

TKB214171

Robotics for Biomedical Application

Robotika Biomedis

BASIC INFORMATION

Course Credit [sks]	3 / 150 minutes per Week
Course Type	Elective
Course Classification	Engineering Topics
Prerequisites	-

STUDENT AND LEARNING OUTCOMES

Covered Student Outcomes

Development of Engineering Solution (b)	Modern Tools Utilization (e)
Engineering Design (c)	Choose Student Outcome

Learning Outcomes

- LO1** Students are able to understand problems in the field of robotics.
[CPMK 1: Mahasiswa memahami permasalahan dalam bidang robotika]
- LO2** Students are able to apply kinematic forward and inverse.
[CPMK 2: Mahasiswa mampu menerapkan kinematika maju dan mundur]
- LO3** Students are able to apply mobile robots and manipulator.
[CPMK 3: Mahasiswa mampu menerapkan robot bergerak dan manipulator]
- LO4** Students are able to design robotic simulation in biomedical application.
[CPMK 4: Mahasiswa mampu merancang simulasi robot dalam penerapan biomedis]

COURSE DESCRIPTION

The course discusses robotics that include robotic elements, various robot structures, robot drives and their controls, kinematics and robot dynamics, robot trajectory generation, robot programming, and the introduction of intelligent robots.

DESKRIPSI MATAKULIAH

Matakuliah ini membahas tentang robotika yang meliputi elemen robotika, berbagai struktur robot, penggerak robot dan kendalinya, kinematika dan dinamika robot, pembangkitan lintasan robot, pemrograman robot, dan pengenalan robot cerdas.

TOPICS

1. Robotics concept and problems [Konsep Robotika dan Permasalahannya]
2. Forward and invers kinematic [Kinematika Maju dan Mundur]
3. Robotics manipulator [Manipulator Robot]
4. Dynamics and control [Dinamika dan Kendali]
5. Trajectory generation [Pembangkitan lintasan]
6. Mobile robotics [Robot Bergerak]
7. Bayesian inference for robotics perception [Inferensi Bayesian untuk Persepsi Robot]
8. Localization and Mapping [Lokalisasi dan Pemetaan]
9. Path planning [Perencanaan jalur]
10. Simulation and robotic middleware frameworks [Simulasi dan robotic middleware frameworks]

REFERENCES

1. Craig, J.J. 1989, Introduction to Robotics: Mechanics and Control, AddisonWesley Pub Co,
2. KoivoJ., 1989, Fundamentals for Control of Robotic Manipulators, John Wiley & Sons.
3. Martin F.G., 2001, Robotic Explorations: A Hands-on Introduction to Engineering, Prentice-Hall
4. Rehg, J. A., 2000, Introduction to Robotics in CIM Systems, Prentice Hall

5. Saeed B. Niku, 2002, Introduction to Robotics: Analysis, Systems, Applications, Prentice-Hall
6. Fu, K. S. Gonzalez, R.C. Lee, C.S.G, 1989, Robotics, Control, Sensing, Vision, and Intellegence, McGraw-Hill
7. Groover M.P.dkk, 1987, Industrial Robotic, McGraw-Hill
8. Nourbakhsh, I. R., 2021, Introduction to Autonomous Mobile Robots, MIT Press
9. Thrun, S., Burgard, W., Probabilistic Robotics, MIT Press