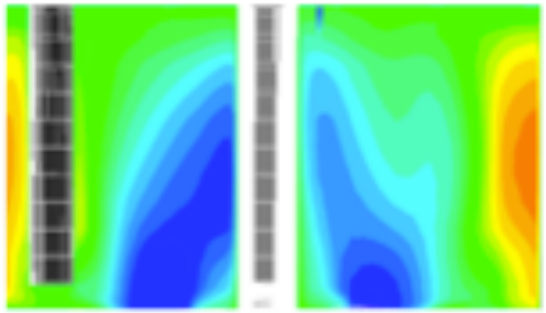
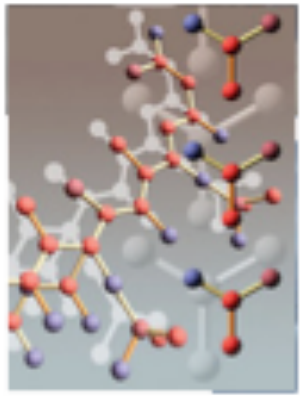
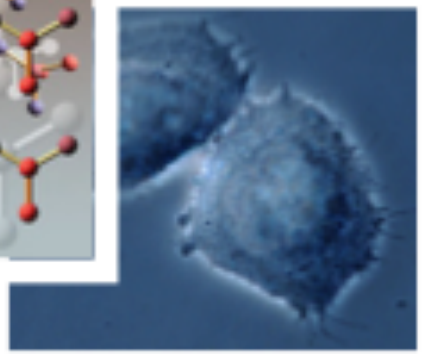
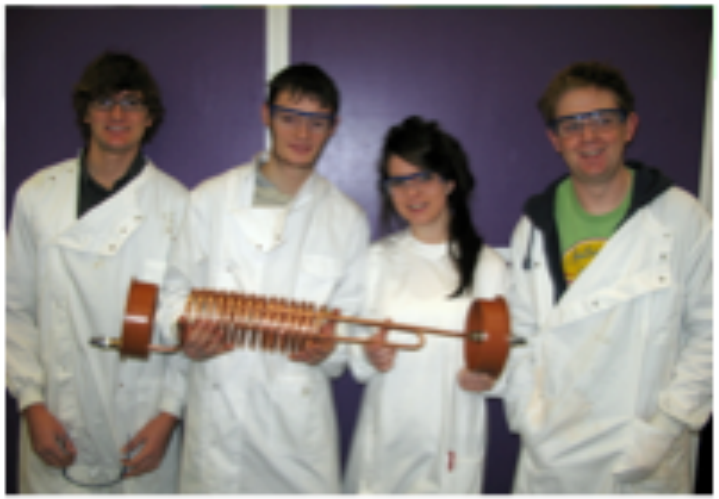
UCD Chemical & Bioprocess Engineering





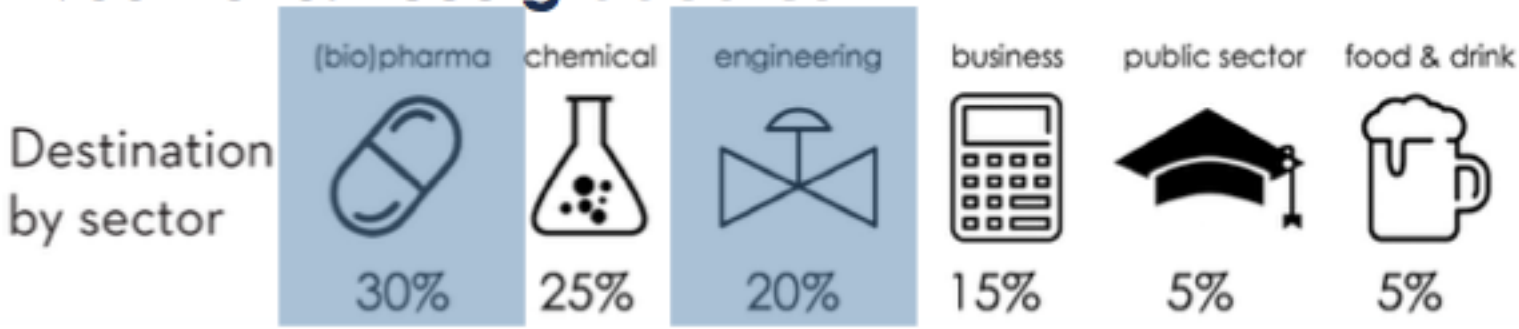




BE-Minor-ME Updates – incoming Stage 2 – August 2017

UCD Chemical & Bioprocess Engineering

1956-2016: 1500 graduates



Bio/Pharmaceutical Industry in Ireland

- 9 of the worlds top 10 Pharma & Biotechnology companies
- Annual exports exceeding €50 billion
- Employment over 23,000 50% graduates

Engineering Firms Supporting the Bio/Pharma Sector

www.approcess.com

JACOBS

PM GROUP

DPS

Biopharmaceutical Facilities in Ireland

existing/in development

UCD Chemical & Bioprocess Engineering

TWO MAJOR CURRICULUM DEVELOPMENTS FOR 2017!

- **ME CHEMICAL & BIOPROCESS ENGINEERING**
  - Available from Sept 2017
  - To incoming Stage 4 students

- **BE CHEMICAL ENGINEERING WITH BIOCHEMICAL ENGINEERING MINOR**
  - Available from Sept 2017
  - To incoming Stage 2 and Stage 3 students

UCD School of Chemical & Bioprocess Engineering

University College Dublin
Ireland's Global University

Chemical & Bioprocess Engineering

5-Year Integrated ME Programme

Course Code: DN150

What is Chemical & Bioprocess Engineering?

Chemical & Bioprocess Engineering involves the transformation of matter and energy into products and services. More specifically, it addresses the design and operation of facilities needed to achieve this transformation in a technically, economically and environmentally acceptable manner.

Why study Chemical & Bioprocess Engineering at UCD?

For more than 60 years, UCD has led the way in the design and delivery of innovative, has been designed to reflect the changing skills needs of Chemical and Bioprocess Engineers in global industries, including chemicals, pharmaceuticals, biotechnology, food, energy, advanced materials and ICT.

5-Year Integrated ME Programme Content

The ME programme, which is structured to address the most up-to-date theoretical and conceptual aspects, alongside practical and industrial elements of Chemical and Bioprocess Engineering practice, includes extensive project work in both design and research, along with

CAO Points Range

2015: 500-625

Length of Course

4 Years (BE) Hons or
5 Years (Integrated ME)

Entry Requirements

English • Irish • Mathematics (Min H4 in LC or equivalent) • One laboratory science subject (Min H6 in LC or equivalent) • Two other recognised subjects

Leaving Certificate

You must obtain a minimum of Grade

Extract from ME CBE Programme Leaflet. Available at:
https://www.ucd.ie/t4cms/UCD-ME-Chemical-&-Bioprocess-Engineering-Information-Aug-2016.pdf

Professional Work Experience Internships

The UCD 5-year Integrated ME Programme in Chemical & Bioprocess Engineering incorporates a credit-bearing Professional Work Experience (PWE) Internship, designed to integrate students' academic and career interests with practical work experience. ME students in Chemical & Bioprocess Engineering are available for placement from Jan/Feb of Year 4, for periods of 6-8 months (i.e. Jan/Feb-Aug). Where a company can support a student in undertaking an appropriate research project, as part of his/her internship, the placement may be extended to 12 months (i.e. Jan-Dec).

PWE Intern Recruitment Process

Typical recruitment process timelines are indicated below. The School is pleased to work with companies based on their individual needs.

April-Aug: Initial Contact
Companies contacted by UCD with a view to arranging Internships for following year

Sept: Applications begin
Students submit CVs & companies shortlist

Sept/Oct: Interviews
Ideally, interviews completed by mid-Nov

Nov/Dec: Contracts finalised
Contracts ideally finalised before students break for Semester 1 exams at end Nov

Jan/Feb: Internships begin

What are the benefits to your company?

Level: Students will have completed three and a half years of Chemical & Bioprocess Engineering studies before commencing their internship.

Duration: Students are available from Jan/Feb for a 6-8 month period. This ensures they can contribute to the company and undertake meaningful work. Where a research project can be incorporated into the placement, students are available for 12 months (Jan-Dec).

Cost-effective: A PWE Internship could provide your company with a simple, cost-effective way to meet short-term recruitment/project needs, by providing you with additional resources.

Graduates: Internships provide companies with the opportunity to develop a pipeline of talented, trained, future employees, in a low risk way.

Extract from ME CBE Programme Leaflet. Available at: https://www.ucd.ie/t4cms/UCD-ME-Chemical-&-Bioprocess-Engineering-Information-Aug-2016.pdf

ME programme in Chemical & Bioprocess Engineering

5-year Integrated Master's degree programme

- Phased introduction from Sept 2017
- With extended Internship from Jan of Stage 4
  - 6-8 months, from Jan/Feb of Stage 4
  - Extended to up to 12 months (i.e. Jan-Dec) where a student undertake a Research Project as part of the Internship
- **Full fees payable for Year 5**
  - EU fees 2016-17: € 7,490
  - Non-EU fees 2016-17: €23,800

ME programme in Chemical & Bioprocess Engineering

BE/ME Decision?

- At end of Stage 3

GPA requirement for admission to ME: ≥ 2.80

- 70:30 (ECTS-based) weighting of Stage 3 GPA + Stage 2 GPA
- Undertaking all/part of Stage 3 2016-17 on JYA?
  - 1 year on JYA: ME admission GPA = UCD Stage 2 GPA
  - 1 Sem on JYA: ME admission GPA = 30:70 Stage 2: UCD Stage 3 GPA*

*JYA/Erasmus GPA Calculations: https://www.ucd.ie/t4cms/Understanding%20your%20Degree%20Award%20Calculation.pdf

ME programme in Chemical & Bioprocess Engineering

Which degrees are accredited? And to what level?

BE CHEMICAL & BIOPROCESS ENGINEERING

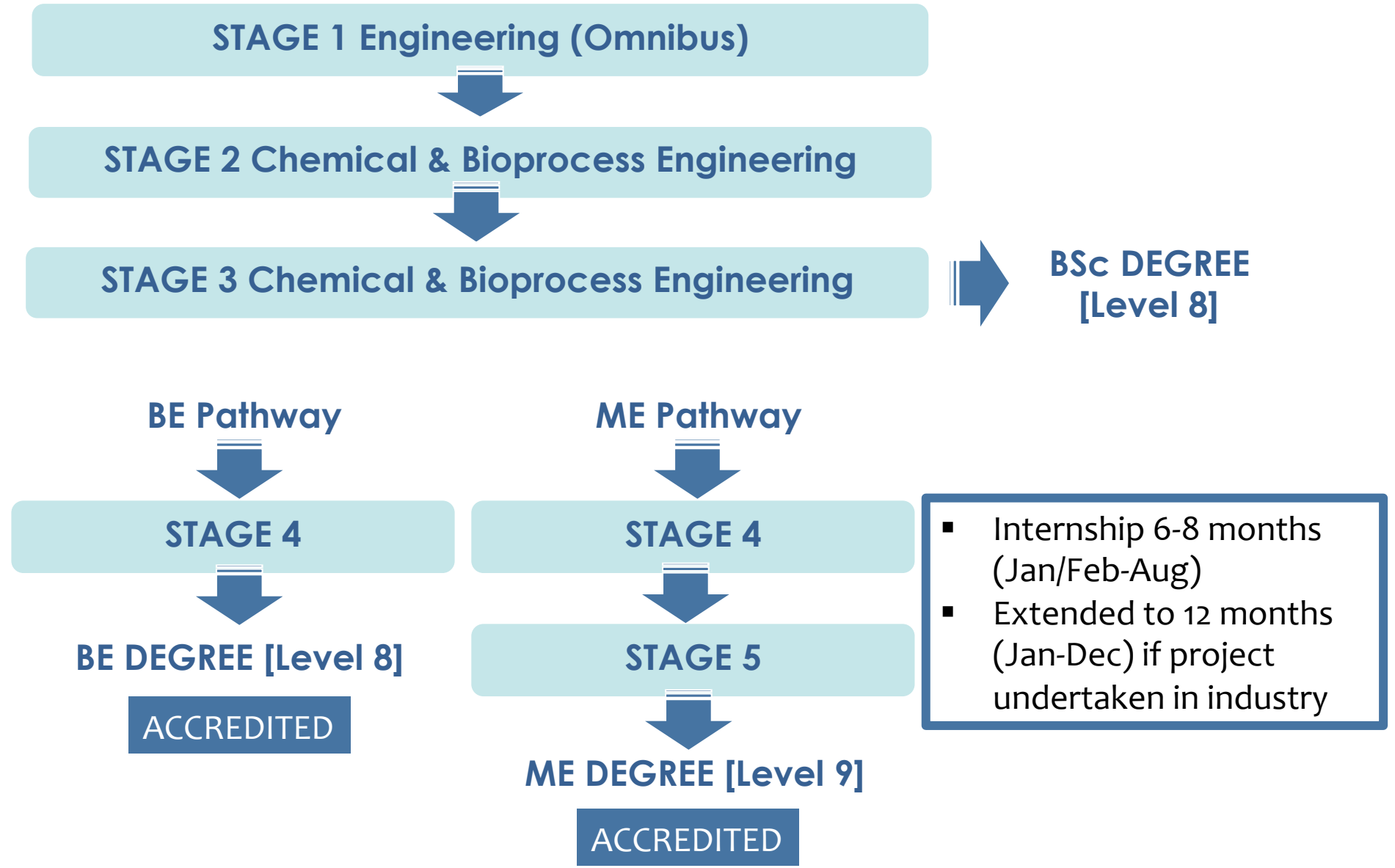
- accredited by **IChemE** to Master level, up to & including Sept 2018 intake

5-YEAR INTEGRATED ME CHEMICAL & BIOPROCESS ENGINEERING

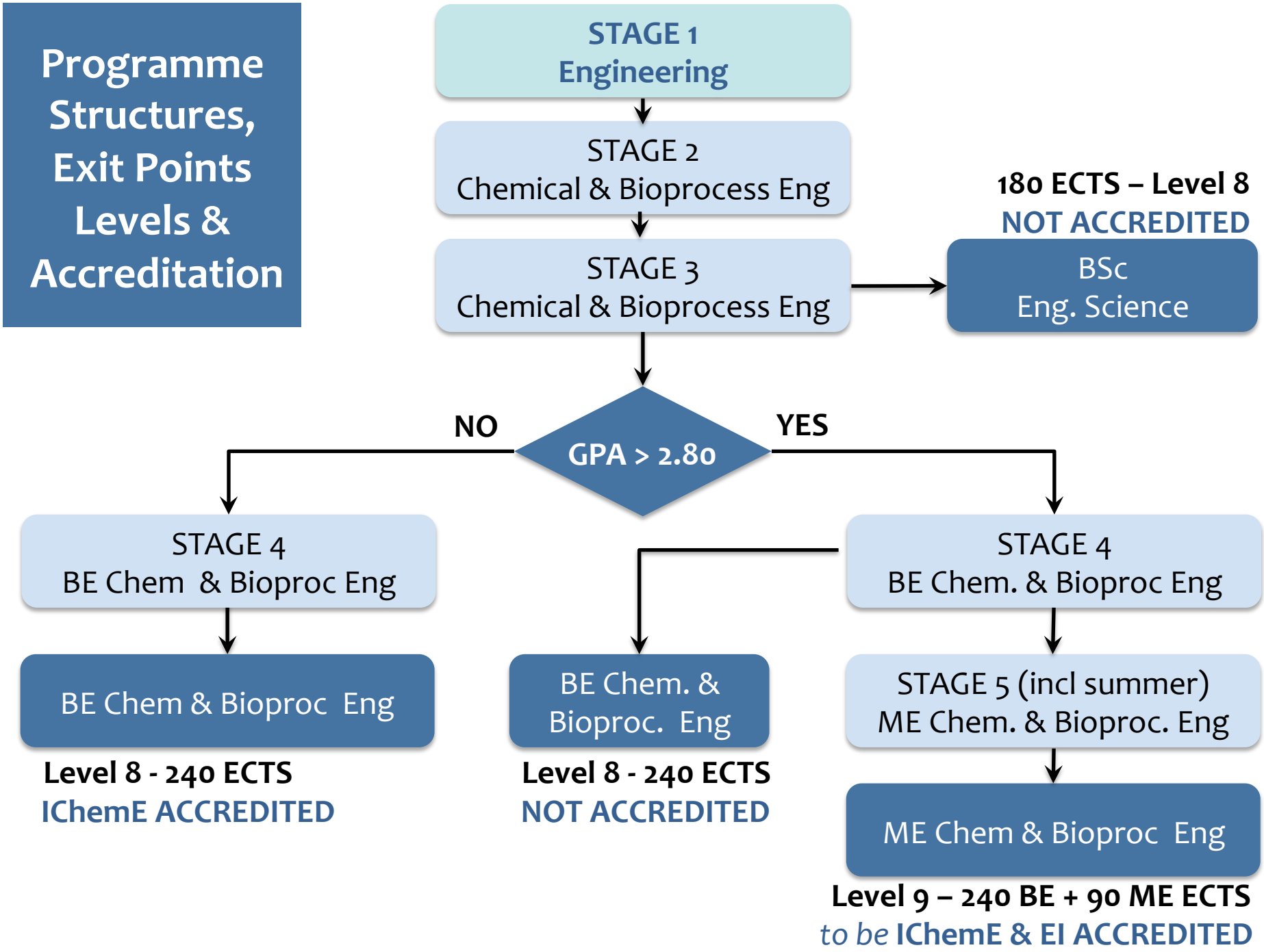
- Designed to be accredited by
  - **IChemE** to Master level
  - **Engineers Ireland** to Master level

  No degree programme can be accredited until after the graduation of the first class from the programme. Accreditation, if awarded. is then applied, retrospectively, to those graduates.

BE & ME Programme Structures & Exit Points



Programme Structures, Exit Points Levels & Accreditation



NEW! BE ChemE with Biochemical Engineering Minor

'MINOR': UCD REQUIREMENTS

- **40 credits** in the 'minor' subject, in Stages 3 & 4, i.e.

Stage 3 BioChemE	Sem 1 - 10 credits	Sem 2 - 20 credits
Stage 4 BioChemE	Sem 1 - 10 credits	

HOW IS THIS ACHIEVED?

- Some core ChemE modules substituted with BiochemE
- **Use of Stage 3 elective credits**
- **CHEN20090** (Biotechnology Principles)
  - Stage 2, Semester 2 Option ***or*** In-Programme Elective
  - Required for Minor for incoming Stage 2 students Sept 2017
  - NOT required for incoming Stage 3 students Sept 2017

NEW! BE ChemE with Biochemical Engineering Minor

BE Chemical & Bioprocess Engineering

Stage 3 Semester 1

- ACM30030 Multi. Calc.
- CHEN30010 Reaction Eng.
- CHEN30020 Unit Ops
- CHEN30030 Thermo.
- CHEN30040 Comm Bio/Pharma.
- Elective

BE Chemical Engineering with Biochemical Engineering Minor

Stage 3 Semester 1

- ACM30030 Multi. Calc.
- CHEN30010 Reaction Eng.
- CHEN30020 Unit Ops
- CHEN30030 Thermo.
- CHEN30040 Comm Bio/Pharma.
- CHEN40040 Animal Cell Cul Tech.

In-programme Elective

CHEN40040 Animal Cell Culture Technology

NEW! BE ChemE with Biochemical Engineering Minor

BE Chemical & Bioprocess Engineering

Stage 3 Semester 2

- CHEN30130 Heat & Fluids (5)
- CHEN30200 CBE Design (10)
- CHEN30210 CBE Lab. 2 (10)
- MEEN30140 Finance (5)

BE Chemical Engineering with Biochemical Engineering Minor

Stage 3 Semester 2

- CHEN30130 Heat & Fluids (5)
- CHEN30150 ChemE Design (5)
- CHEN40530 Bioprocess Design (5)
- CHEN30240 BioChemE Lab 1 (5)
- CHEN30250 BioChemE Lab 2 (5)
- CHEN40460 Bioseparations (5)

NEW! BE ChemE with Biochemical Engineering Minor

For students intending to graduate with a 4-Year BE degree (Level 8)

BE Chemical & Bioprocess Engineering

Stage 4 Semester 1

- CHEN40150 Adv Sep Proc
- CHEN40160 Adv Heat & Fluids
- CHEN40210 Adv Exp Methods
- CHEN40260 Adv Proc Design (10)
- CHEN40570 CB Sys Eng

BE Chemical Engineering with Biochemical Engineering Minor

Stage 4 Semester 1

- CHEN40150 Adv Sep Proc
- CHEN40110 Facility Design
- CHEN40210 Adv Exp Methods
- CHEN40260 Adv Proc Design (10)
- CHEN40570 CB Sys Eng

NEW! BE ChemE with Biochemical Engineering Minor

For students intending to graduate with a 4-Year BE degree (Level 8)

BE Chemical & Bioprocess Engineering

Stage 4 Semester 2

- CHEN40010 Env Eng
- CHEN40200 Research Proj (10)
- CHEN40560 Process Control
- CHEN40610 Appl Chem
- Elective

BE Chemical Engineering with Biochemical Engineering Minor

Stage 4 Semester 2

- CHEN40010 Env Eng
- CHEN40200 Research Proj (10)
- CHEN40560 Process Control
- CHEN40480 Lean Sigma Biopharm*
- Elective

*CHEN40480 will be available to ME students in Stage 5 Semester 2

Q&A from the Information Session: BE/ME

Q: If I meet the ME GPA requirements at the end of Stage 3, do I have to take the ME route?

A: NO! Students who meet the ME GPA requirements at the end of Stage 3 may choose from the BSc, BE or ME routes. Students who do *not* meet the ME GPA requirements may choose from the BSc or BE routes.

Q: Does the introduction of the ME mean that the BE degree for which I originally enrolled is being downgraded?

A: NO! Up to & including the 2018 Stage 1 intake year, the 4-year BE degree will continue to be accredited by the IChemE to Master level (i.e. meeting the academic standards required for IChemE Chartered status). Accreditation for the integrated 5-year ME degree will be sought from both the IChemE and Engineers Ireland.

Q&A from the Information Session: BE/ME

Q: If I take the ME route, do I have to find my own 6-8 month Internship?

A: Internships are not guaranteed, but all ME students are actively supported by the UCD Engineering Internship Managers in securing an ME Internship. For students wishing to seek their own Internship, information and advice are provided.

Q: What happens if I'm in the ME stream and, by January of Year 4, I haven't managed to secure an Internship?

A: The 6-8 month internship is a compulsory part of the 5-Year Integrated ME degree. ChemE students who, by Jan of Year 4, have not secured an Internship, will be required to enrol for the Stage 4 Semester 2 BE programme modules. If they secure a suitable Internship early in Semester 2, they may withdraw from those modules, start the Internship and remain in the ME programme.

Q&A from the Information Session: BE/ME

Q: How is the Internship graded? And what happens if I fail?

A: Internships are graded on a Pass/Fail basis (i.e. grade point neutral). There is no 'resit' opportunity. A student who fails the 30-credit BE-component of the Internship (i.e. Stage 4, Semester 2), will not have sufficient credits to progress into Stage 5.

Q: Now that the ME programme will include an extended, credit-bearing internship, will there still be non-credit-bearing Summer Internships available for students at the end of Stage 3?

A: In theory, yes. However, as companies prefer longer internships, realistically, we anticipate that there will be a significant reduction in the number of non-credit-bearing summer internships available through the School. Students may seek internships independently, e.g. through GradCracker.

Q&A from the Information Session: BE/ME

Q: Is the extended Internship the only difference between the BE and ME degrees?

A: NO! The credit-bearing 6-8 month Internship is a compulsory and very important element of the 5-Year Integrated ME programme. But the programme also includes a 30-credit research project (compared to a 10-credit research project in the BE) and additional (Option/Elective) modules in Semster 2 of Year 5.

Q: Suppose I enrol in the ME programme, do an Internship from Jan-Jun of Stage 4 and then decide to exit at the end of the semester, what happens?

A: By the end of Year 4, a student would normally have accumulated sufficient (i.e. 240) credits for either a BE in Chemical & Bioprocess Enginering *or* a BE in Chemical Engineering with a Biochemical Engineering Minor. But neither of these BE degrees would be accredited by the IChemE.

Q&A from the Information Session: BioChemE Minor

Q: Do I have to take the Biochemical Engineering Minor?

A: NO! This Minor is designed to facilitate students with a particular interest in biochemical engineering and/or preparing for careers in the biopharma sector. It involves the substitution of a small number of core ChemE modules with core BioChemE modules. Additionally, to meet the Minor requirements, students must use their Stage 3 elective credits. From Sept 2017, incoming Stage 2 students wishing to take the Minor must take CHEN20090 (as an Option or Elective).

Q: When do I have to decide if I want to take the Biochemical Engineering Minor?

A: Students entering Stage 3 in Sept 2017 must decide at Registration if they wish to take the Minor**.** For students entering Stage 2 in Sept 2017, CHEN20090 will be required for the Minor. This may be taken *either* as an Option (instead of CHEM20070) *or* as an In-Programme elective in Semester 2.

Q&A from the Information Session: BioChemE Minor

Q: If I'm going on Study Abroad/ Erasmus, can I take the Biochemical Engineering Minor?

A: It depends… Depending on where you're studying overseas and on the modules/courses available to you, it may be possible. But, given that 30 of the 40 credits required for the Minor are scheduled for Stage 3, it is likely to be difficult to access all of the material during your year abroad. If you're enrolled in the ME, you may be able to take some of the Minor modules during Semester 2 of Stage 5, but they would not contribute to a Minor.

Q: If I'm taking the Minor, does this mean that I can't take MEEN30140 (Finance)?

A: MEEN30140 is a core Stage 3 module for the BE in Chemical & Bioprocess Engineering. Students who take the Minor will be able to take MEEN30140, either as a Stage 4, Semester 2 Elective - if you take the BE route, or a Stage 5, Semester 2 Option - if you take the ME route.

Q&A from the Information Session: BioChemE Minor

Q: Is the Biochemical Engineering Minor an 'add-on' that gives you an advantage in the bio/pharmaceutical industry or is it a specialisation that limits you?

A: The Biochemical Minor does not involve additional credits (i.e. both the BE in Chemical & Bioprocess Engineering and the BE in Chemical Engineering with Biochemical Engineering Minor require 240 credits), it is *not* an 'add-on'. In UCD, a Minor is a specialisation in a particular topic (i.e. Biochemical Engineering) within the framework of the relevant degree programme (i.e. Chemical Engineering). But it is *not* an entirely separate discipline. The Minor is not intended to restrict graduates! It is a route, unique in Ireland, to better preparing for Chemical Engineering careers in the biopharma sector, without diluting the underpinning core Chemical Engineering content.

QUESTIONS?

contact: patricia.kieran@ucd.ie