

ES191-15 Electrical and Electronic Circuits

22/23

Department

School of Engineering

Level

Undergraduate Level 1

Module leader

Ryan Montague

Credit value

15

Module duration

10 weeks

Assessment

30% coursework, 70% 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:

- Understand basic principles in electrical and electronic circuits.
- Appreciate fundamental aspects of electronic component operation.
- Make appropriate assumptions to simplify and thus model real-life electrical and electronic components
- Measure electrical components and build electrical circuits to determine parameters and behaviours.

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%)
Supervised practical classes	4 sessions of 3 hours (8%)
Other activity	1 hour (1%)
Private study	107 hours (71%)
Total	150 hours

Private study description

107 hours of guided independent learning

Other activity description

1 hr QMP Lab Results Report Quiz

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group D4

	Weighting	Study time	Eligible for self-certification
Assessment component			
Laboratory Assessment	30%		No
One QuestionMark Perception (QMP) Laboratory Results Quiz.			
Reassessment component			
Laboratory Referral Assignment - 6 page report			No
Simulation-based short laboratory to cover concepts and principles covered by in-person, physical (non-repeatable) Laboratories.			

Assessment component	Weighting	Study time	Eligible for self-certification
Online Examination	70%		No
QMP online examination (2 * 1 hour QMP online tests to be scheduled in same time slot with short break in between)			
~Platforms - AEP,QMP			

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- Online examination: No Answerbook required

Reassessment component is the same

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

Post-requisite modules

If you pass this module, you can take:

- ES4D4-15 Power Electronic Converters & Devices

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
- UESA-H316 MEng Mechanical Engineering
 - Year 1 of H315 Mechanical Engineering BEng
 - Year 1 of H316 Mechanical Engineering MEng
- 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