Open Systems and Advanced Manufacturing Technologies L2

Performance points for 2019

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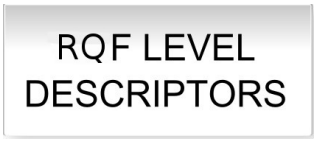

[4]

Level 2

Level 2, Unit 1 - The Understanding and Appreciation of Rocket Science (4 credits)

1. 1. Understanding the basic physical forces involved with rocket flight	2. 2. Applying aspects of construction and development for rockets	3. 3. Building, testing and launching a rocket with further development	4. 4. Investigating further applications and exploratory topics
1.1 I can describe the physics involved in rocket flight [5]	2.1 I can identify materials used in the construction of rockets and explain why they are useful [6]	3.1 I can make rough designs ,test and evaluate versions of my final rocket [7]	4.1 I can investigate and explain the application of rockets for science and experimentation [8]
1.2 I can identify and explain limitations on rocket flight created by physical elements [9]	2.2 I can describe the properties of materials that make them suitable for rockets [10]	3.2 I can explain test procedures and potential outcomes [11]	4.2 I understand the basic physics in relation to space exploration [12]
1.3 I can explain principles of physics which make flight possible [13]	2.3 I can describe the forces which enable rocket flight and which determine material selection [14]	3.3 I can design and build a rocket for flight [15]	4.3 I can describe the range of uses for rockets, as well as their limitations [16]
1.4 I can explain	2.4 I can explain	3.4 I can describe	4.4 I can select

environmental factors which will make flight possible [17]	historical construction techniques and developments [18]	the procedure for launch, including safety and legal aspects required [19]	potential subjects from scientific discussions which would be suitable for rocket based projects [20]
1.5 I can explain how to incorporate an understanding of physics into the final designs [21]	2.5 I can identify the materials needed for my test rocket and explain their suitability for the job [22]	3.5 I can select an appropriate launch venue, taking into consideration local guidelines and legal requirements [23]	4.5 I can discuss and describe the importance of scientific discovery for the wider society [24]
1.6 I can use simulation to minimise problems in my final tests [25]		3.6 I can carry out a launch and document the findings for further development [26]	

Level 2, Unit 2 - The Understanding and Application of Microsatellites (4 credits)

1. 1. Understand the current place in the market of microsatellites	2. 2. Review and define the key issues in making a microsatellite	3. 3. Understand the key issues in space deployment	4. 4. Investigate the control, data use and end of life issues related to microsatellites
1.1 I can review the current status of microsatellites in terms of global production and main countries involved [28]	2.1 I understand the need for size reduction in satellite technology [29]	3.1 I can appreciate the cost implications of getting equipment to space [30]	4.1 I can describe how microsatellites are controlled from earth [31]
1.2 I can list and define the key uses of microsatellites [32]	2.2 I can describe some of the key materials used in construction and say why they are used [33]	3.2 I can describe key terms such as "piggyback" in terms of deployment and give examples of how it is used [34]	4.2 I can describe how microsatellites are controlled while in space [35]
1.3 I can describe the main launch vehicles used for	2.3 I can describe the main forces acting on satellites	3.3 I can list and define the main propellants used by	4.3 I can review the types of data collected by

deployment and their characteristics [36]	in their lifecycle and how this affects their manufacture [37]	microsatellites [38]	microsatellites [39]
1.4 I can define the main versions of microsatellites including nanosatellites, picosatellites and femtosatellites [40]	2.4 I can describe the main forms of communication used in microsatellites and give examples of their usage [41]	3.4 I can describe the strengths and weaknesses of the main propellants used in space [42]	4.4 I can review the dangers of microsatellites that return to earth when they finish their mission [43]
1.5 I can assess the current market in microsatellites [44]	2.5 I can develop a list of requirements in the manufacture of a microsatellite [45]	3.5 I can describe the different levels of orbit used in microsatellite systems [46]	4.5 I can assess the impact of microsatellites and recommend a possible future use for them [47]
	2.6 I can devise my own basic design for a microsatellite and define its purpose [48]	3.6 I can describe the main legal issues relating to microsatellites [49]	

Level 2, Unit 3 - Working with Robotics and Artifical Intelligence (4 credits)

1. 1. Understand what Artificial Intelligence is and how it works	2. 2. Review and define examples of where robotics is used	3. 3. Understand the processes of making a basic robot work	4. 4. Appreciate and test the issues and challenges of robotics
1.1 I can list the main features of an artificial intelligence [51]	2.1 I can describe instances of robotics in industrial places [52]	3.1 I can review the equipment required to design and create robotic devices [53]	4.1 I can test the build quality of an assembled robot against the specification [54]
1.2 I can describe, with examples, the main uses of artificial intelligence [55]	2.2 I can review how robotics is used in medical applications [56]	3.2 I can assess the design tools used to create robots and use these in a basic way [57]	4.2 I can test the main features of a built robot in terms of hardware and software [58]

1.3 I can review some of the expectations of artificial intelligence [59]	2.3 I can describe how robotics is used in agricultural environments [60]	3.3 I can work with various components of robot design and appreciate their features [61]	4.3 I can make adjustments to a robot build or control system to improve its functioning [62]
1.4 I can review the intended uses of artificial intelligence [63]	2.4 I can assess the wider use of robotics in society [64]	3.4 I can build a basic robot for testing [65]	4.4 I can recommend additional features to existing designs based on usage [66]
1.5 I can assess the strengths and weaknesses of using artificial intelligence [67]	2.5 I can assess and comment on the dangers associated with the reliance on robotics in society [68]		
1.6 I can describe any legal and ethical issues associated with using robots [69]			

Level 2, Unit 4 - The Development and Deployment of Unmanned Vehicles (4 credits)

1. 1. Understand the history and range of uses of UVs	2. 2. Appreciate the design and development issues related to UVs	3. 3. Explore the problems and solutions of UV usage	4. 4. Understand the legal, moral and ethical issues related to UV use
1.1 I can research the history of UVs and list the key milestones [71]	2.1 I can describe the range of designs currently in use [72]	3.1 I can describe the main control methods used with UVs [73]	4.1 I can describe the legal issues relating to UVs [74]
1.2 I can list the primary uses of UVs currently in operation [75]	2.2 I can assess the designs in terms of their use [76]	3.2 I can assess the development constraints that apply in building UVs [77]	4.2 I can assess the main laws and regulations that affect UVs use [78]
1.3 I can explore	2.3 I can assess	3.3 I can describe	4.3 I can review

the extended range of uses of UVs [79]	the main materials used in the construction of UVs and list their strengths and weaknesses [80]	the key requirements of endurance and reliability of UVs [81]	the ethical concerns relating to UVs in a commercial setting [82]
1.4 I can describe the use of UVs in civil and military situations and give examples of each [83]	2.4 I can describe the main forms of UVs based on their use and required characteristics such as range, height, speed, payload [84]	3.4 I can design my own basic UV based on my understanding [85]	4.4 I can review the ethical and legal concerns relating to UVs in a military setting [86]
	2.5 I can describe the software and hardware used in UVs [87]	3.5 I can describe the features and use of my UV [88]	

Source URL: https://theingots.org/community/rocketry

Links
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[2] http://theingots.org/community/rocket_resources
[3] http://register.ofqual.gov.uk/Detail/Index/38418?category=qualifications&query=TLM%20L2%20Certificate%20in%20Open%20Systems%20and%20Advanced%20Manufacturing%20Technologies
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