



BB2480 Energi och miljö 7,5 hp

Energy and Environment

När kurs inte längre ges har student möjlighet att examineras under ytterligare två läsår.

Fastställande

Kursplan för BB2480 gäller från och med VT11

Betygsskala

A, B, C, D, E, FX, F

Utbildningsnivå

Avancerad nivå

Huvudområden

Bioteknik

Särskild behörighet

För fristående studerande krävs:

Totalt 20 högskolepoäng (hp) inom biokemi, mikrobiologi och genetik/molekylärbiologi.
30 högskolepoäng (hp) kemi, samt totalt 20 högskolepoäng (hp) inom matematik och programmering eller motsvarande, samt dokumenterade kunskaper i engelska motsvarande Engelska B

För programstudenter vid KTH krävs:

Undervisningspråk

Undervisningspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

Lärandemål

General metabolism and physiology

- describe and understand how specific organisms in anaerobic industrial and environmental accumulate end products from a specific carbon source. Describe by using metabolic schemes how energy and cofactors are regenerated.
- understand and describe the basis for the carbon and nitrogen cycling in the nature from the point of the microorganisms and their energy metabolism
- describe the processes of biofilm formation and quorum sensing and show why these are important in industrial and environmental processing by giving and explaining relevant examples
- describe the mechanism of a chosen metabolic process into large detail

Fuels

- describe the processes for biofuel production that are technically developed today with respect to raw material, microorganism/metabolism and conversion process.
- speculate on benefits and drawbacks based on different sources of biomass presently used but also of alternative and future sources
- discuss the pro's and con's of the bioprocesses in relation to traditional fuels based on known facts on total yields and energy content but also side effects
- understand the CO₂ emission of the fuels and relate this to the carbon cycling
- know the basic outline of the different fuel generations and know of the present status with respect to the research in the field
- be able to make recommendations with respect to the creation of a sustainable society
- understand the principles of the microbiology of Archeae: methanogens

Sustainable production of chemicals and biomaterials

- know of common chemicals and materials that are produced by microbial processes and some of their characteristic properties.
- be able to outline the cell type used, the appropriate metabolism and the control of this.
- understand the basic outline of Life Cycle Analysis (LCA)

Food and beverages

- give examples of fermented food and understand the microbial background to the products
- describe into metabolic detail how fermented beverages are produced
- describe the basic principles to how food is spoiled and concepts how to avoid this
- calculate sterilisation times
- understand the concept of probiotics and give examples on particular products

Waste treatment

- describe the principles for soil sanitation and composting, discern possible problems and suggest measures to mitigate them
- describe the general principles which are used today to purify waste water with respect to both the aerobic and anaerobic process parts with emphasis is on carbon and nitrogen removal.
- know of the limitations and the degree of purification that can be achieved
- be able to relate the waste processes to emission of greenhouse gases

Microbial mining

- understand and describe the prerequisites to when microbial mining can be used in correlation to conventional mining techniques
- understand the metabolism of the organisms which can be used for the purpose and their preferred substrates and the coupling to chemical reactions in this process
- understand and describe the principles to how mining is performed in the large scale
- understand the principles of the microbiology of Archeae: extremophiles

Kursinnehåll

Kursupplägg

Lectures, 5 credits

Literature study, 2,5 credits

Examination

- SEM1 - Seminarium, 2,5 hp, betygsskala: P, F
- TEN1 - Tentamen, 5,0 hp, betygsskala: A, B, C, D, E, FX, F

Examinator beslutar, baserat på rekommendation från KTH:s handläggare av stöd till studenter med funktionsnedsättning, om eventuell anpassad examination för studenter med dokumenterad, varaktig funktionsnedsättning.

Examinator får medge annan examinationsform vid omexamination av enstaka studenter.

Övriga krav för slutbetyg

- One final examination
- Participation in mandatory seminars
- Give one seminar presentation

Etiskt förhållningssätt

- Vid grupparbete har alla i gruppen ansvar för gruppens arbete.
- Vid examination ska varje student ärligt redovisa hjälp som erhållits och källor som använts.
- Vid muntlig examination ska varje student kunna redogöra för hela uppgiften och hela lösningen.