

Bioprocess engineering

Bioprocess engineering, also **biochemical engineering**, is a specialization of chemical engineering or biological engineering. It deals with the design and development of equipment and processes for the manufacturing of products such as agriculture, food, feed, pharmaceuticals, nutraceuticals, chemicals, and polymers and paper from biological materials & treatment of waste water. Bioprocess engineering is a conglomerate of mathematics, biology and industrial design, and consists of various spectrums like designing of bioreactors, study of fermentors (mode of operations etc.). It also deals with studying various biotechnological processes used in industries for large scale production of biological product for optimization of yield in the end product and the quality of end product. Bioprocess engineering may include the work of mechanical, electrical, and industrial engineers to apply principles of their disciplines to processes based on using living cells or sub component of such cells.^[1]

Colleges and universities

- Auburn University^[2]
- University of Georgia (Biochemical Engineering)^[3]
- Michigan Technological University^[4]
- McMaster University^[5]
- Technical University of Munich^[6]
- University of Natural Resources and Life Sciences, Vienna^[7]
- Keck Graduate Institute of Applied Life Sciences (KGI Amgen Bioprocessing Center)^{[8][9]}
- Queensland University of Technology (QUT)
- University of Cape Town (Centre for Bioprocess Engineering Research)^[10]
- SUNY-ESF (Bioprocess Engineering Program)
- Université de Sherbrooke
- University of British Columbia
- UC Berkeley
- UC Davis
- Savannah Technical College
- University of Iowa (Chemical and Biochemical Engineering)
- University of Minnesota (Bioproducts and Biosystems Engineering)
- East Carolina University
- Jacob School of Biotechnology and Bioengineering, Allahabad, India
- Indian Institute of Technology, Varanasi
- Indian Institute of Technology Kharagpur
- Institute of Chemical Technology, Mumbai
- Jadavpur University
- Universidade Federal de Itajubá (UNIFEI)



Bioreactor

- [Universiti Malaysia Kelantan \(UMK\)](#)
- [Universidade Federal de São João del Rei-UFSJ](#)
- [Federal University of Technology – Paraná](#)
- [Universidade Federal do Paraná-UFPR](#)
- [São Paulo State University](#)
- [Universidade Federal do Pará-UFPA](#)
- [University of Louvain \(UCLouvain\)](#)^{[11][12]}
- [University of Stellenbosch](#)
- [North Carolina Agricultural and Technical State University](#)
- [North Carolina State University](#)
- [Virginia Tech](#)
- [Ege University/Turkey \(Department of Bioengineering\)](#)^[13]
- [National University of Costa Rica](#)
- [University of Brawijaya \(Department of Agricultural Engineering\)](#)^{[14][15]}
- [University of Indonesia](#)
- [University College London \(Department of Biochemical Engineering\)](#)^[16]
- [Universiti Teknologi Malaysia](#)^[17]
- [Universiti Kuala Lumpur Malaysian Institute of Chemical and Bioengineering Technology](#)^[18]
- [University of Zagreb, Faculty of food technology and biotechnology, Croatia](#)^[19]
- [Villanova University](#)^[20]
- [Wageningen University](#)^[21]
- [University College Dublin](#)
- [Obafemi Awolowo University](#)^[22]
- [University of Birmingham](#)
- [Universidad Autónoma de Coahuila \(Facultad de Ciencias Biológicas\)](#)
- [Silpakorn University Thailand](#)
- [Universiti Malaysia Perlis \(UniMAP\), School of Bioprocess Engineering \(SBE\)](#)
- [Berlin University of Technology, Chair of Bioprocess Engineering](#)
- [University of Queensland](#)
- [Technical University of Denmark, Department of Chemical and Biochemical Engineering, BioEng Research Centre](#)^[23]
- [South Dakota School of Mines and Technology](#)^[24]
- [National Institute of Applied Science and Technology Tunis \(Industrial Biology Engineering Program\)](#)

See also

- [Agricultural engineering](#)
- [Biochemical engineering](#)
- [Bioprocess](#)

- Bioproducts
- Bioproducts engineering
- Biosystems engineering
- Cell therapy
- Downstream (bioprocess)
- Food engineering
- Microbiology
- Physical chemistry
- Unit operations
- Upstream (bioprocess)
- Use of biotechnology in pharmaceutical manufacturing

References

1. Bioprocess engineering- Basic concepts; Shular, Michael A., Kargi, Fikret, Prentice Hall of India, 2005
2. <http://bulletin.auburn.edu/undergraduate/samuelginncollegeofengineering/departments/biosystems/>
3. "Undergraduate Programs in the School of Chemical, Materials, and Biomedical Engineering" (<http://www.engineering.uga.edu/schools/cmbe/undergraduate/>)
4. "Minors - Chemical Engineering - Michigan Tech" (<http://www.mtu.edu/chemical/undergraduate/minors/>)
5. "McMaster University, Faculty of Engineering: Biotechnology" (<https://web.archive.org/web/20160920032906/http://learningin3d.ca/biotechnology.html>). Archived from the original (<http://learningin3d.ca/biotechnology.html>) on 2016-09-20. Retrieved 2016-09-13.
6. [http://portal.mytum.de/studium/studiengaenge/bioprosesstechnik_bachelor/index_html?](http://portal.mytum.de/studium/studiengaenge/bioprosesstechnik_bachelor/index_html?selectedTypes=&selectedTGs=&selectedOEs=)
7. <http://www.boku.ac.at/lehre/studabt/studien/master/h066418/?selectedTypes=&selectedTGs=&selectedOEs=>
8. "Amgen Bioprocessing Center (ABC)" (<https://web.archive.org/web/20140704035758/http://www.kgi.edu/faculty-and-research/kgi-centers/amgen-bioprocessing-center.html>). Archived from the original (<http://www.kgi.edu/faculty-and-research/kgi-centers/amgen-bioprocessing-center.html>) on 2014-07-04. Retrieved 2014-06-28.
9. "Bioprocessing" ([https://web.archive.org/web/20150323045145/http://www.kgi.edu/academic-programs/master-of-bioscience-\(mbs\)/career-majors/bioprocessing.html](https://web.archive.org/web/20150323045145/http://www.kgi.edu/academic-programs/master-of-bioscience-(mbs)/career-majors/bioprocessing.html)). Archived from the original ([http://www.kgi.edu/academic-programs/master-of-bioscience-\(mbs\)/career-majors/bioprocessing.html](http://www.kgi.edu/academic-programs/master-of-bioscience-(mbs)/career-majors/bioprocessing.html)) on 2015-03-23. Retrieved 2016-09-02.
10. "Welcome" (<http://www.ceber.uct.ac.za/>).
11. Paris, Bernard. "UCL - COURSES DESCRIPTION FOR 2013-2014" (<http://www.uclouvain.be/en-cours-2013-LBIRC2108.html>).
12. Evrard, Réginald. "Faculty of Bioscience Engineering" (<https://web.archive.org/web/20130517102717/http://www.uclouvain.be/en-agro.html>). Archived from the original (<http://www.uclouvain.be/en-agro.html>) on 2013-05-17.
13. <http://muhfak.ege.edu.tr/tr/biyomuhendislik/>
14. "Brawijaya University" (<http://ub.ac.id/>).
15. "Bioprocess Technology Study Program - Department of Agricultural Engineering - Faculty of Agricultural Technology" (<http://tbp.tp.ub.ac.id/>).
16. "Biochemical Engineering" (<https://www.ucl.ac.uk/biochemeng/>).
17. "Archived copy" (<https://web.archive.org/web/20131010100014/http://www.cheme.utm.my/cheme/index.php/undergraduateprograms/bachelor-of-engineering-chemical-bioprocess>). Archived from the original (<http://www.cheme.utm.my/cheme/index.php/undergraduateprograms/bachelor-of-engineering-chemical-bioprocess>) on 2013-10-10. Retrieved 2014-03-02.
18. "UniKL MICET" (<http://www.micet.unikl.edu.my/>).