

# Engineering Biology, M Sc in Engineering

300 credits

Civilingenjör i teknisk biologi

6CTBI

Valid from: 2016 Autumn semester

**Determined by** 

Board of Studies for Chemistry, Biology and Biotechnology

**Date determined** 2016-01-19

# **Entry requirements**

Degree in Swedish Civilingenjör 300 hp och Teknologie master 120 hp



# Curriculum

# Semester 2 (Spring 2017)

| Course code | Course name                        | Credits | Level | Timetable<br>module | ECV |
|-------------|------------------------------------|---------|-------|---------------------|-----|
| Period 1    |                                    |         |       |                     |     |
| NBIA25      | Cell Biology                       | 6       | G1X   | 1/2                 | С   |
| TATA41      | Calculus in One Variable 1         | 6       | G1F   | 4                   | С   |
| TFYA46      | Engineering Project                | 6*      | G1X   | 3                   | С   |
| TGTU35      | Introduction to University Studies | 2*      | G1X   | -                   | V   |
| Period 2    |                                    |         |       |                     |     |
| NBIA23      | Microbiology                       | 6       | G1X   | 3/4                 | С   |
| TATA42      | Calculus in One Variable 2         | 6       | G1F   | 2                   | С   |
| TFYA46      | Engineering Project                | 6*      | G1X   | 1                   | С   |
| TGTU35      | Introduction to University Studies | 2*      | G1X   | -                   | V   |

### Semester 3 (Autumn 2017)

| Course<br>code | Course name                         | Credits | Level | Timetable<br>module | ECV |
|----------------|-------------------------------------|---------|-------|---------------------|-----|
| Period 1       |                                     |         |       |                     |     |
| TATA16         | Linear Algebra                      | 6*      | G1N   | 4                   | С   |
| TDDD87         | Programming and Problem Solving     | 6       | G1X   | 2                   | С   |
| TSTE92         | Electric Circuits                   | 6       | G1X   | 1                   | С   |
| Period 2       |                                     |         |       |                     |     |
| NBIB45         | Principles in Physiology and Ethics | 6       | G1F   | 1                   | С   |
| TATA16         | Linear Algebra                      | 6*      | G1N   | 3                   | С   |
| TFYA16         | Engineering Mechanics               | 6       | G1X   | 4                   | С   |



# Semester 4 (Spring 2018)

| Course code | Course name                           | Credits | Level | Timetable<br>module | ECV |
|-------------|---------------------------------------|---------|-------|---------------------|-----|
| Period 1    |                                       |         |       |                     |     |
| TAMS28      | Mathematical Statistics, First Course | 6       | G2X   | 4                   | С   |
| TATA83      | Calculus, several variables           | 6       | G1F   | 1                   | С   |
| TFYY55      | Physics                               | 6*      | G2X   | 2                   | С   |
| Period 2    |                                       |         |       |                     |     |
| TDDD74      | Databases for Bioinformatics          | 6       | G2X   | 4                   | С   |
| TFKE36      | Biochemistry 2                        | 6       | G2X   | 1/2                 | С   |
| TFYY55      | Physics                               | 6*      | G2X   | 3                   | С   |
| TPTE06      | Industrial Placement                  | 6       | G1X   | -                   | E   |

# Semester 5 (Autumn 2018)

| Course<br>code | Course name                                | Credits | Level | Timetable<br>module | ECV |
|----------------|--|---------|-------|---------------------|-----|
| Period 1       |  |         |       |                     |     |
| TFYA35         | Molecular Physics                          | 6       | G2X   | 4                   | С   |
| TSBB14         | Signal and Image Processing                | 6*      | G2X   | 3                   | С   |
| TVMB17         | Immunobiology and Immunological Techniques | 6       | G2X   | 1/2                 | С   |
| Period 2       |  |         |       |                     |     |
| TSBB14         | Signal and Image Processing                | 6*      | G2X   | 3                   | С   |
| TSRT03         | Biological Automatic Control               | 6       | G2X   | 4                   | С   |
| TVCB02         | Gene Technology and Molecular Genetics     | 6       | G2X   | 1/2                 | С   |



### Semester 6 (Spring 2019)

| Course<br>code | Course name                                       | Credits | Level | Timetable<br>module | ECV |
|----------------|---|---------|-------|---------------------|-----|
| Period 1       |   |         |       |                     |     |
| TBMT19         | Models in System Biology                          | 2       | G2F   | 3                   | С   |
| ТВМТ33         | System Biology and Modelling, Bachelor Project    | 16*     | G2E   | 3                   | С   |
| TFMT14         | Measurement Technology                            | 6       | G2X   | 2                   | С   |
| TVCB11         | Cellbiological Methodology                        | 6       | G2X   | 1/4                 | С   |
| Period 2       |   |         |       |                     |     |
| TBMT33         | System Biology and Modelling, Bachelor<br>Project | 16*     | G2E   | 2/3/4               | С   |

# Semester 7 (Autumn 2019)



| Course code | Course name                                   | Credits | Level | Timetable<br>module | ECV |
|-------------|---|---------|-------|---------------------|-----|
| Period 1    |   |         |       |                     |     |
| TFYA31      | Materials and Nanotechnology                  | 6*      | A1X   | 4                   | С   |
| TFYA47      | Surfaces and Interfaces                       | 6       | A1X   | 2                   | С   |
| TANA21      | Scientific Computing                          | 6       | G1F   | 3                   | C/E |
| TAOP88      | Engineering Optimization                      | 6       | G2F   | 1                   | C/E |
| TATM38      | Mathematical Models in Biology                | 6       | A1N   | 3                   | C/E |
| TBMT36      | Biomedical Optics                             | 6       | A1X   | 1                   | E   |
| TEAE01      | Industrial Economics, Basic Course            | 6       | G1X   | 2                   | E   |
| TGTU91      | Oral and Written Communication                | 6       | G1F   | 2                   | E   |
| THFR05      | Communicative French                          | 6*      | G1X   | 4                   | E   |
| THSP05      | Spanish                                       | 6*      | G1X   | 4                   | E   |
| THTY05      | German  | 6*      | G1X   | 4                   | E   |
| Period 2    |   |         |       |                     |     |
| TAMS41      | Statistical Modelling with Regression Methods | 6       | A1N   | 3                   | С   |
| TFYA31      | Materials and Nanotechnology                  | 6*      | A1X   | 1                   | С   |
| TBMI04      | eHealth: Aims and Applications                | 6       | G2F   | 2/4                 | C/E |
| TFYA30      | Supramolecular Chemistry                      | 6       | A1X   | 2                   | C/E |
| THFR05      | Communicative French                          | 6*      | G1X   | 4                   | E   |
| THSP05      | Spanish                                       | 6*      | G1X   | 4                   | E   |
| THTY05      | German  | 6*      | G1X   | 4                   | E   |
| TMMS07      | Biomechanics                                  | 6       | A1X   | 4                   | E   |



#### Specialisation: Industrial biotechnology and production

| Course<br>code | Course name                                   | Credits | Level | Timetable<br>module | ECV |
|----------------|---|---------|-------|---------------------|-----|
| Period 1       |   |         |       |                     |     |
| TANA21         | Scientific Computing                          | 6       | G1F   | 3                   | Е   |
| TAOP88         | Engineering Optimization                      | 6       | G2F   | 1                   | E   |
| TATM38         | Mathematical Models in Biology                | 6       | A1N   | 3                   | E   |
| TEAE01         | Industrial Economics, Basic Course            | 6       | G1X   | 2                   | E   |
| TGTU91         | Oral and Written Communication                | 6       | G1F   | 2                   | E   |
| THEN18         | English                                       | 6*      | G1X   | 4                   | E   |
| THFR05         | Communicative French                          | 6*      | G1X   | 4                   | E   |
| THSP05         | Spanish                                       | 6*      | G1X   | 4                   | E   |
| THTY05         | German  | 6*      | G1X   | 4                   | E   |
| TKMJ31         | Biofuels for Transportation                   | 6       | A1N   | 1                   | E   |
| Period 2       |   |         |       |                     |     |
| TAMS41         | Statistical Modelling with Regression Methods | 6       | A1N   | 3                   | С   |
| TFYA32         | Industrial Biotechnology                      | 6       | A1X   | 1                   | С   |
| TFKE30         | Analytical Chemistry                          | 6       | G1X   | 4                   | E   |
| THEN18         | English                                       | 6*      | G1X   | 4                   | E   |
| THFR05         | Communicative French                          | 6*      | G1X   | 4                   | E   |
| THSP05         | Spanish                                       | 6*      | G1X   | 4                   | E   |
| THTY05         | German  | 6*      | G1X   | 4                   | E   |
| TMMS07         | Biomechanics                                  | 6       | A1X   | 4                   | E   |



# Semester 8 (Spring 2020)

| Course<br>code | Course name                                       | Credits | Level | Timetable<br>module | ECV |
|----------------|---|---------|-------|---------------------|-----|
| Period 1       |   |         |       |                     |     |
| TFTB34         | Biosensor Technology                              | 6       | A1X   | 3                   | С   |
| TFTB35         | Surface Science                                   | 6       | A1X   | 1                   | С   |
| TFTB43         | Materials in Medicine (CDIO-Project)              | 6*      | A1X   | 2                   | C/E |
| TBMI26         | Neural Networks and Learning Systems              | 6       | A1N   | 2                   | E   |
| TDDE10         | Object Oriented Programming in Java               | 6       | G2F   | 1                   | E   |
| TFYA85         | Alternative Energy Sources and their Applications | 6       | G2X   | 4                   | E   |
| TGTU94         | Technology and Ethics                             | 6       | G1F   | 1                   | E   |
| THEN18         | English   | 6*      | G1X   | 4                   | E   |
| TMQU46         | Quality Management                                | 6       | G2X   | 4                   | E   |
| TSRT07         | Industrial Control Systems                        | 6       | A1N   | 2                   | Е   |
| Period 2       |   |         |       |                     |     |
| TFTB38         | Imaging and Ubiquitous Biosensing                 | 6       | A1F   | 1                   | С   |
| TEIO95         | eHealth: Innovation and Entrepreneurship          | 6       | G2F   | 2/4                 | C/E |
| TFTB43         | Materials in Medicine (CDIO-Project)              | 6*      | A1X   | 2                   | C/E |
| TBME08         | Biomedical Modeling and Simulation                | 6       | A1N   | 3                   | Е   |
| TFMT19         | Chemical Sensor Systems                           | 6       | A1X   | 4                   | E   |
| TGTU95         | Philosophy of Science and Technology              | 6       | G1F   | 4                   | E   |
| THEN18         | English   | 6*      | G1X   | 4                   | Е   |



#### Specialisation: Industrial biotechnology and production

| Course<br>code | Course name   | Credits | Level | Timetable<br>module | ECV |
|----------------|---|---------|-------|---------------------|-----|
| Period 1       |   |         |       |                     |     |
| TFTB32         | Design of Biotechnical Process and Production Systems, Project Course | 6*      | A1X   | 1                   | С   |
| TMMT03         | Biotechnical Production Systems                                       | 6       | A1X   | 3                   | С   |
| TMQU46         | Quality Management  | 6       | G2X   | 4                   | С   |
| TBMI26         | Neural Networks and Learning Systems                                  | 6       | A1N   | 2                   | E   |
| TDDE10         | Object Oriented Programming in Java                                   | 6       | G2F   | 1                   | E   |
| TFYA85         | Alternative Energy Sources and their Applications                     | 6       | G2X   | 4                   | E   |
| TGTU94         | Technology and Ethics   | 6       | G1F   | 1                   | E   |
| TKMJ15         | Environmental Management Strategies                                   | 6       | G1F   | 3                   | E   |
| TSRT07         | Industrial Control Systems  | 6       | A1N   | 2                   | E   |
| Period 2       |   |         |       |                     |     |
| NKED20         | Drug Discovery and Pharmaceutical Development                         | 6       | A1X   | 2                   | С   |
| TFTB32         | Design of Biotechnical Process and Production Systems, Project Course | 6*      | A1X   | 1                   | С   |
| TFTB39         | Biotechnology Manufacturing   | 6       | A1X   | 3/4                 | С   |
| TGTU95         | Philosophy of Science and Technology                                  | 6       | G1F   | 4                   | E   |

#### Semester 9 (Autumn 2020)



| Course<br>code | Course name                                  | Credits | Level | Timetable<br>module | ECV |
|----------------|--|---------|-------|---------------------|-----|
| Period 1       |  |         |       |                     |     |
| TFTB40         | Biomedical Materials                         | 6       | A1X   | 1                   | С   |
| TAMS81         | Experimental Design                          | 6       | A1F   | 4                   | C/E |
| TBMI28         | eHealth Project                              | 12*     | A1F   | 2/4                 | C/E |
| TEIO94         | Entrepreneurship and Idea Development        | 6*      | G2X   | 3                   | C/E |
| TSRT92         | Modelling and Learning for Dynamical Systems | 6       | A1X   | 3                   | C/E |
| TDDE18         | Programming C++                              | 6*      | G2F   | 2                   | E   |
| TEAE01         | Industrial Economics, Basic Course           | 6       | G1X   | 2                   | E   |
| TFTB46         | Advanced Bioinformatics                      | 6       | A1X   | 2                   | E   |
| TFYA43         | Nanotechnology                               | 6       | G2X   | 3                   | E   |
| TKMJ24         | Environmental Engineering                    | 6       | G1N   | 1                   | E   |
| TMQU03         | Quality Management and Engineering           | 6       | G2X   | 2                   | E   |
| Period 2       |  |         |       |                     |     |
| TFTB33         | Microsystems and Nanobiology                 | 6       | A1X   | 3                   | С   |
| TBMI28         | eHealth Project                              | 12*     | A1F   | -                   | C/E |
| TEIO94         | Entrepreneurship and Idea Development        | 6*      | G2X   | 4                   | C/E |
| TBMT01         | Biomedical Signal Processing                 | 6       | A1F   | 1                   | Е   |
| TDDE18         | Programming C++                              | 6*      | G2F   | 1                   | E   |
| TFKE30         | Analytical Chemistry                         | 6       | G1X   | 4                   | Е   |
| TFYA32         | Industrial Biotechnology                     | 6       | A1X   | 1                   | E   |
| TFYA37         | Soft Condensed Matter Physics                | 6       | A1X   | 1                   | E   |
| TGTU04         | Leadership                                   | 6       | G2X   | 2                   | E   |
| TGTU49         | History of Technology                        | 6       | G1F   | 3                   | Е   |
| TVCB13         | Stem Cell Engineering                        | 6       | A1X   | 3                   | E   |



| Course<br>code | Course name                                  | Credits | Level | Timetable<br>module | ECV |
|----------------|--|---------|-------|---------------------|-----|
| Period 1       |  |         |       |                     |     |
| TAMS81         | Experimental Design                          | 6       | A1F   | 4                   | С   |
| TEIO94         | Entrepreneurship and Idea Development        | 6*      | G2X   | 3                   | С   |
| TBMT57         | Biomedical Optics                            | 6       | A1F   | 1                   | E   |
| TDDE18         | Programming C++                              | 6*      | G2F   | 2                   | E   |
| TEAE01         | Industrial Economics, Basic Course           | 6       | G1X   | 2                   | E   |
| TEIO90         | Innovation Management                        | 6       | A1X   | 2                   | E   |
| TFTB46         | Advanced Bioinformatics                      | 6       | A1X   | 2                   | Е   |
| TFYA47         | Surfaces and Interfaces                      | 6       | A1X   | 2                   | E   |
| TKMJ24         | Environmental Engineering                    | 6       | G1N   | 1                   | E   |
| TRTE18         | The Biogas Process                           | 6       | A1N   | 1                   | E   |
| TSRT92         | Modelling and Learning for Dynamical Systems | 6       | A1X   | 3                   | Е   |
| TVMB26         | Molecular Virology                           | 6       | A1X   | 1                   | E   |
| Period 2       |  |         |       |                     |     |
| TEIO94         | Entrepreneurship and Idea Development        | 6*      | G2X   | 4                   | С   |
| TAOP61         | Optimization of Realistic Complex Systems    | 6       | A1N   | 3                   | E   |
| TBMT01         | Biomedical Signal Processing                 | 6       | A1F   | 1                   | Е   |
| TDDE18         | Programming C++                              | 6*      | G2F   | 1                   | E   |
| TGTU04         | Leadership                                   | 6       | G2X   | 2                   | E   |
| TGTU49         | History of Technology                        | 6       | G1F   | 3                   | E   |
| TMQU12         | Lean Production                              | 6       | A1X   | 2                   | E   |
| TVCB13         | Stem Cell Engineering                        | 6       | A1X   | 3                   | E   |
| _              |  |         | _     |                     |     |

#### Semester 10 (Spring 2021)

| Course<br>code | Course name                      | Credits | Level | Timetable<br>module | ECV |
|----------------|----------------------------------|---------|-------|---------------------|-----|
| Period 1       |                                  |         |       |                     |     |
| TQXX33         | Degree project - Master's Thesis | 30*     | A1X   | -                   | С   |
| Period 2       |                                  |         |       |                     |     |
| TQXX33         | Degree project - Master's Thesis | 30*     | A1X   | -                   | С   |



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#### Specialisation: Industrial biotechnology and production

| Course<br>code | Course name                      | Credits | Level | Timetable<br>module | ECV |
|----------------|----------------------------------|---------|-------|---------------------|-----|
| Period 1       |                                  |         |       |                     |     |
| TQXX33         | Degree project - Master's Thesis | 30*     | A1X   | -                   | С   |
| Period 2       |                                  |         |       |                     |     |
| TQXX33         | Degree project - Master's Thesis | 30*     | A1X   | -                   | С   |



ECV = Elective / Compulsory /Voluntary
\*The course is divided into several semesters and/or periods