	•Produce a dose report for a staff or patient dose greater than intended •Carry out a foetal dose assessment •Review most recent CQC annual IRMER report	•RADS-C-24 and 25
	RADS7-10	Review plans and action cards to be used in the event of a major radiation incident	•Review major radiation incident plan •Review equipment for the major radiation incident plan •Participate in delivery of training for the major radiation incident plan •Participate in an exercise of the major radiation incident plan	•RADS7-10 to 12
	RADS7-11	Audit equipment available for use in a major radiation incident and ensure the appropriate radiation monitors would be available	•Included in the above	•RADS7-10 to 12
	RADS7-12	Participate in the training of staff with regards to major radiation incidents	•Included in the above	•RADS7-10 to 12
Module 8 - Information and Communication Technology	RADS11-1	Critically appraise the information governance and operational management requirements for patient and staff data	• Complete mandatory training on Information Governance and include certification. • Short report demonstrating awareness of legislation & national guidance pertaining to data protection and how these are applied in a particular organisation (e.g. Caldicott principles; links to RADS11-1 for issues relating to data storage and anonymisation of patient data; information security plan for sealed sources)	RADS11-1 and 2
	RADS11-2	Review data security for sensitive information	•Included in the above	RADS11-1 and 2
	RADS11-3	Appraise the radiation safety implications of ICT processes, e.g. RIS, PACS, electronic requesting and prescription	•Review of policies and / or standard operating procedures for the use of systems in the organisation, e.g. RIS, PACS, electronic requesting and prescription •Review of incidents arising from systems or operator failure in the use of systems in the organisation	•RADS7-7 to 9 •RADS-C-24 and 25 •RADS11-4
	RADS11-4	Specify, develop and validate the use of novel spreadsheets or software for radiation safety calculations	•Patient or staff dose calculations •Room shielding calculations •Equipment QA spreadsheets	•RADS-C-2 •RADS-C-15 to 16 •IIR-C-1 •IIR-C-19 to 25 •RADS11-3 •RADS1-4 to 6 •RADS2-5 to 11