

## Environmental Regulator's RWA Syllabus mapped to UKHSA's RPTS courses

RPA Syllabus				RPTS coverage			
EA. No	Topic	GA, BU, DU experience	Detailed Content (Sub Topics)	Topic Addressed ?	RPTS Syllabus/Course Reference	RPA requirement	Depth of Delivery
1	Basic atomic and nuclear physics	BU	Atomic structure and composition of the nucleus	Yes	F	BU	DU
			Stable and unstable isotopes, activity	Yes	F		DU
			Types of radioactive decay	Yes	F		DU
			Nuclear fission	Yes	F		BU
			Half life and decay constants	Yes	F		DU
			Radioactive equilibria	Yes	F		DU
			The effects of time, distance and shielding	Yes	F		DU
2	Basic biology	BU	Basic radiation chemistry	Yes	F	BU	BU
			Effects of radiation on cells and tissue	Yes	F		BU
3	Interaction of radiation with matter	BU	Charged particles, photons and neutrons	Yes	F	BU	DU
			Types of nuclear reactions	Yes	F		DU
			Induced radioactivity	Yes	F		BU
4	Biological effects of radiation	BU	Deterministic biological effects of ionising radiation	Yes	F	BU	DU
			Stochastic biological effects of ionising radiation	Yes	F		DU
			The dose–response relationship	Yes	F		DU
			Effects of whole body irradiation	Yes	F		DU
			Effects of partial body irradiation	Yes	F		DU
5	Detection and measurement methods (including uncertainties and limits of detection) for radioactive waste assessment and environmental monitoring	BU	Principles and theory of detection and measurement (e.g. efficiency, background, geometry, statistics)	Yes	F	BU	BU

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			Types of detection instruments (e.g. gas filled, ionisation chambers, scintillators, thermoluminescence, neutron detectors)	Yes	F		BU
			Choice of detection instruments	Yes	F		BU
			Interpretation of instrument measurements	Yes	F		BU
6	Quantities & Units (including dosimetry underlying regulatory quantities)	BU	Units	Yes	F	BU	DU
			Dose terms (absorbed dose, equivalent dose, effective dose, committed dose)	Yes	F		DU
			Dose Limits and Constraints	Yes	F, L		DU
			Dosimetric Calculations	Yes	F. (I)		BU (DU)
7	Basis of Radiation Protection Standards	BU	Linear hypotheses for stochastic effects	Yes	F	BU	BU
			Threshold for deterministic effects	Yes	F		BU
			Epidemiological Studies	Yes	F		BU
8	ICRP Principles	BU	Principles (justification, optimisation, limitation			BU	BU
	a Justification of Practices			Yes	F	BU	BU
	b Optimisation of protection from radioactive sources			Yes	F	BU	BU
	c Dose Limitation/Limits			Yes	F, L	BU	BU
9	Practices & Interventions (including natural radiation sources)	GA	Practices and Interventions	Yes	F	BU	BU
10	Legal and Regulatory Basis						

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	<b>a International Recommendations/Conventions</b>	<b>GA</b>	Conceptual framework (ICRP basic framework, justification/optimisation/dose limits, system of protection for intervention)	Yes	F	GA	GA
			International Organisations - ICRP, IAEA, ICRU, UNSECAR, OECD	Yes	F	GA	GA
	<b>b European Union Legislation</b>	<b>GA</b>	The Euratom Basic Safety Standards Directive	Yes	F, L	GA	GA
			Council Regulation (Euratom ) 1493/93 - The shipment of radioactive substances between MS	Yes	F, L	-	GA
	<b>c Key national legislation and regulation</b>	<b>DU*</b>	Legislative framework in the UK	Yes	F, L		DU
			UK Regulatory Bodies and Regulatory System	Yes	F, L		DU
			Knowledge of the main requirements of the following :				
			- EPR 2010/RSA 1993	Yes	L, W		DU
			- Exemption Orders under EPR2010/ RSA 1993	Yes	L, W		DU
			- published policies and guidance from the EAs	Yes	L, W		BU
			Limitations & conditions included in Permits	Yes	L, W		BU
	<b>d National legislation and regulations affecting radioactive sources and radioactive waste</b>	<b>BU</b>	The HASS and Orphan Sources Regulations 2005	Yes	L		DU
			The Ionising Radiations Regulations 1999	Yes	L	DU	DU
			Directions made under RWL	Yes	L, W		BU
	<b>e Other relevant RS legislation</b>	<b>GA</b>	The Justification of Practices Involving Ionising Radiations Regulations 2004	Yes	L		GA
			The Radiation (Emergency Preparedness and Public Information) Regulations 2001	Yes	F, L		BU

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			The Transfrontier Shipment of Radioactive Waste and Spent Fuel Regulations 2008	Yes	L		GA
			Radioactive Contaminated Land legislation	Yes	W		GA
	<b>f Other relevant waste legislation</b>	GA	Nothing suggested, but indicate your awareness of the topic (RPA2000)	?	-		-
<b>11</b>	<b>Operational radiation protection</b>	BU	Types of sources – sealed and unsealed	Yes	F	BU	BU
	<b>a Types of sources (sealed, unsealed sources, and accelerators excluding X-ray units)</b>		Sources of radioactivity – natural and man-made	Yes	F	BU	BU
			Uses of radioactive sources (e.g. medical, research, industrial radiography, irradiators and accelerators, gauges, radiotracers, well logging, radioisotope production, nuclear medicine, radiotherapy, nuclear installations, mining and processing of raw materials)	Yes	F	BU	BU
	<b>b Hazard and risk assessment (including environmental impact)</b>	DU*	Radiological impact assessment methods	Yes	W	DU	DU
			Pathways by which radioactive discharges may lead to a public dose:	Yes	W		DU
			o External	Yes	W		DU
			o Airborne – direct ingestion	Yes	W		DU
			o Airborne – deposition, followed by ingestion via food pathway	Yes	W		DU
			o Airborne – inhalation	Yes	W		DU
			o Liquid – direct ingestion (drinking water)	Yes	W		DU
			o Liquid - ingestion via food pathway	Yes	W		DU
			o Contact	Yes	W		DU
			Bio-accumulation effects	Yes	W		DU
		BU	Impacts of radiation on non-human species	Yes	F, L		GA
	<b>c Minimisation of risk</b>	GA	Containment and control of radioactive waste	Yes	F, I, E, W	DU	GA
			Appropriate balance between employee dose and public dose	Yes	F, L, W		GA
			Exposure control	Yes	F, L, W		GA

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	d Control of releases	BU*	Understanding of conditions and limitations in RWL Permits	Yes	L, W	BU	BU
	Quality and environmental management systems		Record keeping requirements and systems for radioactive materials	Yes	L, W		BU
			Investigation requirements for radiological incidents	Yes	W		BU
			Understanding of operating instructions relevant to RWL permits	Yes	W		BU
			Understanding of maintenance instructions relevant to RWL permits	Yes	W		BU
			Understanding of emergency instructions relevant to RWL permits	Yes	W		BU
			Understanding the reporting requirements and systems for radioactive sources and discharges	Yes	W		BU
	Abatement technology	GA	Abatement technologies available	Yes	W		GA
			Maintenance needs of abatement technologies	Yes	W		GA
	e Monitoring	GA	Personal monitoring methods	Yes	F	DU	GA
	Area monitoring		Monitoring of operations – instrumentation and control methods	Yes	F	DU	GA
	Personal dosimetry (external, real time and internal)		Knowledge of instrument calibration procedures	Yes	F	DU	GA
	Biological monitoring					DU	
	f Critical group concept/dose calculation for critical group	BU	How to determine the critical group	Yes	W	GA	BU
			How to asses critical group dose	Yes	W		BU
	g Ergonomics (e.g. user-friendly design and layout of instrumentation)	GA		No	will not be covered by RPTS	GA	-
	h Operating rules and contingency planning	BU	Relevant aspects of work procedures written for radioactive waste management purposes including management procedures, work instructions, local rules etc	Yes	L, W	BU	BU
	i Emergency procedures	BU	Relevant aspects of emergency response planning and contingency planning	Yes	W		BU
			Reporting requirements	Yes	W		BU

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	j. Remedial action/decontamination	BU	Investigation of incidents Environmental monitoring requirements in the event of an emergency Monitoring after an incident Remediation methods Public and employee protection measures after an incident Availability of equipment and methods for dealing with spillages and other incidents	Yes Yes Yes Yes Yes Yes	W W W W W W	BU	BU BU BU BU BU BU
	k. Analysis of past incidents including experience feedback	GA		Yes	W	GA	GA
<b>12 Organisation of radiation protection:</b>							
	a. Role of qualified experts	DU BU	The role of the Radioactive Waste Adviser The role of other experts employed to advise on radiological protection	Yes Yes	W F, L	BU BU	DU DU
	b. Safety culture (importance of human behaviour)	BU		Yes	L	BU	GA
	c. Communication skills (skills and ability to instil safety culture into others)	BU	Effective communication	No	will not be covered by RPTS	BU	-
	d. Record keeping (sources, doses, unusual occurrences etc)	BU*	Record keeping to comply with legislative requirements Content, format and maintenance of records	Yes Yes	L, W L, W	BU	GA GA
	e. Permits to work and other authorisations	GA		Yes	L	BU	GA
	f. Designation of areas and classification of workers	GA	Controlled and supervised areas	Yes	L	DU	DU
	g. Quality control/auditing	BU		Yes	W	BU	BU
	h. Dealing with contractors	GA	Advising the permit holder on appropriate procedures for ensuring that any contractors (including visitors) comply with the requirements of permits in relation to radioactive waste management and environmental radiation protection.	Yes	L	GA	GA
<b>13 Waste management</b>							

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	<b>a. Radioactive waste management</b>	DU*	Sources of radioactive waste, waste types, waste classification and waste characterisation	Yes	W	GA	BU
			Principles of radioactive waste management: dilute and disperse, concentrate and contain, storage for decay and clearance from control	Yes	W		BU
			The waste hierarchy: avoidance minimisation reuse recycle disposal	Yes	W		BU
			Storage options for radioactive waste	Yes	W		BU
			Treatment options for radioactive waste	Yes	W		BU
			Management of disused sealed sources: technical options and safety aspects	Yes	W		BU
	<b>b. Radioactive waste assay</b>	BU	Disposal options for radioactive waste	Yes	W		BU
			Sampling methodologies and minimisation of secondary waste	Yes	W		BU
			Assay methodologies	Yes	W		BU
	<b>c. Radioactive waste disposal</b>	DU*	Uncertainties and limitations in assay data	Yes	W		BU
			Assay recording methods	Yes	W		BU
			Disposal options for radioactive waste	Yes	W	GA	BU
<b>14 Transport</b>		GA	Transport of radioactive materials	Yes	L	GA	DU
			Packaging of radioactive materials and waste for transport	Yes	L		BU
			Security of radioactive materials during transport	Yes	L		BU
			Transport documentation – dispatch and receipt	Yes	L		BU
<b>15 Optimisation techniques</b>	BAT/BPM	DU*	How to apply the BAT/BPM condition, and audit against BAT/BPM requirements, in relation to:				
			Facility design	Yes	W		BU
			Facility operation, including abatement of discharges	Yes	W		BU
			Minimisation of risk	Yes	W		BU
			Radioactive waste management	Yes	W		BU
			Facility decommissioning	Yes	W		BU

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16	Environmental monitoring	BU	Environmental monitoring: atmosphere, water bodies, foodstuffs, other environmental indicators, verification of compliance with derived environmental reference levels, survey techniques.	Yes	W		BU
			Tools available for environmental radiation monitoring	Yes	W		BU
			Sampling and analysis methods for environmental measurements	Yes	W		BU
			Mapping and data presentation for environmental data	Yes	W		BU
			Monitoring at source: external radiation and liquid and gaseous effluents, verification of compliance with discharge limits	Yes	W		BU
			Application to different sources.	Yes	W		BU
17	Security of radioactive materials	BU	Understanding of where to get advice.	Yes	W		BU
			Security requirements for radioactive sources (e.g. from CPNI/NaCTSO or OCNS).	Yes	L, W		BU
			Understanding the purpose and use of a security plan.	Yes	W		BU
			Understanding of protecting information.	Yes	W		BU

Key: GA = General Awareness  
 BU = Basic Understanding  
 DU = Detailed Understanding

RPTS Course: F = Foundation  
 L = Legislation  
 E = External  
 I = Internal  
 W = Waste