

ES191-15 Electrical and Electronic Circuits

26/27

Department

School of Engineering

Level

Undergraduate Level 1

Module leader

Amit Dwivedi

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 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

[Reading lists can be found in Talis](#)

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	27 sessions of 1 hour (18%)
Supervised practical classes	4 sessions of 2 hours (5%)
Total	150 hours

Type	Required
Other activity	2 hours (1%)
Private study	113 hours (75%)
Total	150 hours

Private study description

113 hours of guided independent learning

Other activity description

Revision classes

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group BC

Assessment component	Weighting	Study time	Eligible for self-certification
Centrally-timetabled examination (On-campus) Examination	100%		No

- Answerbook Pink (12 page)
- Students may use a calculator
- Engineering Data Book 8th Edition

Reassessment component is the same

Feedback on assessment

- Support through advice and feedback hours.
- 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
- 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