Project code:

OFFLINE PROGRAMMING

OF INDUSTRIAL ROBOT

*A mid-term project report submitted for*

BACHELOR OF TECHNOLOGY PROJECT (PART-I)

IN

MECHANICAL ENGINEERING

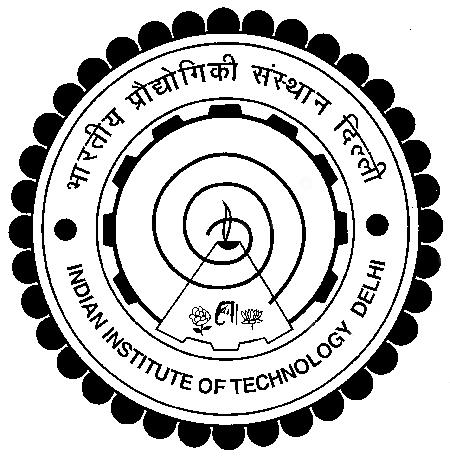
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**ABSTRACT**

Online teaching methods to program Industrial Robots contribute significantly to the down-time of the robot, and hence restrict its productivity. Off-line Programming is the key technology to solve this problem. Offline programming (OLP) is a robot programming method that does not interfere with production as the programme for the robot is written outside the production process on an external PC.

This B.Tech Project is aimed at developing new software and/ or integrating OLP modules into existent softwares, like SimMechanics and RoboAnalyzer.

Apart from stating the objectives of the project, this report chronicles the methodology adopted in the initial phase of the project, which includes familiarizing oneself with the above softwares, learning and implementing path planning algorithms, and doing inverse kinematics and dynamics of a basic two link robot, all of which are essential to understand before we proceed to make any software.

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# Nomenclature

# List of Abbreviations

# List of Symbols

**CHAPTER 1**

**INTRODUCTION**

It is now a commonly known fact that many industrial processes can be performed by robots. Moreover, robots prove to be extremely useful when the task is monotonous or hazardous. Industrial robots are also employed where high precision or quick action is required.

The first industrial robot was installed in 1961, and was used in the General Motors Assembly line at the Inland Fisher Guide Plant in Ewing Township, New Jersey. Since then, there have been considerable advancements in the field of robotics, all aimed to increase precision and decrease cycle time.

Traditional industrial robots are taught or controlled online, i.e. the robots ‘learn’ their job while on the machining or assembly line. This obviously leads to wastage of time, and the robot isn’t fully utilized (some amount of time is spent on training or controlling the robot, rather than making the robot work for the whole time), hence bringing down its productivity. Offline programming technique is the key to solving this problem.

Off-line programming (OLP) is a robot programming method where the robot program is created independent from the actual robot cell. The robot program is then uploaded to the real industrial robot for execution. In off-line programming, the robot cell is represented through a graphical 3D model in a simulator.

**CHAPTER 2**

**LITERATURE REVIEW**

Xxxxxx..............Should not exceed two pages.......................................................xxxx

Xxxxxx..............Should not be less than one and a half pages................................xxxx

xxxx......Use Font, Font Size, Line Spacing and indentation as specified here..........xxxx

**Times New Roman 12 pt 1.5 line spacing**

xxxx......Mention all references in [] square brackets starting from [1] and so on......xxxx

Xxxxxx..............Page 2 of literature review.......................................................xxxx

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Xxxxxx..............The last paragraph of literature review should constitute a brief defence of your objectives..............................................xxxx

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**CHAPTER 3**

**OBJECTIVES**

The objective of the present work is to xxxx...should not exceed one page..............xxxx

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* xxxxx..Clearly state all objectives of your work....xxxx
* xxxxx...Students are advised to give utmost importance to this section as...xxxx
* xxxxx... they will be primarily defending this in mid term presentation....xxxx

xxxx-----In this paragraph of not more than 5-6 lines, please briefly describe the methodology you envisage to meet your objectives------xxxx

**CHAPTER 4**

**PROGRESS SUMMARY AND RESULTS**

Xxxxxx....Should not exceed three pages including any graphs, images, tables etc...xx

xxxx......Use Font, Font Size, Line Spacing and indentation as specified here..........xxxx

**Times New Roman 12 pt 1.5 line spacing**

xxxx......Please include only work done till date in this section......xxxx

xxxx......All tables, figures etc should be given title suitably below the table or image as specified below....xxxx

Table 1: Xxxxxx

Fig.1: Xxxxx

Xxxxxx....Page 2 of Progress Summary........xxxxxxxxxxx

Xxxxxx....Page 3 of Progress Summary........xxxxxxxxxxx

**CHAPTER 5**

**CONCLUSIONS & REMAINING WORK**

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xxxx......Preferably please provide all conclusions in bulleted form.........xxxx

**GANTT CHART**

Xxxxxx....Please provide the Gantt Chart for the semester...... xxxxxxxxx

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| Work Elements | Aug  1-15 | Aug  15-31 | Sept  1-15 | Sept  15-30 | Oct  1-15 | Oct  15-31 | Nov  1-15 | Nov  15-30 |
| Literature review |  |  |  |  |  |  |  |  |
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**REFERENCES**

Please provide list of references strictly as shown below.

Examples:   
Reference to a journal publication:

J. F. Fuller and K. J. Roesler, "Influence of harmonics on power distribution system protection," IEEE Trans. on Power Delivery, Vol. 3, No 2, Apr. 1988, pp. 549-557.

Reference to a conference publication:

[5] J. F. Fuller and K. J. Roesler, "Influence of harmonics on power distribution system protection," IEEE-PES Conference on Power Quality, held at IIT Bombay, 20-23 Dec. 2003, pp. 549-557.

Reference to a book:

[21] E. Clarke, Circuit Analysis of AC Power Systems, Vol. I. 2nd ed , New York: Wiley Publications, 1950, p. 81.

###### Reference to web sites

[22] www. doe.hov.org/fundamental Series Item Power Quality and Harmonics.htm (as on 23-3-07)