Guidance for preparation and delivery of blended learning Geoscience training courses
(supplementing usual considerations when preparing training courses)

Pre-tender preparation

1. Liaison with Agency: identify staff with relevant subject expertise for provision of material / case studies *[3.5]*

2. Development costs: sufficient allowance should be made in budgets to prepare different modes of delivery including videos, quizzes etc *[4]*, prepare case study material *[3.5]*, revise and rework any existing material provided *[3.5]*; time (and budget) should be explicitly agreed to support contributions from Agency staff if needed

3. Delivery costs: assess cost implications of face-to-face learning components (both for providers and students) *[3.4]*; agree budget (if needed) for Agency staff to support course delivery *[3.5]*; include realistic budget for online as well as face-to-face delivery (including preparation as well as contact time); consider balance between initial development costs (likely to be higher than for traditional courses) and repeat delivery (likely to be lower)

Overall course design *[2.1]*

4. Objectives and learning outcomes: consider subject scope, level and (technical) needs within the context of the overall Geoscience Training Programme (e.g. recognising pre- and post-requisites) *[3.2]*, alignment with the relevant Agency Technical Development Framework (TDF) and mandatory competencies required by professional bodies *[2.2, 3.1]*

5. Student requirements: consider background and experience of the range of students who may take the course, their motivation *[2.2]*, and ability to attend (e.g. availability of time)*; consider if some students (e.g. more experienced staff) could take only parts of the course as refresher material or regulatory updates *[3.4]*

6. Modes of delivery *[3.4]*: Consider appropriate balanced use of self-study, online, and classroom (or field) based face-to-face course components as parts of a blended learning approach *[2.4,3.4]*, taking account of types of material and student learning requirements *[2.2,2.3]*; identify any specific learning outcomes that cannot reasonably be delivered online (e.g. practical activities); consider how different modes of delivery may exclude or disadvantage particular groups of students, or conversely allow wider participation *[2.5]*; consider appropriate use of selected case studies within course material *[3.5]* and the use case study 'clinics' *[4.5]*; could a course be adapted to run fully online if further pandemic restrictions were imposed? *[3.4]*

Planning and preparation of materials

7. Course elements *[3.3]*: identify how the course objectives and materials map onto Fundamental Concepts, Advanced Technical Methods, 'How to' / Regulatory, and Case Studies *[3.3]*; consider how these categories can help students understand scope of appropriate courses for them, and help with future updating and maintenance of material *[2.9]*

8. Structure and scheduling of content: break down teaching material into structured small deliverable units *[4.2,4.3,4.4]*; consider how best to integrate different components, e.g. using revision sessions *[4.3]*; set up course schedule to allow sufficient time for self-study (see examples *[5]*); provide appropriate access to tutorial support, including scheduled online tutorials and asynchronous support via emails, collaborative forums *[2.6,4.3]*

9. Development of material: aim to use a 'rich' mix of learning activities to convey concepts and techniques *[4]*; make use of existing material available within the Agency where available *[3.6]*; highlight different course elements within material where possible (e.g. fundamental concepts or regulatory material) *[3.3]*; use external resources to complement formal parts of training where appropriate *[4.8]*; consider EDI issues when developing material *[2.5]*; consider IPR issues

Implementation and delivery

10. Access to and use of resources *[2.7]*: Determine which VLE/LMS will be used to deliver the course *[4.1]*; make use of appropriate functionality within the VLE/LMS (check this at tendering stage), or identify alternative delivery mechanisms for online activities (e.g. tutorials, forums, quizzes etc); consider how to provide access to any specialist software needed *[4.6]*; consider any innovative approaches that could be used, e.g. VR *[4.7]*

11. Student information and support: blended learning courses require clearer signposting of expectations compared to traditional delivery, e.g. expected durations of activities such as videos, preparatory activities; essential information about the course (including overall schedule, see examples *[4])* can be summarised in a course handbook; consider some form of 'admissions' process to assess students' previous learning, experience, and motivation [2.2]; methods for tutorial support *[2.6]* need to be clearly stated

12. Progress monitoring and assessment: include methods to monitor progress of students, especially for online self-study, which may include data analytics and/or formative assessments *[2.8];* use these to inform tutorial support; determine if any summative assessments are required to support student requirements, e.g. for professional bodies *[3.1]*

13. Integration with wider learning: consider how the course could integrate with further internal and external learning, particularly with CoP's or learning / technical interest groups, e.g. through case studies *[3.5]*; consider how the course could benefit from opportunities for mentored learning *[3.5]*

Course review and maintenance

14. Student feedback *[2.8]*: consider how much adaptation of course delivery could be provided during delivery if required by students (e.g. changing scope of tutorials based on analytics or formative assessments such as quizzes); provide opportunities for student feedback at the end of the course, including open comments

15. Annual review: Include allowance for review of both material and course structure, particularly before any repeat delivery *[2.9]*; reviews of material may include regulatory updates, technical developments, new conceptual understanding etc; update links to external resources *[4.8]*

Figure 1.   Summary guidance for course design and delivery