Programme Specification (Undergraduate) FOR ENTRY YEAR: 2026/27

Date created: 15th June 2022 **Last amended:** 21/02/2023 **Version no.** 1

1. Programme title(s) and code(s):

Fundamentals of Space Systems, Regulations & Applications (Certificate of Attendance only)

Fundamentals of Space Systems, Regulations & Applications (Certificate of Attendance with Credits)

a) HECOS Code

Code	%
100116	50
100188	20
100482	7.5
101288	15
100549	7.5

b) UCAS Code (where required)

N/A

2. Awarding body or institution:

University of Leicester

3. a) Mode of study

Full-time

b) Type of study

Campus-based

4. Registration periods:

Fundamentals of Space Systems, Regulations & Applications (Certificate of Attendance)

The normal period of registration is 1 years

The maximum period of registration 1 years

5. Typical entry requirements

Applicants should have a minimum of a 2:1 degree in a physical sciences or engineering subject, a background in systems engineering, or equivalent experience.

6. Accreditation of Prior Learning

N/A

7. Programme aims

The programme aims provide learners with a broad insight into the technical and regulatory aspects of the development, deployment and operation of satellites and instrumentation in space. It has been designed primarily for professionals with some level of technical/engineering background from

other sectors, who need to acquire a working knowledge of the space industry and space applications in order to take up roles within the rapidly growing space sector.

8. Reference points used to inform the programme specification

- QAA Benchmarking Statement
- Framework for Higher Education Qualifications (FHEQ)
- UK Quality Code for Higher Education
- University Learning Strategy
- University Assessment Strategy
- University of Leicester Periodic Developmental Review Report
- External Examiners' reports (annual)
- United Nations Education for Sustainable Development Goals
- Student Destinations Data
- UKSA Space Skills Survey

9. Programme Outcomes

Unless otherwise stated, programme outcomes apply to all awards specified in 1. Programme title(s).

a) Discipline specific knowledge and competencies

i) Understanding and application of key concepts and techniques

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated? (Applies to With Credits version only)
The launch environment (thermal and vibration throughout the launch phase)	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
General characteristics of the Earth's magnetic field and its interaction with spacecraft	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
The gravitational environment in space and its significance for mission design and operation	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
The neutral atmosphere and its effects on spacecraft in near-Earth space	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
The effects of vacuum on systems and materials	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Space plasmas and their effects	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Types of particle radiation and effects on spacecraft subsystems and operations	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
The origins and impact of spacecraft contamination	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
The simple restricted two body problem (R2BP) as an approximation to satellite motion	Seminars, Computational Workshops	Summative Assessment (Design Study Report)

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated? (Applies to With Credits version only)
Kepler's Equation and the “time of flight’ problem	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Describing orbits: the six fundamental Keplerian orbital elements and two line element sets	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Perturbations: disturbances in satellite orbits, and their effects	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Classes of orbit including geostationary, geosynchronous and molniya orbits	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Orbital manoeuvres, rendezvous and station keeping	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Internal & external torques, effects on spacecraft attitude, and resulting control requirements	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Inertial and non-inertial reference frames	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
The physical and engineering principles of satellite attitude control systems	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Properties of waves (wavelength, frequency, phase, velocity, amplitude and polarization)	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Carriers, baseband and bandwidth	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Analogue-to-digital conversion of data in digital communications systems	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Modulation, symbol rate, data rate and data volume	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Key hardware components making up a typical space communications link	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Noise and interference in communications links	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Calculating a communications link budget between a ground station and a spacecraft	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Discuss the origins, impact and control of spacecraft contamination	Seminars, Computational Workshops	Summative Assessment (Design Study Report)

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated? (Applies to With Credits version only)
The Systems Engineering approach and engineering lifecycle in mission development	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Use of analyses such as technical budgets, trade-offs and safety/reliability analysis	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
The function and operation of key spacecraft sub-systems	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Fundamental physics and engineering concepts to estimate preliminary subsystem design parameters	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
The use of standards in guiding and governing space mission development and operations	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
The purpose of Technology Readiness Levels in mission development	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Management and documentation processes relating to quality assurance in space projects	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
The application of the Engineering Change Process in space projects	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
The function of key documents in space mission development	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Describe the function of digital tools including CAD, CAM, FEA and PLM in the development of spacecraft and subsystems	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
The application of Additive Layer Manufacturing in space projects	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Common model philosophies in space projects, and the physical models which they comprise	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
The purpose of technical budgets and margins in space systems engineering	Seminars, Computational Workshops	Summative Assessment (Design Study Report)

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated? (Applies to With Credits version only)
The principles, processes and techniques for thermal-vacuum, electromagnetic compatibility, shock, vibration and acoustic testing	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Awareness of the benefits and challenges of Concurrent Design over sequential methods	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Perform a simple concurrent design study, deriving system parameters and pass/fail criteria for different disciplines (e.g. mechanical, thermal, functional)	Seminars, Computational Workshops	Summative Assessment (Design Study Report)
Perform an automated trade study and determine the optimal solution	Seminars, Computational Workshops	Summative Assessment (Design Study Report)

ii) Critical analysis of key issues

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated? (Applies to With Credits version only)
The international and national framework for space law and the relevant implementing bodies	Seminars	Summative Assessment (Design Study Report)
International UN Outer Space Treaties, including the Outer Space Treaty 1967, Rescue Agreement 1968, Liability Convention 1972, Registration Convention 1976 and Moon Agreement 1984	Seminars	Summative Assessment (Design Study Report)
National legislation, including the Outer Space Act 1986 and the Space Industry Act 2018	Seminars	Summative Assessment (Design Study Report)
Requirements of national space law for regulated operations; UKSA & CAA licensing conditions	Seminars	Summative Assessment (Design Study Report)
The future of regulation and advantages and disadvantages of robust space regulation	Seminars	Summative Assessment (Design Study Report)
Space Debris Mitigation; role of space sustainability in licensing and international relations	Seminars	Summative Assessment (Design Study Report)

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated? (Applies to With Credits version only)
Spectrum requirements and the procedures to access spectrum	Seminars	Summative Assessment (Design Study Report)
The role of regulation, spectrum and law in international strategies and diplomacy	Seminars	Summative Assessment (Design Study Report)
Describe and assess the challenges to space law and regulation, such as for large constellations, small satellites, in-orbit servicing and active debris removal	Seminars	Summative Assessment (Design Study Report)
Space contracts, launch services, and satellite procurement	Seminars	Summative Assessment (Design Study Report)
Space insurance, particularly third party liability insurance	Seminars	Summative Assessment (Design Study Report)

iii) Other discipline specific competencies

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated? (Applies to With Credits version only)
The economics of space applications including launch costs, R&D costs and future trends	Seminars	Summative Assessment (Briefing Note)
The principles underpinning global navigation systems (e.g. GPS, Galileo and other constellations)	Seminars	Summative Assessment (Briefing Note)
The importance of position, navigation and timing (PNT) systems across a range of applications	Seminars	Summative Assessment (Briefing Note)
The significance and threat posed by space debris	Seminars	Summative Assessment (Briefing Note)
The principles, applications and importance of space situational awareness	Seminars	Summative Assessment (Briefing Note)
The principles behind telecommunications satellites, their history and future trends	Seminars	Summative Assessment (Briefing Note)
Earth Observation science and satellite systems - history, data significance and wider applications	Seminars	Summative Assessment (Briefing Note)

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated? (Applies to With Credits version only)
History, current status and future developments in human spaceflight systems	Seminars	Summative Assessment (Briefing Note)
The principles underpinning satellite constellations including architectures and applications	Seminars	Summative Assessment (Briefing Note)
Megaconstellations (e.g Starlink, OneWeb etc) and their business cases	Seminars	Summative Assessment (Briefing Note)
The role of space applications for defence and national security including "dual use"	Seminars	Summative Assessment (Briefing Note)
Engineering and operational requirements and constraints introduced by human spaceflight	Seminars	Summative Assessment (Briefing Note)
Typical applications and objectives of human spaceflight	Seminars	Summative Assessment (Briefing Note)
Radiation and micrometeoroid shielding requirements for human spaceflight	Seminars	Summative Assessment (Briefing Note)
The physiological effects and impact of microgravity and extended periods in space on humans	Seminars	Summative Assessment (Briefing Note)
The role of the United Nations in space affairs - the role of UNOOSA	Seminars	Summative Assessment (Briefing Note)
UN frameworks - the Outer Space Treaty and COPUOS	Seminars	Summative Assessment (Briefing Note)
The UN's Sustainable Development Goals (SDGs)	Seminars	Summative Assessment (Briefing Note)
Brief examples of SDG progress enhanced through space capabilities/assets/programmes	Seminars	Summative Assessment (Briefing Note)
Detailed case study of specific SDG enabled through space capabilities	Seminars	Summative Assessment (Briefing Note)
Future developments - SDGs as a driver of National and International space priorities	Seminars	Summative Assessment (Briefing Note)
Beyond the Outer Space Treaty - the Artemis Accords	Seminars	Summative Assessment (Briefing Note)

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated? (Applies to With Credits version only)
Restrictions on international co-operation - ITAR and export control issues	Seminars	Summative Assessment (Briefing Note)
The challenges of international norms and behaviours - the role of international and intergovernmental organisations	Seminars	Summative Assessment (Briefing Note)
China-Russia and APSCO co-operative frameworks	Seminars	Summative Assessment (Briefing Note)
The UK Defence Space Strategy and linkage to National Space Strategy and Integrated Review	Seminars	Summative Assessment (Briefing Note)
The roles of MOD Space Directorate and UK Space Command	Seminars	Summative Assessment (Briefing Note)
Existing UK space defence capabilities including ISR, space monitoring and communications	Seminars	Summative Assessment (Briefing Note)
Case studies - RAF Fylingdales & Skynet	Seminars	Summative Assessment (Briefing Note)
UK defence space international allies and partnerships	Seminars	Summative Assessment (Briefing Note)
Strategic themes of the Defence Space Strategy - Protect and Defend, Enhance Military Operations, Upskill and Cohere	Seminars	Summative Assessment (Briefing Note)
Future programmes scoped for the next decade	Seminars	Summative Assessment (Briefing Note)
UK defence space - threats and hazards	Seminars	Summative Assessment (Briefing Note)
Defence space commercial partnerships	Seminars	Summative Assessment (Briefing Note)
Dual-Use Technologies	Seminars	Summative Assessment (Briefing Note)
National and International space agencies including non-Governmental associations	Seminars	Summative Assessment (Briefing Note)
UK National Space Strategy and International priorities for the UK	Seminars	Summative Assessment (Briefing Note)

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated? (Applies to With Credits version only)
History and drivers of the first "space race"	Seminars	Summative Assessment (Briefing Note)
Global space budgets and trends	Seminars	Summative Assessment (Briefing Note)
Case studies: ESA, UAE Space Agency and the Chinese space programme	Seminars	Summative Assessment (Briefing Note)
The new "Space Race" in the 2020s, the role of "Newspace" companies, civil/defence synergies	Seminars	Summative Assessment (Briefing Note)

b) Transferable skills

iv) Information technology

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated? (Applies to With Credits version only)
Office skills and use of common software packages.	Seminars, workshops	Coursework assignment, project reviews and final reports
Programming skills to solve technical or scientific problems that could be applied in more generic contexts.	Seminars, workshops	Coursework assignment, project reviews and final reports
Demonstrate the ability to adapt to different technical design or analysis software environments.	Seminars, workshops	Performance in workshop sessions, coursework assignment, project reviews and final reports

v) Numeracy

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated? (Applies to With Credits version only)
Competence and understanding of numerical data, statistics and graphs.	Seminars, workshops	Examinations, coursework assignment, project reviews and final reports
Demonstrate the ability to apply mathematical knowledge in different contexts.	Seminars, workshops	Examinations, coursework assignment, project reviews and final reports

vi) Problem solving

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated? (Applies to With Credits version only)
Demonstrate an understanding of the importance of data and information when faced with a problem to solve.	Seminars, workshops	Examinations, coursework assignment, project reviews and final reports
Demonstrate an understanding of the requirement to determine the cause of the problem and to find solutions by producing a broad range of ideas and putting these to practical use.	Seminars, workshops	Project meetings, reviews and final reports

vii) Information handling

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated? (Applies to With Credits version only)
Demonstrate an understanding of how to locate and gather information from different sources and critically appraise the information collected.	Seminars, workshops	Coursework assignment, project reviews and final reports
Demonstrate the ability to organise, record, analyse, communicate and critically evaluate information from different sources.	Seminars, workshops	Coursework assignment, project reviews and final reports

10. Progression points

This programme follows the standard Scheme of Progression set out in Senate Regulations – see the version of Senate Regulation 5 governing undergraduate programmes relevant to the year of entry.

- There are no intermediate progression points in the short course programme.

In cases where a student has failed to meet a requirement to progress he or she will be required to withdraw from the course

a) Course transfers

N/A

11. Criteria for award and classification

Excepting the version of the course which is taken without credits, this programme follows the standard scheme of undergraduate award and classification set out in Senate Regulations – see the version of *Senate Regulation 5 governing undergraduate programmes* relevant to the year of entry.

12. Special features

This short course of 30 credits total, comprises four units (each worth 7.5 credits) aimed at professional learners, and aligned with the Government's ambitions for a programme of short courses for Life long learning. Each unit in the course can be associated with microcredentials, which can be combined with other University of Leicester credits from appropriate courses, to lead to a larger award.

Each of the modules in this course are also available as stand-alone professional training short courses, and can be taken in either as assessed pieces of work (attracting credits) or unassessed (in which case the learner receives a simple certificate of attendance).

13. Indications of programme quality

UK Space Agency Support (TBC)

Office For Students approval of pilot course (TBC)

14. External Examiner(s) reports

The details of the External Examiner(s) for this programme and the most recent External Examiners' reports for this programme can be found at exampapers@Leicester [log-in required]

UNIVERSITY OF LEICESTER

Programme Specification (Undergraduate) FOR ENTRY YEAR: 2026/27

Date created: 15th June 2022 **Last amended:** 21/02/2023 **Version no.** 1

Appendix 1: Programme structure (programme regulations)

The University regularly reviews its programmes and modules to ensure that they reflect the current status of the discipline and offer the best learning experience to students. On occasion, it may be necessary to alter particular aspects of a course or module.

Fundamentals of Space Systems, Regulations & Applications

Level 5/Year 1 **2026/27**

Credit breakdown

Status	Year long	Semester 1	Semester 2
Core	30	n/a	n/a
Optional	n/a	n/a	n/a

40 credits in total

Core modules

Delivery period	Code	Title	Credits
Year long	PA2041	The Commercial, Strategic and Scientific Use of Space	7.5
Year long	PA2042	The Space Environment and Spacecraft Dynamics	7.5
Year long	PA2043	Space Communications & Regulations	7.5
Year long	PA2044	Space Systems Engineering	7.5

Notes

1) This is a short course with a total duration of 4 weeks when taken as a single contiguous block.
2) Individual modules will also be available as stand-alone CPD courses with or without micro-credentials attached according to learner choice (credit value as indicated above)

Option modules

There are no option modules in this course when taken as a coherent programme (set out in this Programme Specification). However, each of the individual modules can be purchased as stand-alone short courses.

Appendix 2: Module specifications

See undergraduate module specification database [log-in required]. Note - modules are organized by year of delivery.

Appendix 3: Skills matrix

LO	Intended Learning Outcome	PAxxx1: The Commercial, Scientific & Strategic Use of Space	PAxxx2:The Space Environment & Spaceflight Dynamics	PAxxx3: Space Communications & Regulations	PAxxx4: Space Systems Engineering
1	The different types of satellite orbits - relevance and usage	X			
2	The economics of space applications including launch costs, R&D costs and future trends	X			
3	The principles underpinning global navigation systems (e.g. GPS, Galileo and other constellations)	X			
4	The importance of position, navigation and timing (PNT) systems across a range of applications	X			
5	The significance and threat posed by space debris	X			
6	The principles, applications and importance of space situational awareness	X			
7	The principles behind telecommunications satellites, their history and future trends	X			
8	Earth Observation science and satellite systems - history, data significance and wider applications	X			
9	History, current status and future developments in human spaceflight systems	X			
10	The principles underpinning satellite constellations including architectures and applications	X			
11	Megaconstellations (e.g Starlink, OneWeb etc) and their business cases	X			
12	The role of space applications for defence and national security including "dual use"	X			
13	Engineering and operational requirements and constraints introduced by human spaceflight	X			
14	Typical applications and objectives of human spaceflight	X			
15	Radiation and micrometeoroid shielding requirements for human spaceflight	X			
16	The physiological effects and impact of microgravity and extended periods in space on humans	X			
17	The role of the United Nations in space affairs - the role of UNOOSA	X			
18	UN frameworks - the Outer Space Treaty and COPUOS	X			
19	The UN's Sustainable Development Goals (SDGs)	X			
20	Brief examples of SDG progress enhanced through space capabilities/assets/programmes	X			
21	Detailed case study of specific SDG enabled through space capabilities	X			
22	Future developments - SDGs as a driver of National and International space priorities	X			
23	Beyond the Outer Space Treaty - the Artemis Accords	X			
24	Restrictions on international co-operation - ITAR and export control issues	X			
25	The challenges of international norms and behaviours - the role of international and intergovernmental organisations	X			
26	China-Russia and APSCO co-operative frameworks	X			
27	The UK Defence Space Strategy and linkage to National Space Strategy and Integrated Review	X			
28	The roles of MOD Space Directorate and UK Space Command	X			
29	Existing UK space defence capabilities including ISR, space monitoring and communications	X			
30	Case study - RAF Fylingdales	X			
31	Case study - Skynet programme	X			
32	UK defence space international allies and partnerships	X			
33	Strategic themes of the Defence Space Strategy - Protect and Defend, Enhance Military Operations, Upskill and Cohere	X			
34	Future programmes scoped for the next decade	X			
35	UK defence space - threats and hazards	X			
36	Defence space commercial partnerships	X			
37	Dual-Use Technologies	X			
38	National and International space agencies including non-Governmental associations	X			
39	UK National Space Strategy and International priorities for the UK	X			

40	History and drivers of the first "space race"	X			
41	Global space budgets and trends	X			
42	Case study - ESA - formation, development, future priorities and relationship with EUSPA	X			
43	Case study - UAE Space agency - formation, strategy and impact	X			
44	Case study - China's space programme including future ambitions	X			
45	The new "Space Race" in the 2020s, the role of "Newspace" companies, civil/defence synergies	X			
46	The launch environment (thermal and vibration throughout the launch phase)		X		
47	General characteristics of the Earth's magnetic field and its interaction with spacecraft		X		
48	The gravitational environment in space and its significance for mission design and operation		X		
49	The neutral atmosphere and its effects on spacecraft in near-Earth space		X		
50	The effects of vacuum on systems and materials		X		
51	Space plasmas and their effects		X		
52	Types of particle radiation and effects on spacecraft subsystems and operations		X		
53	The origins and impact of spacecraft contamination		X		
54	The simple restricted two body problem (R2BP) as an approximation to satellite motion		X		
55	Kepler's Equation and the “time of flight’ problem		X		
56	Describing orbits: the six fundamental Keplerian orbital elements and two line element sets		X		
57	Perturbations: disturbances in satellite orbits, and their effects		X		
58	Classes of orbit including geostationary, geosynchronous and molniya orbits		X		
59	Orbital manoeuvres, rendezvous and station keeping		X		
60	Internal & external torques, effects on spacecraft attitude, and resulting control requirements		X		
61	Inertial and non-inertial reference frames		X		
62	The physical and engineering principles of satellite attitude control systems		X		
63	Properties of waves (wavelength, frequency, phase, velocity, amplitude and polarization)			X	
64	Carriers, baseband and bandwidth			X	
65	Analogue-to-digital conversion of data in digital communications systems			X	
66	Modulation, symbol rate, data rate and data volume			X	
67	Key hardware components making up a typical space communications link			X	
68	Noise and interference in communications links			X	
69	Calculating a communications link budget between a ground station and a spacecraft			X	
70	The international and national framework for space law and the relevant implementing bodies			X	
71	International UN Outer Space Treaties, including the Outer Space Treaty 1967, Rescue Agreement 1968, Liability Convention 1972, Registration Convention 1976 and Moon Agreement 1984			X	
72	National legislation, including the Outer Space Act 1986 and the Space Industry Act 2018			X	
73	Requirements of national space law for regulated operations; UKSA & CAA licensing conditions			X	
74	The future of regulation and advantages and disadvantages of robust space regulation			X	
75	Space Debris Mitigation; role of space sustainability in licensing and international relations			X	
76	Spectrum requirements and the procedures to access spectrum			X	
77	The role of regulation, spectrum and law in international strategies and diplomacy			X	
78	Describe and assess the challenges to space law and regulation, such as for large constellations, small satellites, in-orbit servicing and active debris removal			X	
79	Introduction to space contracts, launch services, and satellite procurement			X	
80	Introduction to space insurance, particularly third party liability insurance			X	
81	Discuss the origins, impact and control of spacecraft contamination				X
82	The Systems Engineering approach and engineering lifecycle in mission development				X
83	Use of analyses such as technical budgets, trade-offs and safety/reliability analysis				X
84	The function and operation of key spacecraft sub-systems				X
85	Fundamental physics and engineering concepts to estimate preliminary subsystem design parameters				X
86	The use of standards in guiding and governing space mission development and operations				X
87	The purpose of Technology Readiness Levels in mission development				X
88	Management and documentation processes relating to quality assurance in space projects				X
89	The application of the Engineering Change Process in space projects				X
90	The function of key documents in space mission development				X
91	Describe the function of digital tools including CAD, CAM, FEA and PLM in the development of spacecraft and subsystems				X
92	The application of Additive Layer Manufacturing in space projects				X
93	Common model philosophies in space projects, and the physical models which they comprise				X
94	The purpose of technical budgets and margins in space systems engineering				X
95	The principles, processes and techniques for thermal-vacuum, electromagnetic compatibility, shock, vibration and acoustic testing				X
96	Awareness of the benefits and challenges of Concurrent Design over sequential methods				X
97	Perform a simple concurrent design study, deriving system parameters and pass/fail criteria for different disciplines (e.g. mechanical, thermal, functional)				X
98	Perform an automated trade study and determine the optimal solution				X