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ELECTRICAL , ELECTRONIC and MECHATRONIC ENGINEERING

at The University of Manchester

Dr Ognjen Marjanović
Undergraduate Programmes Director

Shaping the modern world and enabling modern life

Athena SWAN Bronze Award
ECU GENDER CHARTER

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Have you checked in to the open day yet? Let us know you've attended by following the link in the email sent this morning

No fire alarms are scheduled for today. In the event of an alarm, please follow university staff and ambassadors to the nearest fire exit

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WHY ELECTRICAL, ELECTRONIC AND MECHATRONIC ENGINERING?

The world is (becoming increasingly more) **electrical, electronic and mechatronic**!

Can you imagine your life without electricity?

Can you imagine your life without computers, telephones, radio, television, cars, planes?

"Technology" = Electrical and Electronic Engineering

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Electrical Engineering

Conversion, production and distribution of electrical power

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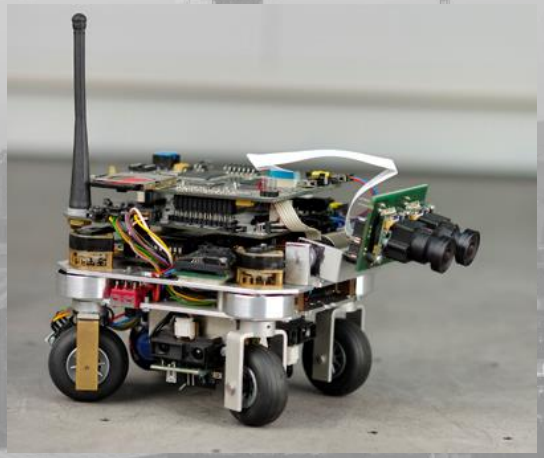
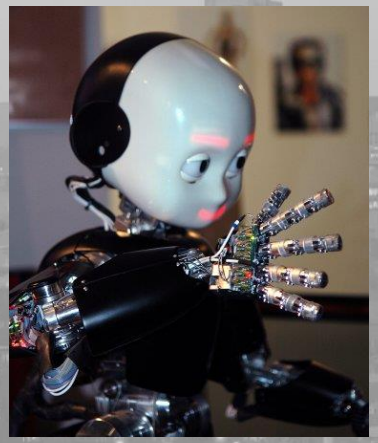
Electronic Engineering

Low powered circuits with decision making capability





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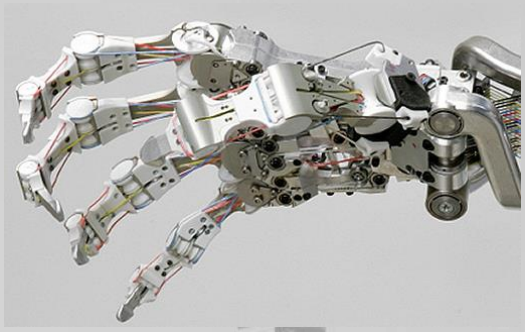
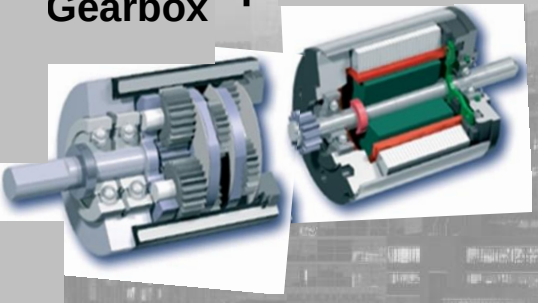
Mechatronic Engineering

Integrated electrical & mechanical systems in a single intelligent device

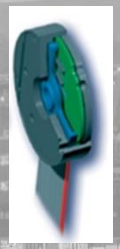


Gearbox +



Motor +

Feedback Device +



Control Electronics

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The future is yours!

?

800 g - phone

160 g - phone, bank, camera, travel, health, play, learn, read…

???

1983

2024

2034

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The future is yours!

?

1950-90 2024 2034

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WHY ELECTRICAL, ELECTRONIC AND MECHATRONIC ENGINERING?

Highly employable profession !

- The Electrical and Electronics engineer occupation is on the current UK government Shortage Occupation List (SOL)
- Deemed to be in shortage and expected to be significantly in demand in the coming years
- Currently about 15% of the UK engineering workforce

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EMPLOYABILITY

Electronics sector - UK

- The UK electronics sector experienced the fastest growth of any manufacturing sector in 2018 – with a continued further growth trend
- Contributes ≈5% of UK manufacturing output – set to grow
- Global growth of electronic sector of ≈6% in 2020/21 and expected to continue at this rate
- UK Engineering council: 'insufficient quantities of graduates to satisfy sector demand, third of all vacancies are difficult to fill across the sector'

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EMPLOYABILITY

- Income – EEE is in UK top 20 highest paid professions
- UK median annual full-time gross pay – indicative figures:
  - £52,000 per annum for electrical engineers
  - £44,000 per annum for electronics engineers
  - £47,500 per annum for mechatronic engineers
  - Specialist chartered engineers can earn significantly more
- Graduate engineers usually earn anywhere between £30k and 40k per annum gross
- 90% of UoM graduates employed after 15 months (in Engineering, IT, Business development, Banking…)
- EEE is a global market today – opportunities truly are global !

UK Government annual survey of hours and earnings 2019, jobted.com, UoM

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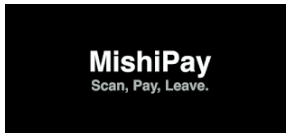
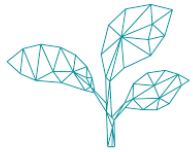
Our employability

Some of recent employers of our graduates

Some start their own successful companies





modo

FOTENIX
Next-Generation Crop Analytics

Careers service

- Careers service in place to support you and help navigate your next steps.

From start of course to up to two years after graduation

- **Careers information and guidance**
- **CV and application advice**
- **Employability support alongside your degree**
- **Employer events and careers fairs**
- **Further study and funding**
- **Global Graduates programme**
- **Graduate careers**
- **Interview and assessment centre preparation**
- **University College (modules outside your degree area)**
- **The Manchester Network Mentoring Portal**
- **The Manchester Gold Programme**
- **Part-time jobs**
- **Psychometric test preparation**
- **Self-employment**
- **Vacancy website**
- **Volunteering**
- **Work experience, placements and internships**

- Find out more at: www.manchester.ac.uk/careers

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WHO WE ARE

28th
in the world

#10
In top 10 institutions in the world for social & environmental impact

Manchester

Original and modern

Britain's most popular student city

Regarded as the UK's second city

£1 billion
Campus Masterplan 2012–22

Lively, diverse

Sport, culture, history

Industrial Revolution heritage with an enduring, progressive can-do attitude

QS World University Rankings, 2022 and 2019 Academic Ranking of World Universities

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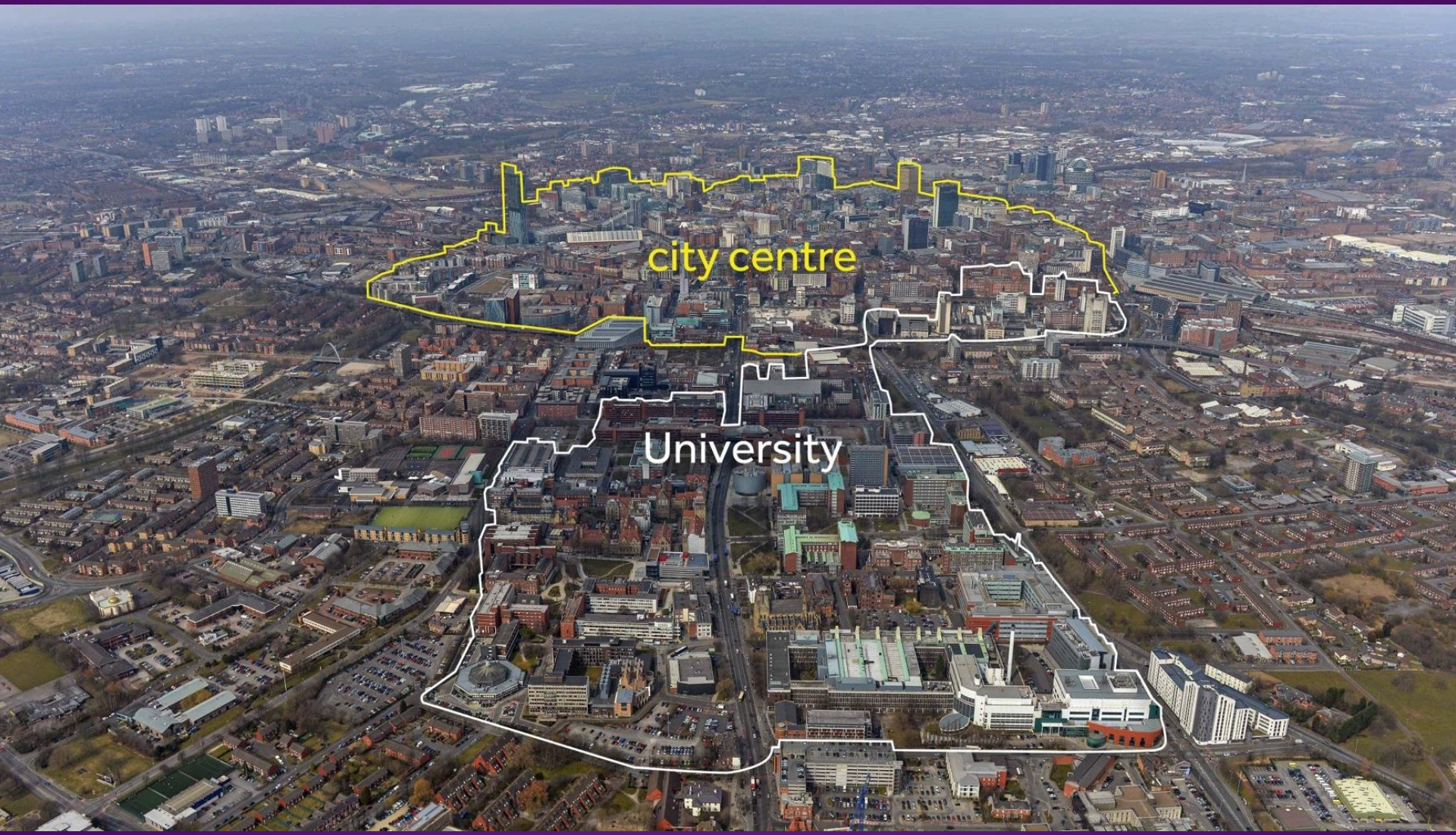

WHERE WE ARE

Department of Electrical and Electronic engineering

- One of the largest Electrical Engineering departments in the UK:
  - ≈ 800 undergraduates and ≈ 400 postgraduate students
  - ≈ 70 academic staff
  - ≈ 20 professional support staff
  - ≈ 20 technical support staff

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Dept. of eee

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RESEARCH QUALITY

- In top three in the UK in terms of the research impact according the latest Research Excellence Framework
- 4th in the UK in terms of the research power
- 95% of the academic staff are research active
- 93% of our research activity deemed to be world leading or internationally excellent.

The Research Excellence Framework (REF2014)

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RESEARCH THEMES

Advanced functional materials and devices

Electronic engineering for agriculture

Resilient energy systems

Robotics for extreme environments

Sensing technologies for security

- Find out more at: https://www.eee.manchester.ac.uk/research/themes/

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INDUSTRIAL PARTNERS

The Department has strategic industrial partners for both **research** and **teaching:**

- National Instruments (NI)
- Rolls-Royce
- National Grid

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TEACHING QUALITY

- Teaching by real experts, underpinned by internationally significant research and strong industrial links
- Silver award in the 2023 Teaching and Excellence Framework (TEF) – with gold for student outcomes
- Continuously high overall satisfaction with the course

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IET ACCREDITED COURSES

During accreditation visit by the IET we were commended for:

- Embedded Systems Project
- Industrial Advisory Group
- Industrial Placement support
- Influence of the Department's research on the undergraduate course
- The facilities available for the MEng Team Projects

IET The Institution of Engineering and Technology

All of our courses are IET accredited

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UNDERGRADUATE DEGREE COURSES

Fully accredited MEng (4 years) and BEng (3 years) degree courses in Electrical and Electronic Engineering, Mechatronic Engineering and Electronic Engineering

You can choose to have a degree with or without an industrial experience

You can also choose to have a Foundation Year prior to starting year 1 of the chosen course

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ENTRY REQUIREMENTS

Standard offer for UG courses (MEng & BEng):

AAA at A Level

Two “A” levels in: Maths + Physics or Electronics or Further Maths or Chemistry or Computer Science

Third A level is not required to be in a technical subject (could be history, geography, music…)

36 points at IB Diploma (6,6,6)

With 6 points in Mathematics + Physics or Chemistry or Computer Science at HL and 6 points in one other HL subject (any).

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MEng vs BEng

- Different duration (1 year more for MEng)
- 50% of final MEng year spent on a practical Team Project - aimed at development of further industrially relevant employability skills.
- The BEng degree satisfies a substantial proportion of the educational requirements for registration as a Chartered Engineer (CEng).
- Further learning at Masters level or equivalent is needed to meet these requirements in full – our MEng degree streams meet these requirements.

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INDUSTRIAL EXPERIENCE

Courses can be combined with an accredited year-long industrial placement for the award of a "with Industrial Experience" degree.

- Technical experience and transferable skills
- Project management skills
- Interview 'platform'
- Helps you to make informed career choice
- Takes place between 2nd and 3rd year
- Paid year – cost 'neutral'

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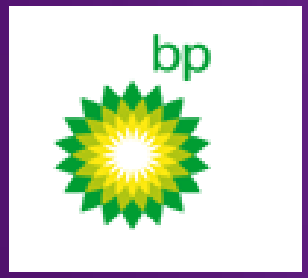
INDUSTRIAL EXPERIENCE



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Tuition Fees

For 2024 entry:

£9,250 (Home students)

Visit our website for details:

manchester.ac.uk/study/undergraduate/student-finance/

“Future inflationary increases may also be applied to each subsequent year of your course, subject to government regulations on fee increases…”

Scholarships

- **The Beatrice Shilling Scholarships**

20 awards of £2,000 per year of study up to year 4. Open to women applying to study engineering at undergraduate level.

- **The Manchester Science & Engineering Excellence Scholarships**

25 awards of £2,000 per year of study up to year 4. (WP or WP Plus flag)

- **More details / opportunities available – find out more on**

Subject-specific scholarships (manchester.ac.uk)

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Scholarships

Power Academy (IET + Industry)

Who?	Home (EEE/MTE only)
To qualify:	Competitive
How much?	£3,000 per year
	+ paid summer work placements
	+ mentoring from industry partners

BAE SYSTEMS
ATKINS
SCOTTISHPOWER
NORTHERN POWERGRID
MITSUBISHI ELECTRIC Changes for the Better
SSE
WESTERN POWER DISTRIBUTION Serving the South West and Wales
nationalgrid
Rolls-Royce
CCFE CULHAM CENTRE FUSION ENERGY
RWE The energy to lead
Northern Ireland Electricity
COSTAIN
NetworkRail
UNDERGROUND

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Scholarships

UK Electronic Skills Foundation (IET + Industry)

Who?	Home
To qualify:	Competitive
How much?	£1,000 per year
	+ paid summer work placements
	+ industrial mentoring and professional development training

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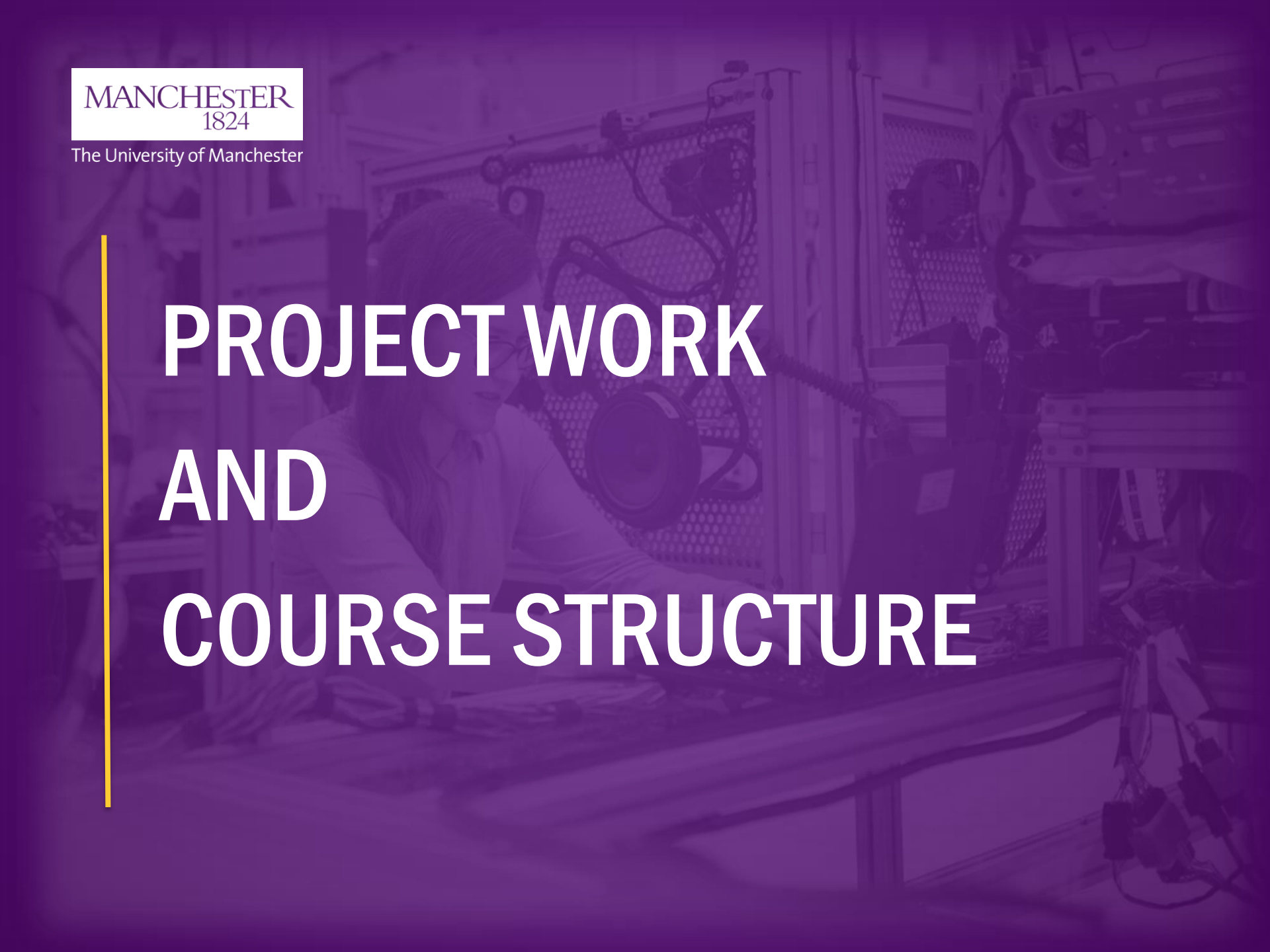
PROJECT WORK AND COURSE STRUCTURE



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Year One

All courses are the same (fundamental principles material)
Electronics Project

UNDERGRADUATE

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Yr1 Electronics Project : Build and test a microcontroller input /output board

Mechanical fabrication

Electrical testing

Final inspection

Electronic assembly

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UNDERGRADUATE

Year One

All courses are the same (essential background material)

Electronics Project

Year Two

Semester one common, semester two course specific

Embedded Systems Project

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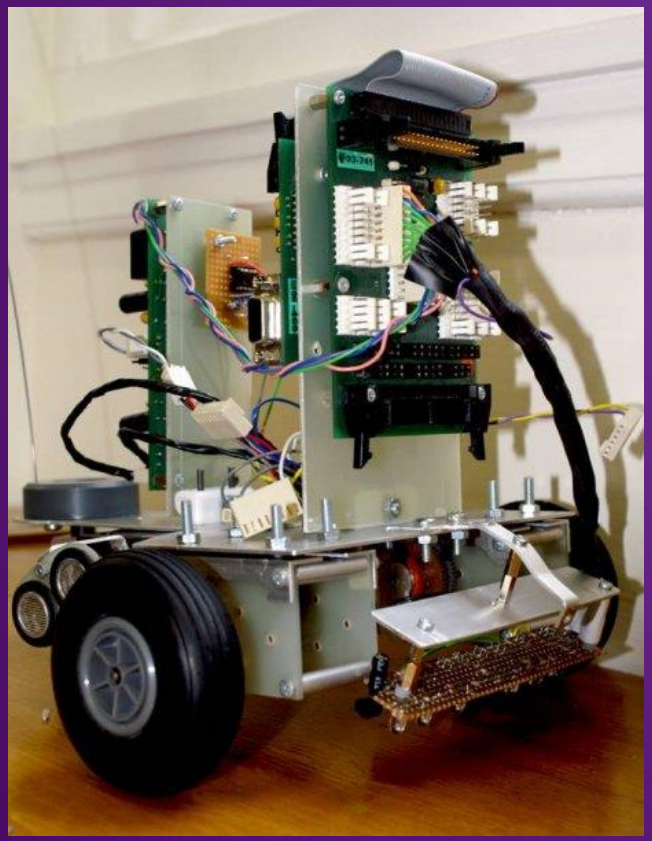
Yr2 Embedded Systems Project : Design and build an autonomous mobile robot



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UNDERGRADUATE

Year One

All courses are the same (essential background material)
Electronics Project

Year Two

Semester one common, semester two course specific
Embedded Systems Project

Year Three

Course specific, elective course units
Individual Project

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Yr3 Individual Project : a year long individual research and development activity

- AndroidTM mobile device application for an audience response system
- Integration of wind turbines into the electric distribution network
- Design of a snake robot
- Study of sub-synchronous oscillations in future power networks
- Development of one-atom thick transistors
- Design of tuneable UWB patch antenna with notch functionality
- Financial time series modelling using neural networks
- Design and build of a mechatronic positioning system
- Power electronic systems for electric vehicles

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UNDERGRADUATE

Year One

All courses are the same (essential background material)

Electronics Project

Year Two

Semester one common, semester two course specific

Embedded Systems Project

Year Three

Course specific, elective course units

Individual Project

Year Four

Course specific, elective course units

Team Project

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Yr4 Team project : a year long team activity

- Frequently sponsored by industry
- Account for 50% of time and assessment
- Teams consist of students from all degree courses
- Demonstration/exhibition day for the Industrial Advisory Board/academics/students at the end

Projects have included:

- Real-time position monitoring for humanitarian demining
- Robotic Precision Management of Crop Nutrification, Disease Treatment & Weed Control
- Integrated electric vehicle energy management system
- Instrumented training wheelchair system for para-athletes
- Automated Calibration of Aircraft Fuel System Simulators
- Underground Train Line Inspection Robot

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STUDENT ACADEMIC AND PASTORAL SUPPORT

- Personal Tutorials: weekly meetings
- Academic advisors: one academic advisor during studies
- Peer-assisted study sessions (PASS): students from senior years assist first year students

Other university support includes; Disability Advisory and Support Service (DASS), counselling service and Students' Union independent advisers

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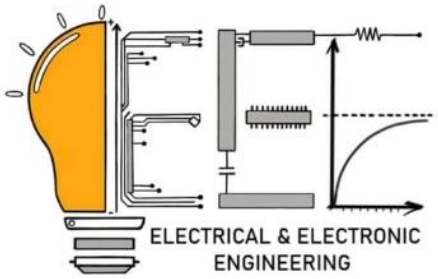
STUDENT SOCIETIES

STUDENTS' UNION
University of Manchester

The largest students' union in the UK



Robotics Society

FORMULA STUDENT
Institution of MECHANICAL ENGINEERS

E4C Electronics Club

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SUMMER JOBS

- Financially beneficial
- Technical experience
- Transferrable skills

Types of projects:

- Research focused
- Teaching development

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ADDITIONAL BENEFITS

IET membership in the first year

A microcontroller development system

A National Instruments myDAQ

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Manchester Engineering Campus Development (MECD)

- Collaborate
- Create
- Connect

Opened in September 2022

The Manchester Engineering Campus Development (MECD) will be your new home, where you can come together with fellow students, academics and industry partners to study, experience and enjoy engineering.

Facilities include:

- Blended lecture theatres
- Makerspace to inspire creative design
- Teaching workshops and lab spaces
- Student study spaces for independent and collaborative learning

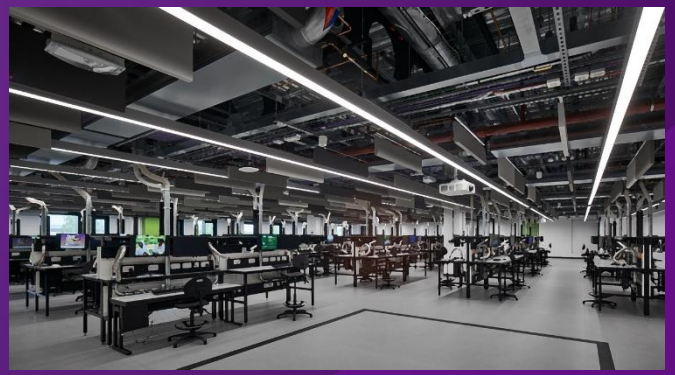
Explore MECD on: https://stories.manchester.ac.uk/exploremecd/

Further EEE demos / activities in the building today)

Demo 1: Real-time data manipulation system (2B.019)

Demo 2: Buggy Race Demo (2A.011)

Demo 3: RoboSoc Robot Wars (Makerspace near the entrance of Engineering Building 1)



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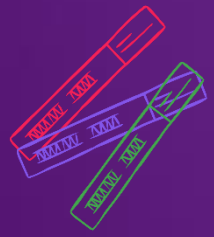
Add your brochures to your home-screen to keep them handy!

HOW TO FIND YOUR BROCHURE



First, find the subject stands you're interested in and ask for a wristband

Put on your wristband to help our students and staff identify your subjects of interest!

Scan the QR code for instant access to your brochure

You're in! Enjoy exploring our quizzes, timetables, advice and more

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QUESTIONS?

- You can also ask via Unibuddy at:
  manchester.ac.uk/study/chat-with-our-students/
- Or contact us directly on: ug.eee@manchester.ac.uk

@UoM_EEE

/TheUniversityofManchester

@officialuom