

ES191-15 Electrical and Electronic Circuits

24/25

Department

School of Engineering

Level

Undergraduate Level 1

Module leader

Ryan Montague

Credit value

15

Module duration

10 weeks

Assessment

100% exam

Study location

University of Warwick main campus, Coventry

Description

Introductory description

ES191-15 Electrical and Electronic Circuits

[Module web page](#)

Module aims

To present, in context, the fundamental concepts of circuits, devices and systems that underpin all branches of Engineering. Students will study fundamental circuit analysis techniques including nodal analysis, mesh analysis, Thevenin circuits as well as transient analysis applied to 1st and 2nd order circuits. Students will study fundamental mathematical operations of DC and AC quantities including phasors, vectors and complex numbers. Students will also study basic electronic components (like diodes, transistors, operational amplifiers and filters) that make up more complex electrical and electronic circuitry.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be

covered. Actual sessions held may differ.

DC circuit analysis (Nodal, Mesh, Thevenin, Norton, Superposition etc) ,

AC Circuit Analysis (Vectors, Reactance, Impedance etc)

Circuit Techniques for Transients (1st and 2nd order)

AC Power

Introduction to Electricity and Magnetism

Diodes and transistors

Operational amplifiers

Analogue amplifiers and circuits

Basic digital electronics

Active and passive filters (RC filters, op-amp filters etc)

Learning outcomes

By the end of the module, students should be able to:

- Apply basic principles in electrical and electronic circuits. [C1(d), M1(d), C2(d), M2(d), C3(d), M3(d),C4(d), M4(d)]
- Make appropriate assumptions to simplify and thus model real-life electrical and electronic components. [C2(d), M2(d), C4(d), M4(d)]
- Measure electrical components and build electrical circuits to determine parameters and behaviours. [C4(d), M4(d),C12(d), M12(d), C13(d),M13(d)]

Indicative reading list

G. Rizzoni – Fundamentals of Electrical Engineering, McGraw-Hill, 2008, ISBN 978-0-07-128338-0

Subject specific skills

Ability to apply relevant practical and laboratory skills building and testing electrical and electronic circuits

Transferable skills

Numeracy: apply mathematical, computational and modelling methods in an engineering context

Study

Study time

| Type | Required |
|----------|-----------------------------|
| Lectures | 30 sessions of 1 hour (20%) |
| Total | 150 hours |

| Type | Required |
|------------------------------|----------------------------|
| Supervised practical classes | 4 sessions of 3 hours (8%) |
| Private study | 108 hours (72%) |
| Total | 150 hours |

Private study description

108 hours of guided independent learning

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group BB

| | Weighting | Study time |
|---|------------------|-------------------|
| Online Examination | 100% | |
| QMP Examination 80% Lecture Course + 20% Laboratory 2 Hour QMP Examination | | |
| ~Platforms - AEP,QMP | | |

- Online examination: No Answerbook required
- Students may use a calculator
- Engineering Data Book 8th Edition

Feedback on assessment

- Support through advice and feedback hours.
- Cohort-level feedback on computer-based Lab quiz.
- Cohort-level feedback on final examination.

[Past exam papers for ES191](#)

Availability

Courses

This module is Core for:

- Year 1 of UESA-H335 BEng Automotive Engineering
- Year 1 of UESA-H161 BEng Biomedical Systems Engineering
- Year 1 of UESA-H216 BEng Civil Engineering
- Year 1 of UESA-H63W BEng Electronic Engineering
- Year 1 of UESA-H113 BEng Engineering
- Year 1 of UESA-HN15 BEng Engineering Business Management
- Year 1 of UESA-HH75 BEng Manufacturing and Mechanical Engineering
- Year 1 of UESA-H315 BEng Mechanical Engineering
- Year 1 of UESA-HH35 BEng Systems Engineering
- Year 1 of UESA-HN11 BSc Engineering and Business Studies
- Year 1 of UESA-H336 MEng Automotive Engineering
- Year 1 of UESA-H163 MEng Biomedical Systems Engineering
- Year 1 of UESA-H217 MEng Civil Engineering
- Year 1 of UESA-H63X MEng Electronic Engineering
- Year 1 of UESA-H114 MEng Engineering
- Year 1 of UESA-HH76 MEng Manufacturing and Mechanical Engineering
- Year 1 of UESA-H316 MEng Mechanical Engineering
- UESA-HH31 MEng Systems Engineering
 - Year 1 of HH31 Systems Engineering
 - Year 1 of HH35 Systems Engineering
- Year 1 of UCSA-G406 Undergraduate Computer Systems Engineering
- Year 1 of UCSA-G408 Undergraduate Computer Systems Engineering
- Year 1 of UESA-H605 Undergraduate Electrical and Electronic Engineering
- Year 1 of UESA-H606 Undergraduate Electrical and Electronic Engineering MEng