



HÖGSKOLAN I GÄVLE

Robotics 7.5 cr

Robotik 7,5 hp

Set by Faculty of Engineering and Sustainable Development

Version

Set at

Valid from

5/27/19

HT2019

| | |
|----------------------------|------------------------|
| Level | A1N |
| Education level | Second cycle |
| Course identifier | EEA003 |
| Credits | 7.5 cr |
| Main field of study | Electronics |
| Subject group | Electrical Engineering |
| Disciplinary domain | Technology 100.0 % |

Learning outcomes After completion of the course the student shall be able to

Knowledge and understanding

1. describe the key characteristics and historical development of industrial and service robots
2. explain the various methods for robot mobility
3. explain the role of robots in modern society and the keys issues for their deployment in different sectors of society

Skills and abilities

4. perform simple tasks such as holding, lifting, transporting and placement of work-pieces at desired locations using robots
5. explain and calculate kinematic and inverse transformations in various multi-jointed robot configurations
6. describe key areas in designing complete robot systems and the limits of current technology in each area
7. perform detailed calculations for calculating dynamics and control requirements of multi-linked robots

Values and attitudes

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|--------------------------------|--|--------|---------------------|------|-----------|------|-------------|--------|-----------|
| Course content | <p>8. identify critical factors in assessing conceptual designs in making final design decisions.</p> <p>Overview of robotics and its history, robot components/ modularity, industrial and non-industrial perspectives</p> <p>Kinematics: Definitions, transformations matrices, forward and inverse kinematics</p> <p>Robot system design: Specifications, sensors, actuators, end effectors, user interface</p> <p>Dynamics and control: calculation of forces and torques, Newton's recursive method, Gauss Energy method of dynamics</p> <p>Mobile robots: Localisation, Navigation and Path planning</p> <p>Robot applications: Research, development and trends concerning modern robotic systems (industrial and service robots)</p> | | | | | | | | |
| Teaching | Lectures and exercises | | | | | | | | |
| Prerequisites | 180 credits completed courses within Electronics including Control Theory 7.5 credits and Programming Methodology, 7.5 credits or equivalent | | | | | | | | |
| Examination | <p>Written Examination and assignments</p> <p>Module 0010 Written Examination 4 credits, examines learning outcomes 1, 2, 3, 5, 6 and 8, grades A-F</p> <p>Module 0020 Assignments 3.5 credits, examines learning outcomes 4, 7 and 8, grades Pass, Fail</p> | | | | | | | | |
| Grade | A, B, C, D, E, Fx, F | | | | | | | | |
| Other regulations | Degree Criteria for final grade will be given by course responsible or examiner latest at the beginning of the course. | | | | | | | | |
| Sustainable environment | A minor part of the course content deals with sustainable development. | | | | | | | | |
| Module | <table border="0" style="width: 100%;"> <tr> <td style="width: 15%;">0010</td> <td style="width: 60%;">Written Examination</td> <td style="width: 15%; text-align: right;">4 cr</td> <td style="width: 10%;">Grade: AF</td> </tr> <tr> <td>0020</td> <td>Assignments</td> <td style="text-align: right;">3.5 cr</td> <td>Grade: UG</td> </tr> </table> | 0010 | Written Examination | 4 cr | Grade: AF | 0020 | Assignments | 3.5 cr | Grade: UG |
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