



**One-week GIAN course  
on  
ADVANCED SCIENTIFIC PROCESS PLANNING**



### Overview

Process planning is the main link that connects design and manufacturing. Thus, it is a very important step that would greatly influence the manufacturing outcome of the product. Typical process planner has a large number of years of experience in the process, because process planning requires considerable amount of information and decision making in order to come to an optimum process plan such as:

- An ability to interpret engineering drawings
- Knowledge of materials for manufacture
- Knowledge of manufacturing processes
- Knowledge of jigs and fixtures
- An ability to use reference material, for example, manufacturer, machining & tooling data, etc.
- Knowledge of the relative costs of materials, processes and tooling
- An ability to calculate manufacturing parameters and costs
- Knowledge of inspection/QA procedures and specifications

Process planner would have to consider all this information and take a number of decisions along the route in order to achieve a low-cost process plan. However, the planner will have difficulty to include all the information because of the human limitations. The traditional process planners often reach their exalted position based on the years of experience they

gain in the shop and at the planning level. Thus, process planning is often seen as an art rather than science. However, with the rapid developments that are taking place in technologies, the experience itself will not be sufficient for process planning. It is necessary to incorporate sufficient scientific principles so that optimum process plans could be developed all the time by incorporating past data.

This course is aiming to put the scientific basis for process planning, which is currently missing in most of the process planning research and teaching. By collating the large amount of literature that is already presented by the researchers in journals and textbooks, the team will be presenting a very systematic and scientific decision process at every stage of process planning. The course will present all the algorithms, the data and the method of scientific process planning. This will be supplemented by practical examples so that the participants will be able to gain proper knowledge as to the methods of applying the principles provided.

With the experience gained in the course it would be possible to develop computer aided process planning methods where the many technologies that are presented in the program could be incorporated. In fact, many of the concepts presented can provide the participants for automating the process by adding their specific data along with the data provided in the course. Attending this course will be of great benefit to the participants by familiarizing themselves with the state of the art in Energy Technologies and planning long-term research programmes.

## Objectives

The course will provide scientific basis for each stage of the process planning so that automatic process planning could be achieved with minimum inputs from the user. The objectives of the course therefore are as follows:

1. Importance of geometric dimensioning and tolerance of production drawing and how that will affect the process selection process
2. Part modification taking the design for manufacturability and assembly into account. Computerized solutions for DFMA
3. Systematic rule based selection of basic manufacturing process and secondary operations of a part based on the constraints imposed in the part drawing
4. Determination of production tolerances and setting dimensions that ensure execution of the design tolerances, while choosing production dimensions for reasons of commodity and capability of manufacturing machinery
5. Scientific procedures for the sequencing of operations as a function of priorities imposed by accuracy and technological constraints. Grouping of elementary operations on the same machine so that operation time will be reduced, while respecting accuracy requirements (tolerance charting)
6. Linking of all the different elements of the process planning system so that complete process plan could be developed starting from the part print along with all the documentation

| Course Contents  |  |
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| <b>Date</b><br>May<br>7 <sup>th</sup> - 11 <sup>th</sup> ,<br>2018 | Day 1  |
|  | Day 2  |
|  | Day 3  |
|  | Day 4  |
|  | Day 5  |
|  | Date of Examination: May 11 <sup>th</sup> , 2018 |

**Lecture**

Introduction – Introduction to Manufacturing organization and strategy, Planning activities and product design, Geometric Dimensioning and Tolerancing and its relation to planning, Drawing interpretation and Engineering communication, Identifying critical processing factors

**Tutorial**

Laboratory tutorial – Example products and their interpretation from planning point of view

**Lecture**

Design for Manufacturing and Assembly, Material selection from the processing point of view, Manufacturing Processes and their capability, Production equipment for specific processes. Factors in equipment selection

**Tutorial**

Laboratory tutorial – Practice examples using PRIMA

**Lecture**

Process parameters: Factors affecting speeds, feeds and depth of cut. Surface cutting speeds. Use of handbook data, Determine the type of operation, Process and operations sequencing. Machine selection method. Tooling for specific production equipment

**Tutorial**

Laboratory tutorial – Process parameter selection using handbooks

**Lecture**

From design to manufacture, documenting the process plan. Planning for different geometry type parts. Scientific approach, Planning for other manufacturing operations

**Tutorial**

Laboratory tutorial – Process planning with a practical problem

**Lecture**

Product costing methods and Economics of process planning, Group Technology and Computer Aided process planning, Laboratory tutorial – Process planning with a practical problem

**Tutorial**

Examination, Reactions and aspirations from the participants

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|---|---|
| <p><b>You should attend if you are...</b></p> | <ul style="list-style-type: none"> <li>❖ PG/PhD students, Faculty members with research focus in Manufacturing, Production and Design Fields (Mechanical Engineering)</li> <li>❖ Consulting Engineers working in Manufacturing and Design Fields</li> <li>❖ Pre-Final/Final year Undergraduate students (Mechanical Engineering)</li> </ul>   |
| <p><b>Registration Fees</b></p>               | <p><b>Participants from Abroad:</b> US \$500<br/> <b>Industry/ Research Organizations:</b> Rs. 5000/-<br/> <b>Faculty Members:</b> Rs. 3000/-<br/> <b>Students (Pursuing PhD / Master/ Bachelor Courses):</b> Rs. 2000/-<br/> <b>NIT Mizoram:</b> Free (Faculty / Student / Researcher)</p> <ul style="list-style-type: none"> <li>❖ Registration Fee only includes attendance to Sessions, Course material and Lecture notes.</li> <li>❖ UG and PG students need to produce a document as a proof of Student Identification and a letter of Nomination from their Institute/College.</li> <li>❖ The Registration Fee has to be paid by DD drawn in favor of Director, NIT Mizoram, payable at SBI Bawngkawn, Aizawl</li> </ul> |

## Registration

Register for the course online at <http://www.gian.iitkgp.ac.in/GREGN/index>. The last date of registration is **1<sup>ST</sup> April, 2018**. To register or for any questions please send E-mail to [basilkuriachen@gmail.com](mailto:basilkuriachen@gmail.com)

**Number of participants for the course is limited to 50.**

## Course Faculty



**Prof. (Dr.) Nageswara Rao Posinasetti**

Professor, Manufacturing Engineering Technology Program

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Web: [https://www.researchgate.net/profile/Nageswara\\_Posinasetti](https://www.researchgate.net/profile/Nageswara_Posinasetti)

**Dr. Nageswara Rao Posinasetti (P N Rao)** is a Professor and renowned personality in Manufacturing Engineering Technology Program, University of Northern Iowa, Cedar Falls, IA 50614-0178, USA. He held various positions of prestige in his entire professional life tenure as Associate Professor in the Department of Mechanical Engineering at University of Northern Iowa, Cedar Falls, IA, Mara University of Technology, Shah Alam, Malaysia and Indian Institute of Technology, New Delhi, India, Assistant Lecturer at Birla Institute of

Technology and Science, Pilani, India, Visiting faculty member at Asian Institute of Technology, Bangkok, Thailand, and as Research Fellow at Loughborough University of Technology, Loughborough, U.K and University of Manchester Institute of Science and Technology, Manchester, U.K.

Dr. P N Rao was granted Ph. D and M. Tech degrees in Mechanical Engineering from Indian Institute of Technology, New Delhi, India and Birla Institute of Technology and Science, Pilani, India respectively, for his benevolent contribution in the field of academics and research. He has investigative interest in the technical areas of design, manufacturing, sustainable/green manufacturing, metal cutting, computer aided process planning, computer aided manufacturing, numerical control, CAD, CIM, shop floor control methods, simulation, manufacturing tool design, MEMS/NANO education, reliability centered maintenance, machine vibrations monitoring and diagnosis. He has more than 30 years of expertise in academia and is currently active in various manufacturing and allied disciplines of research with precise emphasis to metal cutting, computer applications, mathematical modelling and sustainability. Moreover, he maintained his impregnable stature through 9 book publications, 3 key note addresses in technical conferences and conventions, 30 refereed journal publications and 20 refereed conference publications at national and international levels, since 2001.

### Course Coordinator



#### Dr. Basil Kuriachen

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**Dr. Basil Kuriachen** is an Assistant professor in the Department of Mechanical Engineering, National Institute of Technology Mizoram. His vivacity and dexterity towards abiding commitment to sublime work ethic conferred him with the Ph. D and M. Tech degree from NIT Calicut (2015) and M G University, Kottayam (2011) respectively. Prior to his joining at NIT Mizoram, he served as an Associate Professor in the School of Mechanical Science at VIT University, Vellore. His resolute research niches are in the field of micro and nano-machining processes, precision and ultra-precision machining, modeling and analysis in machining of 'difficult to machine' materials, etc. He has to his credit, 45 research publications in international referred journals and conferences alongside with two filed patents. Several M. Tech theses has been efficaciously completed through his versatile contribution and professionalism. In addition, he is an esteemed reviewer of many international journals (SCI) and conferences (AIMTDR) of phenomenal repute.

**A**  
**One Week GIAN Course**  
**on**  
**ADVANCED SCIENTIFIC PROCESS PLANNING**  
(Under the aegis of MHRD- Global Initiative of Academic Networks)  
**May 07 - May 11, 2018 at NIT Mizoram**  
**Registration Form**

GIAN Portal Application Number:

1. Name of the Candidate:
2. Category: Academic / Industry /Student
3. Category of Registration: SC/ ST/ General & OBC
4. Organization:
5. Address:
  
6. Mobile Number:
7. E-mail:
8. Highest Academic Qualification:
9. Demand Draft Details:

Bank Draft Number:

Date:

Amount:

Drawn on:

Signature of the Candidate

Signature of the Head of the Dept. /Institution

**Important Points:**

- ❖ First, **register** in GIAN portal, <http://www.gian.iitkgp.ac.in/GREGN/index>. Get Application Number.
- ❖ Fill in this Registration Form. Take a print out of it. Get it signed by Corresponding Authority.
- ❖ Draw DD (amount specified in brochure) in favor of “**Director, NIT Mizoram**” payable at SBI Bawngkawn, Aizawl – 796012 and send the hard copy of the filled in Registration Form along with DD to: **Dr. Basil Kuriachen, Assistant Professor, Department of Mechanical Engineering, National Institute of Technology Mizoram, Chaltlang, Aizawl, Mizoram - 796012**, Contact: +91-9947187133, E-mail: [basilkuriachen@gmail.com](mailto:basilkuriachen@gmail.com).