Supplementary Specifications

BEng, MEng and MSc Module Teaching Assistants

Summary

Teaching Assistants support a range of teaching activities at the upper undergraduate and postgraduate (Masters) level. As with other Teaching Assistant roles, these are highly interactive and require significant engagement with students. However, the technical requirements for these courses are more demanding. Therefore the relative technical skill level of Teaching Assistants must be able to meet these requirements.

All Teaching Assistants share common core responsibilities and requirements (covered in EG/TA/2/2018 – Job Specifications) as well as having role-specific responsibilities. These additional responsibilities and requirements are covered in this supplementary document. Supplementary Specifications for other TA roles are summarised below.

Supplement	Document number	Roles covered
A	EG/TA/2A/2018	Undergraduate Example & Feedback Workshop Class Tutors
B	EG/TA/2B/2018	Undergraduate Computer-aided Design Class Tutors
C	EG/TA/2C/2018	Undergraduate Laboratory Teaching Assistants
D	EG/TA/2D/2018	Undergraduate Programming (MATLAB) Tutors
E	EG/TA/2E/2018	BEng, MEng and MSc Module Teaching Assistants

Supplementary specifications included in this document

1. EG3202 Radio and Digital Comms Systems – Programming (MATLAB) Tutors

1.1. Role description

In Programming (MATLAB) Classes for EG3202, Teaching Assistants support practical sessions in computational programming. The topics covered by students include:

- Modelling components of digital communications systems using MATLAB and Simulink.
- The application of coding schemes to negate noise and fading.
- Using computational design tools to evaluate engineering designs against given criteria.

1.1.1. Hours

Programming (MATLAB) Classes for run for up to 6 weeks in the Spring semester. Each session lasts for 2 hours. Therefore, expected hours for each TA are:

- 2 MATLAB Classes x 2 hours = 4 hours per week.
- 6 weeks x 4 hours per week = 24 hours per semester.

1.2. Supplementary responsibilities

Programming (MATLAB) Class Tutors will be expected to:

- Proactively engage with students in MATLAB Classes to ensure they are progressing adequately through their computational exercises.
- Conduct other relevant duties of a Teaching Assistant (see EG/TA/2/2018).

1.3. Supplementary requirements

Characteristic	Essential	Desirable
Experience in using MATLAB and Simulink for the modelling and analysis of digital communications systems, or engineering systems of similar complexity.	X	

2. EG3311 State Variable Control – Programming (MATLAB) Tutors

2.1. Role description

In Programming (MATLAB) Classes for EG3311, Teaching Assistants support practical sessions in programming activities related to control systems. The topics covered during the labs include:

- Using basic functions of MATLAB, such as plotting graphs representing the time evolution of signals.
- Performing the analysis of dynamical systems and the synthesis of controllers as m-files.
- Designing state-variable control schemes using Simulink.

2.1.1. Hours

Programming (MATLAB) Classes run during the last two weeks of the Autumn semester, with each session lasting for 2 hours. Therefore, expected hours for each TA are:

- 2 MATLAB Classes x 2 hours = 4 hours per semester.

2.2. Supplementary responsibilities

Programming (MATLAB) Class Tutors will be expected to:

- Proactively engage with students, discussing both theoretical principles and applicative issues, in order to enhance deep learning of control theory.
- Conduct other relevant duties of a Teaching Assistant (see EG/TA/2/2018).

2.3. Supplementary requirements

Characteristic	Essential	Desirable
Good knowledge of control theory, especially in state-space methods.	X	
Experience in using MATLAB for modelling, analysis, and design of control systems.	X	

3. EG4113 Advanced Solid Dynamics – FEA (COMSOL) Tutors

3.1. Role description

In Advanced Solid Mechanics (taught simultaneously to MEng students and MSc students as EG4113/7037), Teaching Assistants support practical sessions in which the students complete a series of finite element case studies using COMSOL. The topics covered by these practical sessions include:

- Elastic and plastic stress analysis for 2D and 3D beam structures using beam elements, and 2D and 3D elements.
- Elastic and plastic stress analysis for stress concentrations in structures with holes.
- Creep analysis of a bolted joint.

3.1.1. Hours

FEA (COMSOL) Classes run during the Autumn semester, with each session lasting for 2 hours. Therefore, expected hours for each TA are:

- 1 COMSOL Class x 2 hours = 2 hours per week.
- 10 weeks x 2 hours per week = 20 hours per semester.

3.2. Supplementary responsibilities

FEA (COMSOL) Class Tutors will be expected to:

- Proactively engage with students, discussing both theoretical principles and applicative issues, in order to enhance deep learning of the finite element analysis technique.
- Conduct other relevant duties of a Teaching Assistant (see EG/TA/2/2018).

3.3. Supplementary requirements

Characteristic	Essential	Desirable
Experience in using finite element analysis for the solution of mechanical problems.	X	

4. EG4212 Radio Systems – Radio Propagation (VOACAP and MATLAB) Tutors

4.1. Role description

In radio propagation classes for EG4212, Teaching Assistants support practical sessions where students learn to use computer-based tools to:

- Model HF broadcast systems using VOACAP.
- Model satellite communication systems using various relevant ITU-R recommendations implemented in MATLAB.

4.1.1. Hours

Radio propagation classes run for 6 weeks in Semester 1. Each session lasts for 2 hours. Therefore the expected hours for each TA are:

- 1 lab class x 2 hours = 2 hours per week.
- 6 weeks x 2 hours = 12 hours per semester.

4.2. Supplementary responsibilities

Radio propagation tutors will be expected to:

- Proactively engage with the students in the classes to ensure they are progressing through the various exercises.
- Assist with the invigilation of the computer-based assessment (this lasts for 1 hour in the final laboratory class).
- Conduct other relevant duties of a Teaching Assistant (see EG/TA/2/2018).

4.3. Supplementary requirements

Characteristic	Essential	Desirable
Sound knowledge of radio propagation principles and theory.	X	
Experience in running MATLAB programs.		X

5. EG4311 Robust Control – Systems Design (MATLAB/Simulink) Tutors

5.1. Role description

Teaching Assistants will be supporting a set of MATLAB/Simulink tutorial sessions for the Robust Control module. The tutorial sessions consist of a series of exercises associated with robust control theory and design exercises using both the Control System and Robust Control toolboxes.

5.1.1. Hours

There are two computer sessions for EG4311, that each last two hours. Therefore, the expected hours for each TA are:

- 2 classes x 2 hours = 4 hours per semester.

5.2. Supplementary responsibilities

Systems Design (MATLAB/Simulink) Class Tutors will be expected to:

- Proactively engage with students and guide them through the exercises in tutorial sessions.
- Assist with the marking of coursework submitted by students.
- Conduct other relevant duties of a Teaching Assistant (see EG/TA/2/2018).

5.3. Supplementary requirements

Characteristic	Essential	Desirable
Familiarity with MATLAB and Simulink modelling and system analysis.	X	
Familiarity with MATLAB Control Toolbox.	X	
Familiarity with MATLAB Robust Control Toolbox.	X	
Familiarity with robust control theory.		X

6. EG4421 Holistic Aeroengine Design – Systems Design Class Tutors

6.1. Role description

In Systems Design Classes, two Teaching Assistants support students in performing engineering calculations to the design of aerospace gas turbine systems through seminar-type activities.

6.1.1. Hours

Systems Design Classes run for 7 weeks in the Spring term. Each session lasts for 2 hours. Therefore, expected hours for each TA are:

- 1 Design Class x 2 hours = 2 hours per week.
- 7 weeks x 2 hours per week = 14 hours per semester.
- Additional hours for marking etc. = 36 hours per semester.

6.2. Supplementary responsibilities

Holistic Aeroengine Design Class Tutors will be expected to:

- Proactively engage with students and challenge them to advance their understanding to a high-level using their engineering skills and judgement.
- Assist with the marking of coursework submitted by students.
- Conduct other relevant duties of a Teaching Assistant (see EG/TA/2/2015).

6.3. Supplementary requirements

Characteristic	Essential	Desirable
Sound knowledge of engineering thermodynamics and fluid mechanics.	X	
Familiarity with the Assessed Coursework of this module, e.g. by having completed this module themselves.		X

7. EG4222 Radio Communications – Programming (MATLAB) Tutors

7.1. Role description

In Programming (MATLAB) Classes for EG4222, Teaching Assistants support practical sessions in computational programming aimed at designing telecommunications systems.

7.1.1. Hours

Programming (MATLAB) Classes for run for up to 7 weeks in the Spring semester. Each session lasts for 3 hours. Therefore, expected hours for each TA are:

- 1 MATLAB Classes x 3 hours = 3 hours per week.
- 7 weeks x 3 hours per week = 21 hours per semester.

7.2. Supplementary responsibilities

Programming (MATLAB) Class Tutors will be expected to:

- Proactively engage with students in MATLAB Classes to ensure they are progressing adequately through their computational exercises.
- Conduct other relevant duties of a Teaching Assistant (see EG/TA/2/2018).

7.3. Supplementary requirements

Characteristic	Essential	Desirable
Experience in using MATLAB and Simulink for the modelling and analysis of radio communications systems, or engineering systems of similar complexity.	X	
Knowledge of undergraduate level communications theory.		X

8. EG7012 MATLAB and CAD – Programming (MATLAB) Tutors

8.1. Role description

Teaching Assistants will support practical sessions in MATLAB programming. The topics covered include:

- Analysing simple problems arising in science and engineering for the purpose of programming with a computer.
- Using MATLAB in an interactive mode – entering and assigning data to variables and using plotting functions.
- Writing simple programs using, as and when necessary, loop structures and condition statements including 'for loops', 'while loops' and 'if-then-else' constructs, and user-defined functions.
- The module also includes CAD elements (SolidWorks, ORCAD/Pspice, Simulink for control, and Simulink for communications). The Teaching Assistants could be involved in the CAD elements depending on their experience.

8.1.1. Hours

MATLAB Classes run for 6 weeks in the Autumn semester. Each session lasts for 2 hours. The CAD Classes run for 3 weeks, each session is 3 hours. Therefore, expected hours for each TA are:

- 1 Programming (MATLAB) Class x 2 hours = 2 hours per week.
- 6 weeks x 2 hours per week = 12 hours per semester.
- 1 CAD Class x 3 hours = 3 hours per week
- 3 weeks x 3 hours = 9 hours per semester

8.2. Supplementary responsibilities

Systems Design Class Tutors will be expected to:

- Proactively engage with students and encourage them in the learning process.
- Conduct other relevant duties of a Teaching Assistant (see EG/TA/2/2018).

8.3. Supplementary requirements

Characteristic	Essential	Desirable
Experience in using MATLAB for solving problems in science and engineering.	X	
Experience in using Simulink **OR** Communications toolbox **OR** Solidworks **OR** ORCAD/Pspice		X

9. EG7018 Embedded Systems for Condition Monitoring and Control – Programming (Embedded C) Tutors

9.1. Role description

Teaching Assistants support the practical sessions mainly by providing support to the students in Embedded C programming as well as in the use of the particular development platform used. The topics covered include:

- Embedded C programming
- Use of the LPCXpresso development platform for the LPC1769 microcontroller
- Use of the LPC1769 peripherals
- Interacting with hardware components of the LPCXpresso LPC1769 hardware platform consisting of an LPCXpresso LPC1769 development board and an LPCXpresso base board
- Use of the LPCXpresso IDE

9.1.1. Hours

Programming classes run for 11 weeks in the Spring semester. There are two practical sessions per week, each of which lasts for 2 hours. Therefore, expected hours for each TA are:

- 2 Programming (Embedded C) Class x 2 hours = 4 hours per week.
- 11 weeks x 4 hours per week = 44 hours per semester.

9.2. Supplementary responsibilities

Systems Design Class Tutors will be expected to:

- Proactively engage with students and encourage them in the learning process.
- Conduct other relevant duties of a Teaching Assistant (see EG/TA/2/2018).

9.3. Supplementary requirements

Characteristic	Essential	Desirable
Good knowledge of C programming language and how this is used in embedded systems.	X	
Good general knowledge about microcontrollers	X	
Knowledge of the basics of embedded systems including: architectures of embedded systems; techniques used in high-reliability embedded systems; ADCs and PWMs	X	