NAGALAND : DIMAPUR

Nagaland Tool Room & Training Centre

(A Govt. of Nagaland Society, Industries & Commerce Deptt)
Approved By AICTE, New Delhi, Affiliated to SCTE, Nagaland
Dimapur : Nagaland

Motto: Technology-Innovation-Development

Prospectus of Diploma in Tool and Die Making

2023-24

GOVERNING BODY/ADMINISTRATIVE BODY

NTTC has been registered with the Govt. of Nagaland vide No. H/RS-3873 dt. 01/11/04 under Registration of Societies Act 1860. The management of the affairs of the Centre rest with Governing Council, which is a constituted body appointed by the Governor of Nagaland. The administrative head of the Department of Industries & Commerce, Govt. of Nagaland is the Chairman of the Governing Council body.

The present Governing Council Members as on 9th July 2020.

GOVERNMENT OF NAGALAND
INDUSTRIES AND COMMERCE DEPARTMENT
e-mail: gon.indcom@gmail.com

N O T I F I C A T I O N

Dated Kohima, the 9th July, 2020.

NO.I&C/MTTC-2/GC/2010: : In pursuance to Rule 5 of the Memorandum of Association of Nagaland Tool Room & Training Centre(NTTC) and in view of recent transfer/retirement of members of Governing Council of Nagaland Tool Room & Training Centre(NTTC), the Governor of Nagaland is pleased to re-constitute the Governing Council of Nagaland Tool Room & Training Centre(NTTC), Dimapur comprising the following Officers with immediate effect:

1. Shri Kekhrievor Kevichusa, IPoS, Commr. & Secretary, Industries & Commerce Dept. – Chairperson
2. Shri V. Kezo, Special Secretary, Finance Dept., Kohima – Member
3. Shri Nosazol Charles, Addl. Dev. Commissioner, Planning & Coord. Dept. – Member
4. Director & Regional Officer, AICTE (Eastern), Kolkata – Member
5. Director, Technical Education, Kohima – Member
6. Director(HoD), Employment, Skill Development & Entrepreneurship, Kohima – Member
7. Shri P. Zuvito Waths, M.D., NIDC Ltd., Dimapur – Member
8. The Commissioner, Department of Labour, Kohima – Member
9. Shri Tali Longchar, Director(I/C), MSME-DI, Dimapur – Member
10. Shri. K. Hokishe Assumi, Director, Ind. & Commerce Dept. & CEO, NTTC. – Member
11. Representative from the O/o the Dev. Commissioner, MSME, New Delhi – Member
12. Er. Petchetuo Maisalhou, Principal, NTTC, Dimapur – Member Secretary

This supersedes the previous Notification of even no. dated 18th April, 2020.

Sd/- **KEKHRIEVOR KEVICHUSA, IPoS**
Commissioner & Secretary to the Govt. of Nagaland.

NO.I&C/MTTC-2/GC/2010 /568 // Dated Kohima, the 9th July, 2020.

Copy to:

1. The Commissioner & Secretary to the Governor of Nagaland.
2. The Principal Secretary to the Chief Minister of Nagaland.
3. The P.S. to Advisor (I&C), Nagaland.
4. The OSD to Chief Secretary, Nagaland.
5. The Publisher, Nagaland Gazette, Kohima for publication.
6. All concerned Members.
7. Guard file.

9/7/2020

(K LIBANTHUNG PATTON)
Under Secretary to the Govt. of Nagaland.

MD/NTTC

13/7/2020

All India Council for Technical Education

(A Statutory body under Ministry of Education, Govt. of India)

Nelson Mandela Marg,Vasant Kunj, New Delhi-110070 Website: www.aicte-india.org

APPROVAL PROCESS 2022-23

Extension of Approval (EoA)

F.No. Eastern/1-10974019637/2022/EOA Date: 02-Jul-2022

To,

The Commissioner & Secretary
(Higher Education), Govt. of Nagaland,
New Sectt., Nagaland, Kohima-797001

Sub: Extension of Approval for the Academic Year 2022-23

Ref: Application of the Institution for Extension of Approval for the Academic Year 2022-23

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Institutions) Regulations, 2022 Notified on 4th February, 2022 and amended on 24th February 2022 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to

Permanent Id	1-2094042981	**Application Id**	1-10974019637
Name of the Institution	NAGALAND TOOL ROOM & TRAINING CENTRE	**Name of the Society/Trust**	NAGALAND TOOL ROOM & TRAINING CENTRE
Institution Address	NAGALAND TOOL ROOM & TRAINING CENTRE, NEW INDUSTRIAL, NEAR SUB-JAIL JUNCTION, TINALI, NH-36, DIMAPUR, NAGALAND 797112, DIMAPUR, DIMAPUR, Nagaland, 797112	**Society/Trust Address**	NEW INDUSTRIAL, NEAR SUB-JAIL JUNCTION, TINALI, NH- 36, DIMAPUR, NAGALAND 797112,DIMAPUR,DIMAPUR,Nagaland,797112
Institution Type	Govt aided	**Region**	Eastern
Year of Establishment	2007		

To conduct following Courses with the Intake indicated below for the Academic Year 2022-23

Level	Program	Course	Affiliating Body (University /Body)	Intake Approved for 2021-22	Intake Approved for 2022-23	NRI Approval Status	FN / Gulf quota/ OCI/ Approval Status
DIPLOMA	ENGINEERING AND TECHNOLOGY	TOOL AND DIE MAKING	Directorate of Technical Education	60	60	NA	NA

It is mandatory to comply with all the essential requirements as given in APH 2022-23 (Appendix 6)
The Institution/ University is having the following deficiencies as per the online application submitted to AICTE and the same shall be complied within Six Months from the date of issue of this EoA

Deficiencies Noted based on Self Disclosure	
Particulars	**Deficiency**
1. Amenities Area	
Cafeteria	Yes
2. Instructional Area – ENGINEERING AND TECHNOLOGY-Diploma	
Drawing Hall	Yes
3. Library Facilities	
Volumes	Yes
Library Management Software	Yes
4. Other Facilities Deficiency	
Establishment: Internal Complaint Committee(ICC)	Yes
Food Safety and Standards	Yes
Group accident policy for employees	Yes
5. Other Facilities III & Faculty Questions	
Fees to be charged, policies uploaded	Yes
List of faculty and data uploaded	Yes
Courses/Approved Intake displayed	Yes
Faculty Pay as per VI pay commission	Yes

*Please refer Deficiency Report for details

Important Instructions

1. The State Government/ UT/ Directorate of Technical Education/ Directorate of Medical Education shall ensure that 10% of reservation for Economically Weaker Section (EWS) as per the reservation policy for admission, operational from the Academic year 2019-20 is implemented without affecting the reservation percentages of SC/ ST/ OBC (NCL)/ General. However, this would not be applicable in the case of Minority Institutions referred to the Clause (1) of Article 30 of Constitution of India. Such Institution shall be permitted to increase in annual permitted strength over a maximum period of two years.

2. The Institution offering courses earlier in the Regular Shift, First Shift, Second Shift/Part Time are now amalgamated as total intake and shall have to fulfil all facilities such as Infrastructure, Faculty and other requirements as per the norms specified in the Approval Process Handbook 2022-23 for the Total Approved Intake. Further, the Institutions Deemed to be Universities/ Institutions having Accreditation/ Autonomy status shall have to maintain the Faculty: Student ratio as specified in the Approval Process Handbook. All such Institutions/ Universities shall have to create the necessary Faculty, Infrastructure and other facilities WITHIN 2 YEARS to fulfil the norms based on the Affidavit submitted to AICTE beginning with the Academic Year 2022-23

3. Strict compliance of Anti-Ragging Regulation, Establishment of Committee for SC/ ST, Establishment of Internal Complaint Committee (ICC), Establishment of Online Grievance Redressal Mechanism, Barrier Free Built Environment for disabled and elderly persons, Fire and Safety Certificate should be maintained as Approval Process Handbook and provisions made in AICTE Regulation notified from time to time.

4. In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

Pharmacy Institute: In compliance with the order dated 05.03.2020 passed by the Hon'ble Supreme Court of India in Transferred Petitions (CIVIL) No 87-101 of 2014, for the existing institutions offering courses in Pharmacy Programme, approval of Pharmacy Council of India (PCI) is mandatory and AICTE approval is NOT required. The requirements for running the Programme (Diploma / UG / PG) such as Land & Build-up Area, Student-faculty ratio, Intake etc. will be as per the respective regulatory body (PCI).
In case of any inconsistency in the course name and intake for EoA issued by AICTE and the approval by PCI, the approval of PCI shall

prevail.

Architecture Institute: In compliance with the order dated 08.11.2019 passed by the Hon'ble Supreme Court of Indian CA No.364/ 2005, for the existing Institutions offering Courses in Architecture Programme, approval by the Council of Architecture (CoA) is mandatory and AICTE approval is NOT required. The requirements for running the Programme (Diploma / UG / PG) such as Land & Build-up Area, Student-faculty ratio, Intake etc. will be as per respective regulatory body (CoA). In case of any inconsistency in the course name and intake for EoA issued by AICTE and the approval by CoA, the approval of CoA shall prevail.

Deemed to be University: Institutions Deemed to be Universities (Running Technical Education Programmes), it is mandatory to have AICTE approval from the Academic Year 2018-19 in compliance of the Hon'ble Supreme Court Order dated 03-11-2017 passed in CA No.17869- 17870 /2017.

Prof.Rajive Kumar
Member Secretary, AICTE

Copy to:

1. **The Director Of Technical Education**, Nagaland**

2. **The Principal / Director,**
   NAGALAND TOOL ROOM & TRAINING CENTRE
   Nagaland Tool Room & Training Centre, New Industrial, Near Sub-Jail Junction, Tinali, Nh-36, Dimapur, Nagaland 797112,
   Dimapur,Dimapur,
   Nagaland,797112

3. **The Secretary / Chairman,**
   NEW INDUSTRIAL, NEAR SUB-JAIL JUNCTION, TINALI, NH- 36, DIMAPUR, NAGALAND 797112
   DIMAPUR,DIMAPUR
   Nagaland,797112

4. **The Regional Officer,**
   All India Council for Technical Education
   College of Leather Technology Campus
   Block LB, Sector III, Salt Lake City
   Kolkata - 700 098, West Bengal

5. **Guard File(AICTE)**

Note: Validity of the Course details may be verified at http://www.aicte-india.org/

****** Individual Approval letter copy will not be communicated through Post/Email. However, consolidated list of Approved Institutions(bulk) will be shared through official Email Address to the concerned Authorities mentioned above.

This is a computer generated Statement. No signature Required

About NTTC

The **Nagaland Tool-Room & Training Centre (NTTC), Dimapur** was established by the Government of Nagaland with the assistance of the Government of India. It was formally inaugurated on 9th August 2006 by the then Hon'ble Minister, Shri. Khekiho Zhimomi, for Industries & Commerce, Sericulture and Border Affairs. Today, NTTC stands as the premier Technology Institute in North-East Region.

Objectives

- To impart long-term and short-term training to youngsters with the latest technologies and create self-employment opportunities.
- To provide training facility in Tool Design and Manufacturing so as to generate skilled workers, technicians, designers, engineers, supervisors.
- To act as common facility centre to Industries, Entrepreneurs and to assist them in product development.
- To provide Consultancy Services primarily to Small Scale Units in the field of Tool Engineering.

Facilities

- A state-of-the-art CNC Machining set-up which includes CNC Milling, CNC Lathe, CNC-EDM, CNC-Wire EDM, CNC-Plasma Cutting, CNC-Laser Engraving Cutting Machine, CNC-Lathe, CNC-Vertical Machining Centre.
- Other general and specific purpose machines in the section are Universal Milling, Horizontal & Vertical Milling, Cylindrical Grinding, Pedestal Grinding, Lathe, Surface Grinding, Jig Grinding, Injection Moulding, Heat Treatment, Hydraulic Press, Hydraulic Power Hacksaw, Electro-Hydraulic Trainer, Electro Pneumatic Trainer.
- Comprehensive range of training with boarding facilities on first come first basis.

Activity Profile

- Conducting Long Term Training Program of 4 (Four) year course on Diploma in Tool and Die Making(DTDM) which is recognized as equivalent to 3 (Three) year Diploma in Mechanical Engineering
- Community College Program Diploma (Voc.) in Automobile
- Sponsored Skill Development Programmes like DDU-GKY, PMKVY, SC-ST Hub, Capacity Building, Entrepreneurship Skill Development Programme etc.
- Manufacturing and Production of Tools & Precision Components
- Provide Internships to students as a way to have hands-on experience in their field.
- Consultancy on machines and tools
- Computer Professional Courses like Diploma in Computer Application (DCA), Graphic Designing, Web Designing, Video Editing, Advanced Diploma in Multimedia, Desktop Publishing (DTP)

Course: Diploma In Tool And Die Making

Diploma in Tool and Die Making (DTDM) is a 4 (four) year course (3 years + 1 year Inplant Training). After completion of 3 Years of training at NTTC, Dimapur, students/ trainees will be deputed to different companies/ industries across the country for their 1 Year of mandatory In-Plant (Internship) training as per the course curriculum.

Objective of this programme

The main objective of this program is to ensure that all the students/ trainees learn the required skills both in theory & practical in Tool Design and Manufacturing field.

1. Eligibility for Admission: Candidates having the following qualifications shall be eligible for admission to the course:-

(i)10th pass with at least 45% of marks each in Maths & Science and must be within 15 to 22 years of age. (SC/ST candidates have relaxation of 5% marks and 3 yrs. in the upper age limit).

(ii) On the scheduled date of starting of the course, the candidate should have attained the age of 15 years but should not be more than 22 years of age.

(Relaxable to 25 years in case of candidates belonging to SC/ST and handicapped candidates who are otherwise suitable for the course).

2. **Method of Selection:** Candidates who apply for the admission to the course shall be required to take such written examination, tests and interviews as may be decided by the C.E.O. On the basis of performance, candidates will be selected for admission to the course in order of merit.

Reservation shall be made for candidates belonging to SC/ST/Orthopaedically handicapped candidates who are suitable for the course, as per rules of the Centre, who will be selected for admission, even if they do not fall within the range of selection in order of general merit, against reserved seats. The Governing Council may from time to time make reservation of seats for certain specified areas or distribute the total number of seats in such a manner as it may deem fit.

3. **Intake & Security Deposit:** The course shall start once a year. The intake of each batch shall be decided by the Governing Council from time to time. The exact date of starting of the course shall be decided by the C.E.O. Only such candidates who have satisfied the requirements mentioned above and undertake to abide by the rules and regulations of the course as enforced from time to time shall be admitted to the course.

The security deposit of ` 1000/- at the time of admission is refundable on completion of course after deduction of any dues to the Centre. The security deposit of ₹ 1000/- shall not earn any interest and will be forfeited if a trainee fails to complete the training as per rules.

4. Fee Structure

Sl.No	Particulars	Amount (in ₹)
1.	Admission fee	- 5000.00
2.	Tuition fee (per month)	- 2500.00
3.	Security Deposit (Refundable)	- 1000.00
	Total	**- 8500.00**

* **Semesterial Registration:** An amount of ₹1000/- shall be charged per semester

Hostel Fee

Fee Structure:

1.	Admission fee	:	₹ 2000/- per annum.
2.	Security deposit (refundable)	:	₹ 1000/- one time only.
3.	Hostel Fee (maintenance)	:	₹ 500/- p.m
4.	Mess Fee (monthly)	:	₹ 3500/- p.m. (to be paid one month advance)
5.	Internet/Wifi Fee	:	-

Note: The above fees are subjected to change from time to time.

5. Vacation and Leave:

(i) During the period of training, trainees shall be allowed a vacation of one week after Semester examination inclusive of any holidays, falling within this one week. The exact date or period of vacation shall be

fixed every year by the Chief Executive Officer/ Principal.

(ii)A trainee who is injured due to an accident during his training at the Centre and is unable to attend his training on account of that, shall be allowed leave for maximum period of 15 days, provided it is certified by medical authorities as may be specified for this purpose by the Chief Executive Officer/ Principal that he is unable to attend training on account of that injury.

(iii) No other leave shall be permissible to the trainees during the course. Any other period of absence, including treatment of late coming or any other commission, misconduct or otherwise shall be treated as absence from training for the purpose of completion of requisite percentage of attendance for eligibility for appearing in Term/Final Examination.

6. Risk and hazards: The trainees should decide to join course at their own will and at their own risk. In case of any injury or any disablement (temporary or permanent) suffered by the trainees during the course due to any accident or otherwise the Centre shall not be liable to pay any compensation whatsoever. The trainees and their guardians (incase of Minors) shall indemnify the Centre on this account.

7. Syllabus & Evaluation System: The Syllabus for the course, for theory as well as practical is given in Appendix-I. The scheme for Assessment of the progress of trainees through Term/Final Examination leading to the award of Diploma Certificate by the Centre is given in Appendix-II. Certificates of completion of training shall be issued only to those trainees who complete the training course and reach the level of proficiency as stipulated therein.

8. General Rules for Training Programmes: Rules related to leave, uniform and conduct of trainees during the training course are given in Appendix-III.

9. Termination of Training:

(i) During the course of training the trainees shall strictly abide by the Rules and Regulations of the course and any instructions issued by the Chief Executive Officer/ Principal or any other official authorized to issue such instructions from time to time. Violation of any rules and Regulations and/or any instructions by any trainee(s) shall amount to misconduct in terms of the aforesaid Agreement and Surety Bond and the training of trainee(s) may be terminated and surety money be realized from the surety and/or trainees in terms of the Surety Bond as aforesaid.

(ii) If any time during the course of training, it is observed that the activities of trainees go against the smooth conduction of the training programmes by the Centre or any other activity of the Centre, or is otherwise detrimental to the interest of the Centre, the training of the trainees may be terminated without notice and without assigning any reasons. The decision of the Principal of the Centre or any official for the time being looking after the duties of C.E.O, as to whether the activities of the trainees goes against the smooth conduction of the training programme by the Centre or any other activity of the Centre, or is otherwise detrimental to the interest of the Centre or not, shall be final and binding on the trainee, his surety and Guardians. Competant Authority to take action under this rule shall be Chief Executive Officer/ Principal or any other officer for the time being looking after the duties of Chief Executive Officer. The appellate authority shall be Chief Executive Officer.

10. Power to Relax: Chief Executive Officer may relax or modify any rule in Appendix-III, relaxation or any change in rule(s) other than in Appendix-II may be made by Chief Executive Officer/Principal subject to the post approval by the Governing Council.

Amendment: The Rules and Regulations can be amended any time by the Governing Council of the Centre.

The Rules and Regulations as amended shall be applicable to all trainees undergoing training at the Centre.

11. Interpretation: The powers vested in the Chief Executive Officer and Principal shall be exercised by the Chief Executive Officer and Principal. All decisions taken and orders issued by the Chief Executive Officer and Principal in-charged shall be valid.

12. Application of other rules: Such of the Rules and Regulations which have not been referred to herein or any decision of the Governing Council of the Centre shall apply to Trainee of the course except where the said provisions have become repugnant due to any provision laid down in these Rules and Regulations.

13. Repeal: Any rules corresponding to these existing Rules and Regulations before the commencement upon whom these Rules & Regulations apply are hereby repealed, provided that any order made or action taken under the rules and regulations so repealed shall be deemed to have been made or taken under the corresponding provisions. All admissions made prior to coming into force of these Rules and Regulations shall be deemed to have been made under these and all the present trainees shall be governed by these Rules and Regulations.

STUDENTS AFFAIRS AND AWARDS

ATTENDANCE AWARD

Top three students maintaining the highest percentage of attendance in each Semester are eligible for the award. It carries certificate and cash incentives

MERITORIOUS AWARD

This award is given to those three students (starting from 2nd Semester) who secures the Highest Mark (Aggregate) in the last qualifying Semester Examination. It carries certificate and cash incentives.

EXPOSURE TRIP

Local Industrial Tour related to the field is organized for the Diploma in Tool and Die Making students

SPORTS & LITERARY

To teach life skills such as teamwork, leadership, patience, self-confidence and also to display their intellectual and independent thinking skills, activities such as Sports & Literary Competitions are organized annually.

ADMISSION OFFER

- Students securing 70% and above (aggregate) in Matric/HSLC Result will be eligible for Direct & Free Admission. However, Tuition Fee and Security Deposit have to be paid at the time of admission.

APPENDIX-I

Subjects for DTDM Course

FIRST SEMESTER

Sl No.	Name of Subjects	Training Period
1	Technical English-I	20
2	Engineering Mathematics-I	40
3	Material Technology-I	40
4	Engineering Drawing-1	100
5	Engineering Mechanics-I	40
6	Electrical Technology-1	40
7	Workshop Technology-1	60
8	Metrology-I	40
9	Polymer Science-I	20
10	Workshop Practice	400
	Total	**800**

SECOND SEMESTER

Sl No.	Name of Subjects	Training Period
1	Engineering Chemistry	20
2	Engineering Mathematics-II	40
3	Material Technology-II	40
4	Engineering Drawing-II	100
5	Engineering Mechanics-II	40
6	Electrical Technology-II	40
7	Workshop Technology-II	60
8	Metrology-II	40
9	Polymer Science-II	20
10	Workshop Practice	400
	Total	**800**

THIRD SEMESTER

Sl No.	Name of Subjects	Training Period
1	Technical English -II	20
2	Theory of Jigs & Fixtures-I	40
3	Industrial Management-I	40
4	Strength of Material-I	40
5	Engineering Thermodynamics-I	40
6	Theory of Mould-I	40
7	Theory of Press Tool-I	40
8	Workshop Technology-III	40
9	Engineering Drawing-III	80
10	Workshop Practice	420
	Total	**800**

FOURTH SEMESTER

Sl No.	Name of Subjects	Training Period
1	Engineering Physics	20
2	Theory of Jigs & Fixtures-II	40
3	Industrial Management-II	40
4	Strength of Material-II	40
5	Engineering Thermodynamics-II	40
6	Theory of Mould-II	40
7	Theory of Press Tool-II	40
8	Workshop Technology-IV	40
9	Engineering Drawing-IV	80
10	Workshop Practice	420
	Total	**800**

FIFTH SEMESTER

Sl No.	Name of Subjects	Training Period
1	Fluid Mechanics	40
2	Machine Elements & Designs	40
3	Press Tool Design-I	80
4	Mould Design-I	80
5	Jigs & Fixtures Design-I	80
6.	CAD/CAM	80
7.	Workshop Practice	400
	Total	**800**

SIXTH SEMESTER

Sl No.	Name of Subjects	Training Period
1	Hydraulic & Pneumatics	40
2	Workshop Presentation	40
3	Press Tool Design-II	120
4	Mould Design-II	120
5	Jigs & Fixtures Design-II	80
6	Workshop Practice	400
	Total	**800**

SEVENTH SEMESTER

Sl No.	Name of Subjects	Training Period
1	Workshop Practice	800
	Total	**800**

EIGHT SEMESTER

Sl No.	Name of Subjects	Training Period
1	Workshop Practice	800
	Total	**800**

Note: 8 Periods per day, 1 Period = 45 Minutes, 40 effective weeks per year and 5 days per week.

APPENDIX-II
Evaluation System

FIRST SEMESTER

Sl No.	Name of Subjects	Hours	Marks	Pass Marks
1	Technical English -I	2.0	50	
2	Engineering Mathematics-I	2.5	75	
3	Material Technology-I	2.5	75	
4	Engineering Drawing-1	4.0	100	40% for Theory
5	Engineering Mechanics-I	2.5	75	50% for practical
6	Electrical Technology-1	2.5	75	& Viva
7	Workshop Technology-1	3.0	100	
8	Metrology-I	2.0	50	
9	Polymer Science-I	2.0	50	
10	Workshop Practice-	-	300	
	Viva-voce-	-	50	
	Total		**1000**	

SECOND SEMESTER

Sl No.	Name of Subjects	Hours	Marks	Pass Marks
1	Engineering Chemistry	2.0	50	
2	Engineering Mathematics-II	2.5	75	
3	Material Technology-II	2.5	75	
4	Engineering Drawing-II	4.0	100	

5	Engineering Mechanics-II	2.5	75	
6	Electrical Technology-II	2.5	75	40% for Theory
7	Workshop Technology-II	3.0	100	50% for practical
8	Metrology-II	2.0	50	& Viva
9	Polymer Science-II	2.0	50	
10	Workshop Practice	-	300	
	Viva-voce	-	50	
	Total		**1000**	

THIRD SEMESTER

Sl No.	Name of Subjects	Hours	Marks	Pass Marks
1	Technical English-II	2.0	50	
2	Theory of Jigs & Fixtures-I	2.5	75	
3	Industrial Management-I	2.5	75	
4	Strength of Material-I	2.5	75	
5	Engineering Thermodynamics-I	2.5	75	
6	Theory of Mould-I	2.5	75	40% for Theory
7	Theory of Press Tool-I	2.5	75	50% for practical
8	Workshop Technology-III	3.0	100	& Viva
9	Engineering Drawing-III	4.0	100	
10	Workshop Practice	-	250	
	Viva-voce	-	50	
	Total		**1000**	

FOURTH SEMESTER

Sl No.	Name of Subjects	Hours	Marks	Pass Marks
1	Engineering Physics	2.0	50	
2	Theory of Jigs & Fixtures-II	2.5	75	
3	Industrial Management-II	2.5	75	
4	Strength of Material-II	2.5	75	
5	Engineering Thermodynamics-II	2.5	75	
6	Theory of Mould-II	2.5	75	40% for Theory
7	Theory of Press Tool-II	2.5	75	50% for practical
8	Workshop Technology-IV	3.0	100	& Viva
9	Engineering Drawing-IV	4	100	
10	Workshop Practice	-	250	
	Viva-voce	-	50	
	Total		**1000**	

FIFTH SEMESTER

Sl No.	Name of Subjects	Hours	Marks	Pass Marks
1	Fluid Mechanics	2.5	75	
2	M/c. Elements & Designs	2.5	100	
3	Press Tool Design-I	4.0	150	
4	Mould Design-I	4.0	150	40% for Theory
5	Jigs & Fixtures Design-I	4.0	150	50% for practical
6.	CAD/CAM	4.0	75	& Viva
7.	Workshop Practice	-	250	
	Viva-voce	-	50	
	Total		**1000**	

SIXTH SEMESTER

Sl No.	Name of Subjects	Hours	Marks	Pass Marks
1	Hydraulics & Pneumatics	2.5	75	
2	Workshop Presentation	2.0	75	
3	Press Tool Design-II	4.0	200	40% for Theory
4	Mould Design-II	4.0	200	50% for practical
5	Jigs & Fixtures Design-II	4.0	150	& Viva
6	Workshop Practice	-	250	

Viva-voce	-	50	
Total		**1000**	

SEVENTH SEMESTER

Sl No.	Name of Subjects	Hours	Marks	Pass Marks
1	Work Diary *		400	
2	Internal **		400	50%
	Viva-voce		200	
	Total		**1000**	

EIGHT SEMESTER

Sl No.	Name of Subjects	Hours	Marks	Pass Marks
1	Work Diary *		400	
2	Internal **		400	50%
	Viva-voce		200	
	Total		**1000**	

Note: * Work Diary of the "On the Job Training"
** Internal Assessment

Syllabus

Semester - I
Technical English – I

- Communication - Theory & Practice: Basics of Communication: Introduction, meaning and definition, Process of Communication, Communication Event, Effective Communication Principles. Types of Communication, Barriers to Effective Communication. 7 Cs for Effective Communication (Considerate, Concrete, Concise, Clear, Complete, Correct and Courteous). Art of Effective Communication - Choosing Words, Voice, Modulation, Clarity, Time, Simplification of Words, Technical Communication.
- How to improve Interpersonal Communication Skills, developing Interpersonal Skills.
- Listening & Speaking Skills
- Vocabulary & Grammar: Idioms and Phrases, Parts of Speech, Active, Passive Voice, Vocabulary of commonly used terms, Antonym, Synonym.
- Application Writing

2. Engineering Mathematics- I

Algebra

- Ratio & Proportion
- Laws of indices
- Quadratic equation
- Linear equation
- Logarithm

Trigonometry

- Measurement of angles
- Trigonometric Ratios
- Associated angles
- Multiple and sub-multiple angles
- Solution of triangles
- Heights & Distances
- Applications

Mensuration
- Rectilinear figures
- Curvilinear figures

3. Material Technology-I
- Elements & compounds
- Metals & non-metals
- Crystalline & non crystalline structures
- Ferrous & non-ferrous metals
- Physical & Mechanical properties of metals
- Iron & Steel
- Cast iron
- Common alloying elements and their effects on the properties of steel
- Elastic & Plastic deformation

4. Engineering Drawing -1
- Definition of Drawing & its importance
- Introduction to drawing instruments
- Standard sheet sizes
- Use and application of various lines in drawing practice
- Lettering (alphabet and numerical, vertical & inclined)
- Different dimensioning methods
- Reduced and enlarged scales and their applications
- Geometrical constructions
- 1st angle & 3rd angle projection
- Pictorial view to orthographic view

5. Engineering Mechanics-I
- Introduction: Divisions of Engineering Mechanics – Statics & Dynamics, Fundamental Units, Derived Units, System of Units, Scalar & Vector quantities
- Composition and Resolution of Forces: Effects & Characteristics of a Force, Principle of Transmissibility of Forces, System of Forces, Resultant and Composition of Forces, Methods for the Resultant Force, Parallelogram Law of Force, Resolution of Force and Principle of Resolution, Triangle Law of Forces, Polygon Law of Forces
- Moments and their Applications: Moment of a Force, Units of Moment, Types of Moment, Clockwise and Anticlockwise Moment, Varignon's Principle of Moments, Application of Moments
- Equilibrium of Forces: Principle of Equilibrium, Methods for the Equilibrium of Coplanar Forces, Lami's Theorem, Conditions of Equilibrium, Types of Equilibrium
- Centre of Gravity: Introduction, Centroid, Methods for Centre of Gravity, Centre of Gravity of Symmetrical and Unsymmetrical Sections, Centre of Gravity of solid bodies with Cut-out Holes
- Moment of Inertia: Moment of Inertia of a Plane Area, Units, Methods for Moment of Inertia, Moment of Inertia of a Rectangular Section, Circular Section, Triangular Section, Semi-Circular Section, Composite Section, Section Modulus.
- Principle of Friction: Introduction, Static & Dynamic Friction, Limiting Friction, Normal Reaction, Angle of Friction, Co-efficient of Friction, Laws of Friction, Laws of Kinetic or Dynamic Friction, Equilibrium of a body on a Horizontal & Inclined Plane

6. Electrical Technology- I
- Introduction, modern electron theory, nature of electricity, electric current, electricpotential, potential difference, concept of EMF and potential difference.
- Concept of resistance, conductance, effect of temperature on resistance, temperature coefficient of resistance, graphical determination of temperature of temperature co-coefficient, Ohm's law, electric power, carbon resistor.

- Resistance in series and parallel, special case of parallel and series circuit, open circuitand short circuit, Kirchhoff's law, voltage drop, grouping of cells, real voltage andcurrent source
- Network theorem and techniques, star delta connections and delta star connections
- Unit of work and energy, mechanical work or energy, electrical energy, thermalenergy, unit of power expression for power efficiency, pour efficiency, heatingeffect of electric current power dissipation.

7. Workshop Technology –1

- Safety Precautions
- Fitters vice and hand tools
- Classification of Files
- Hammers and their types, mallets
- Marking Tools, height gauge, try square
- Surface plate
- Centre punch, drills, reamers, chisels, hacksaw
- Spanners, wrenches, pliers, screw drivers
- Scrapers their types and uses
- Common screws, bolts and nuts, washers and rivets
- Drilling Machines
- Different types of drills
- Drill chuck and drill sleeve
- Drilling (through holes and blind holes) & counter sinking,
- Drill angles & grinding of drills
- Use of coolants
- Cutting speed & feeds
- Shaping machine- Different parts and their functions
- Centre Lathe-different parts and their functions
- Lathe accessories- like chucks, revolving and dead centre, lathe dig carrier, steady rest, follow rest.
- Dead centre, lathe dog carrier,
- Turning tools, different angles of single point cutting tool and their functions, tool grinding.
- Power Saw Machine

8. Metrology -1

- Concept of metrology, classification of methods of measurement, objective of metrology, requirements of an inspection tool, international system of unit (SI), source of error, rigorous definitions of accuracy and precision, establishing calibration system.
- Basic standards of measurement, line and end standard of measurement, relation of end standard and line standard of (light wave) standard, classification of standards and gauge control structure, concept of metrology in quality assurance (AQ).
- Introduction to limit, fit and tolerance. Interchangeability, limit of size, Indian standard (IS 1919-1963), terminology. Guide for selection of fits.
- Principle and uses of different measuring instrument like Vernier caliper, micrometer, bore gauge, height gauge, etc. Accuracy and readability.

9. Polymer Science -1

- Chemical linkages
- Monomers, polymers, polymerization
- Kinetics of polymerization mechanism
- Polymerization techniques
- Classification of polymers
- Origin, structure, thermal response
- Formation, tacticity, crystallinity
- Transitions in polymers, rubbers, plastics, fibres

10. Workshop Practice

- Familiarization with the engineering training institute
- Importance of Diploma in Tool & Die Making course in the present scenario of industrial growth.
- Various types of machines used including safety related to each machine
- Introduction to hand tools, measuring tools
- Filing flat surface
- Using marking tool, punch, try square and vernier caliper
- Hack sawing, drilling, tapping
- Filing Tee shape job, polygon.
- Grinding and making single point cutting tool
- Introduction to lathe - use of 3-jaw chuck, 4-jaw chuck.
- Plain turning, facing, step turning.
- Welding Practices with essential theory.

Semester - II

1. Engineering Chemistry

- Chemical equation, concept of oxidation and reduction, electronic concept of oxidation and reduction
- Concept of acid and bases, their strength in ionization constant, electrolysis
- Concept of hydrogen, chemical properties of hydrogen, use of hydrogen, reactive form of hydrogen. Water, physical properties of water, chemical properties of water, hard and soft water, removal of hardness of water, softening of hard water, heavy water, hydrogen peroxide, hydrogen peroxides vs ozone, hydrogen as a fuel, fuel cell.
- Solution, type of solution, colligative properties, relative lowering of vapour pressure, determination of molecular masses using colligative properties.

2. Engineering Mathematics - II

Co-ordinate geometry

- Cartesian Co-ordinates
- Polar co-ordinates
- Distance between two points
- Point dividing a line
- Angle between two lines
- Area of triangle Equations of straight lines & circle

Calculus

- Concept of limits
- Simple differentiation
- Simple integration
- Applications.

3. Material Technology-II

- Principles & description of testing of metals
- Mechanical properties and their method of testing such as tensile, hardness, impact, etc.
- Iron-carbon equilibrium diagram
- TTT diagrams
- Different processes of heat treating of steel such as annealing, normalizing, hardening, tempering ,etc.
- Heat treatment furnaces such as Muffle, Induction, Salt bath furnaces, Vaccum heat treatment furnace.

4. Engineering Drawing -II

- Orthographic view to pictorial view
- 1st angle & 3rd angle projection
- Sectioning- full section, half section , partial or broken section

- Different conventions for materials in sections
- Exercises on sectional views of different objects

5. Engineering Mechanics-II

- Laws of Motion: Introduction, Important Terms, Rigid Body, Newton's Laws of Motion, Newton's First & Second Law of Motion, Absolute and Gravitational Units of Force, Motion of a Lift, Newton's Third Law of Motion, Recoil of a gun, Motion of a boat, etc
- Principle of Balancing
- Principle of Lifting Machines: Types and Advantages, Efficiency, Velocity Ratio, Maximum Efficiency, Law of Machine.
- Simple Lifting Machines
- Collision of Elastic Bodies: Phenomenon of Collision, Law of Conservation of Momentum, Newton's Law of Collision of Elastic Bodies, Co-efficient of Restitution, Types of Collisions.
- Work, Power and Energy: Introduction, Units of Work, Power, Units of Power, Types of Engine Powers, Indicated Power, Brake Power, Efficiency of an Engine, Measurement of Brake Power, Rope Brake Dynamometer, Proney Brake Dynamometer, Energy, Units of Energy, Mechanical, Potential & Kinetic Energy, Transformation of Energy, Law of Conservation of Energy
- Transmission of Power by Belts and Ropes: Types of Belts, Velocity Ratio of a Belt Drive, Velocity Ratio of a Simple & Compound Belt Drive, Slip of belt, Types of Belt Drives, Length of Belt Drives, Power Transmitted, Ratio of Tensions, Centrifugal Tension, Maximum Tension, Creep
- Gear Trains: Important Terms, Types of Gears, Advantages and Disadvantages of a Gear Drive, Velocity Ratio of Gear Drive, Power Transmitted by Gears

6. Electrical Technology- I I

- Fundamental of alternating current, R-L series circuit, impedance, power factor,true power and reactive power, power triangle, R-C series circuit and R-L-C circuit.
- Theory of transformer, EMF equation of a transformer, voltage transformer ratio,practical transformer, impedance ratio, shifting impedance in a transformer, efficiencyof transformer, motor and generator
- Molecular theory of magnetism, domain theory of magnetism, magnetic effect of electriccurrent, current carrying conductor in magnetic field, magnetism of force production, introduction of semiconductor, effect of temperature on semiconductor, charge on n-type and p- type semiconductor, pn junction, applying voltage across pn junction andintroduction to insulator
- Basic electronic, introduction to electron emission, type of electron emission, thermionic emission, cathode construction, diode and triode.

7. Workshop Technology –II

- Different types of Machine vice, face plate, steady rest, follower rest.
- Counter boring, spot facing,
- Taps & Dies
- Knurling tool and different types of knurling
- Different types of lathe operation and their procedure like taper, turning, thread cutting, form turning.
- Different types of taper and thread and their uses.
- Shaping machine-critical operation , quick returnmechanism
- Different types of Taps & Dies and their applications , Male-Female matching , Blue Matching.

8. Metrology -II

- Introduction to gauge. Gauge design. Inspection gauges. Indian standards gauging for plain work piece. Geometric dimensioning and tolerance
- Depth gauge, universal bevel protractor, height master, microscope, profile protector, sine bar, slip gauge and dial gauge
- Introduction to measurement of surface finish. Meaning of surface texture and some definition. Surface roughness, terminology as per Indian standards. Method of measuring surface finish. Replica method. The sample length or cut-off length.

- Analysis of surface trace. Assessment of surface roughness as per Indian standard. Surface finish characteristic RMS and CLS values and its measurement. Roughness comparison specimens. Other methods of interest used for evaluating surface roughness

9. Polymer Science -II
- Properties of polymer-mechanical, thermal, electrical
- Compounding of Polymers
- Classification of plastic-thermosetting and thermo plastic
- Properties and uses of different types of thermosetting and
- Thermoplastic materials
- Common testing methods of plastic materials

10. Workshop Practice
- Fitting male and female
- Face plate, cat head, steady rest, follower rest, plain turning, facing, step turning,
- Taper turning by tail stock offset method, compound slide method, taper turning attachment method.
- Different types of thread cutting including multi -start thread, external and internal.
- Electrical Practices (Basic)
- Eccentric turning.
- Basic MS-Office.

Semester - III

1. Technical English II
- Professional Writing: Letters- Personal, Business, Official & Commercial correspondence
- Report Writing
- Precis Writing: Writing an Effective Précis, Essay Writing: Types, Components
- Technical Reading and Writing Practices
- Resume, E-mail & Blog Writing.

2. Theory of Jigs & Fixtures-I
- Introduction to production. Definition to jigs and fixtures. Fundamental concept in the design of jigs and fixtures
- Work holding devices, work holder purpose and function. General principles of degree of freedom and constrain
- Other principles in the designs of locators, various type of locators. Principles of clamping, classification of clamping.
- Component of loading, tool grinding method, jig bushes

3. Industrial Management -I
- Concept of industrial management. Production and productivity. Concept of organization, characteristic of organization, the process of organization, organization theory, organization manual, principle of organization, project organization, authority, group dynamic.
- Introductions to trade union, industrial dispute, settlement of industrial dispute, union management relationship.
- Introduction to industrial legislation, principle of labour legislation, type of labour laws, The factory acts, introduction to factory acts
- Introduction to wage payment plan, classification of wage payment plan, incentive, wage incentive plane, incentive for indirect worker, profit sharing.
- Introduction to supervisor and leadership, duties and responsibility of a foreman/ supervisor job, qualification of a foreman, qualities of a foreman, leadership style, qualities of leadership.

4. Strength of Material-I
- Load and its type, Effects of load on members
- General meaning of Stress, Unit of Stress, Simple Stress

- Strain, Stress-Strain relation
- Hooke's Law
- Stresses in the bar under composite section
- Ultimate Stress & Strain, Working Stress, Factor of Safety
- Compound Bars, Temperature Stresses, Poisson's Ratio, Volumetric Strain, Elastic Constants
- Beam and its classification
- Shear Forces and Bending Moments
- SF & BM Diagrams, Sign conventions

5. Engineering Thermodynamics - I

- **Fundamental Concepts:** Thermodynamic State and System, Boundary, Surrounding, Universe, Thermodynamic Systems – Closed, Open, Isolated, Adiabatic, Homogeneous and Heterogeneous, Macroscopic and Microscopic, Properties of System – Intensive and Extensive, Thermodynamic Equilibrium, Quasi – Static Process, Reversible and Irreversible Processes, Zeroth Law of Thermodynamics, Pressure, Volume, Temperature, Enthalpy, Internal Energy.
- **Laws of Perfect Gases:** Definition of Gases, Explanation of Perfect Gas – Boyle's Law, Charle's Law, Avagadro's Law, Regnault's Law, Universal Gas Constant, Characteristic Gas Constants, Derivation, Specific Heat at Constant Pressure & Volume, Derivation of an expression for Specific Heats with Characteristics.
- **Thermodynamic Processes on Gases:** Types of Thermodynamic Processes – Isochoric, Isobaric, Isothermal, Hyperbolic, Isentropic, Polytropic and Throttling Processes, Derivation of Work Done, Change in Internal Energy, Change in Entropy.
- **Laws of Thermodynamics:** Law of Conservation of Energy, First and Second Law of Thermodynamics, Applications, Introduction of Third Law of Thermodynamics, Concept of Irreversibility, Entropy
- **Ideal and Real Gases:** Concept of Ideal Gas, Enthalpy and Specific Heat capacities of an Ideal Gas, Real Gas
- **Properties of Steam:** Formation of Steam and related terms, Thermodynamic properties of Steam, Steam Tables, Latent heat, Internal Energy of Steam, T- S diagrams, Saturated Steam, Wet Steam, Dry Steam, Superheated Steam, Expansion of steam, Quality of steam (dryness fraction).

6. Theory of Mould-I

- **Plastic processing Technique-** Basic principles & Classification, fundamentals of processing plastic components.
- **Injection Mould-** introduction, different parts, construction, feed system, cooling system, injection system, air vents, side cavity and side core, types of mould.
- **Injection Moulding Machine-** working principle, different parts, elements and specification of injection moulding machine, applications and trouble shooting.
- **Types of injection moulding machine-** hand injection moulding machine, plunger type and screw type injection moulding machine.
- **Mould polishing-** polishing method and polishing process in mould, need of polishing, types of finishes in mould.

7. Theory of Press Tools-I

- Basic principle of press work
- Different parts & construction of press tool
- Different types of press tools
- Shear action, cutting clearance
- Cutting & Stripping force
- Blanking & Piercing
- Mounting of die and punch, pilot, stripers, stock.
- Strip layout, percentage of utilisation
- Feeding mechanism

8. Workshop Technology –III

- Milling Machine-
- Working principle of milling machine and Specification
- Main parts of milling machine and their functions

- Classification and applications of milling machine
- Milling machine accessories and attachment – Arbors, adaptors, collets, vices, circular table, indexing head and tail stock, vertical milling attachment
- Milling methods - up milling and down milling
- Identification of different milling cutters and work mandrels
- Work holding devices
- Milling operations – face milling, angular milling, form milling, straddle milling, gang milling etc.
- Cutting parameters
- Indexing on dividing heads, plain and universal dividing heads.
- Indexing methods: direct, Plain or simple, compound, differential and angular indexing, numerical problems on indexing.
- Grinding Machine-
- Working principle of grinding machine and Specification
- Types of grinding machines- Rough grinding machines and precision grinding machine
- Grinding wheel- wheel material, bonding material, types of grinding wheel, balancing, dressing and truing of wheel.
- Selection of grinding wheel- grits, grade, structure.
- CNC Machine-
- Introduction to CNC Machines, working process, block diagram, components of CNC machines and their functions, advantages & limitations.

9. Engineering Drawing -III
- Projection of planes
- Projections of solids
- Section of solids
- Intersection of surfaces/inter-penetration of solids
- Development of surfaces
- Limits and fits
- Auxiliary views
- Missing views and lines
- Rivets and riveted joints
- Screw threads
- Screwed fastening
- Screw threads.
- Keys, cotters and joints.
- Shaft couplings.
- Pulleys, gears.

10. Workshop Practice
- Practice on milling machine
- Slab milling, end milling, slot cutting, all cutter operations.
- Practice on surface grinding machine, cylindrical grinding machine, tool and cutter grinding machine.
- Grinding of plain surface, edge grinding to make perfect square.
- "V" grinding, slot grinding.

Semester - IV

1. Engineering Physics
- Concept of Force and motion, Scalar and vectors Quantity, Velocity and acceleration, Distance and Speed, Equation of motion and its derivation, Newton's law of motion, Force and its derivation from Newton's law of motion, Centripetal acceleration, Centripetal and Centrifugal forces, Concept of friction and its application, Solved problems.
- Work and its unit, Work done on bodies on horizontal and inclined planes, Concept of power and its unit,

Concept of energy and its unit, different forms of energy, Concept of kinetic energy and potential energy, Conservation of energy, Principle of conservation of energy, Conservation of energy in case of freely falling bodies, Calculation of power, work and energy.

- Concept of rotational and simple harmonic motions, Equation of rotational and simple harmonic motion, Concept of torque and angular momentum and its formula, Relationship between torque and angular momentum, Principles of conservation of momentum, Rotational kinetic energy of rolling body, Concept of moment of inertia and its unit, Equation of Moment of inertia, Moment of inertia of disc, ring and sphere.
- Concept of heat and its unit, Concept of temperature and its unit, Temperature on the basis of Kinetic energy molecule, Principle of measurement of temperature, Thermometers, thermocouple, Bimetallic and resistance, Pyrometers.
- Concept of thermal expansion of solids, Co-efficient of linear, Surface and Cubical expansions and relation among them, Thermal stresses and its formula, Application of thermal stresses.
- Concept of heat transfer, modes of heat transfer, Co-efficient of thermal conductivity, heat radiation and its characteristics, Black body radiation, Emissivity and absorptivity.
- Sources of energy, Renewable and non- renewable source of energy, Alternate source of energy.

2. Theory of Jigs & Fixtures-II

- Concept of drilling Jigs, type of jig, component of jig. Jig application
- Feature of milling fixture, classification of milling fixture.
- Other type of fixture, turning and grinding fixture.
- Fool-proofing, other principles of design locators, various type of locators, indexing arrangement.

3. Industrial Management -II

- Introduction to cost, accounting and control, element of cost, nature of cost, type of cost, processed cost and cost of production, control and accounting of material, labour and overhead cost, depreciation, breakeven analysis and breakeven chart.
- Material management, accounting, store and material control, receipts and issue of material, store record, codification of material, physical verification of material.
- Concept of inventory, inventory classification, objective of inventory control, function of inventory, economic order quantities, inventory model, ABC analysis, material requirement planning, manufacturing resource planning, operating cycle.
- Concept of material handling, function and principle of material handling, engineering and economic factor, relationship to plant layout, selection of material handling equipment, maintenance of material handling equipment, type of material handling equipment, concept of containerization palletization.

4. Strength of Material-II

- Bending Equation, Theory of Simple Bending
- Neutral Axis, Position of Neutral Axis
- Section Modulus
- Practical application of Bending Equation
- Riveted Joint
- Torsion and Springs
- Columns and Struts

5. Engineering Thermodynamics-II

- Air Standard Cycles : Meaning of air standard cycle – its use, condition of reversibility of a cycle Description of Carnot cycle, Otto cycle, Diesel cycle, simple problems on efficiency, calculation for different cycles Comparison of Otto, Diesel cycles for same compression ratio or same peak pressure developed Reasons for highest efficiency of Carnot cycle and all other cycles working between same temperature limits
- Internal Combustion Engine: Introduction, Classification of I.C.Engines, 2-Stroke and 4-Stroke Engines, Valve Timing Diagram
- Analysis of Refrigeration Cycles: Air-standard Cycles. Joule Cycle. Introduction to Refrigeration Systems. Vapor-compression Refrigeration Cycle. Vapor-absorption Cycle.

6. Theory of Mould-II

- Compression mould- introduction, working process, moulding cycle, different parts, construction, types of compression moulds and applications of compression moulding.
- Transfer mould- introduction, working process, different parts, construction, and types of transfer moulds, advantages, disadvantages and applications of compression moulding.
- Heating of mould- basic principle, pre-heating and types of preheating in moulding.
- Blow moulding- introduction, working process, and blow moulding methods.
- Extrusion moulding- introduction, working process, stages of extruder screw.
- Thermoforming- introduction, working process, and various methods of thermoforming.
- Moulding defects and causes.

7. Theory of Press Tools-II

- Progressive tool, compound tool, drawing tool, triming tool, bending tool, curling and embossing tool, coining tool.
- Fine blanking.
- Different types of press.
- Development.

8. Workshop Technology –IV

- Jig Grinding Machine- introduction, working process, different parts, classification, specification, methods and operations.
- Electric Discharge Machine- introduction, working principle, components of EDM machining and their functions, applications, advantages and disadvantages of EDM.
- Types of EDM Machines- conventional EDM and wire EDM (WEDM), basic difference, parameters of WEDM and their applications.
- Basic Computer Concepts- functionalities, components, system and software.
- CNC Machine- classification of CNC machine tools, types of CNC machines and their basic principle, CNC axes identification, CNC codes and simple part programming concept.

9. Engineering Drawing -IV

- Drawings of assembled views: Steam Engine parts – Stuffing boxes, Crossheads, Eccentrics.
- Drawings of assembled views:Machine tool parts – Tailstock, Tool Post, and Machine Vices,4-Jaw Chuck
- Drawings of assembled views:Other machine parts – Screws jacks, Petrol engine connecting rod, Plummer block.
- Drawings of assembled views: Simple designs of steam stop valve, spring-loaded safety valve, feed check valve and Air cock.

Note: First angle projection to be adopted.

10. Workshop Practice

- Form milling, dove-tail milling.
- Indexing, rotary milling.
- Grinding of shaft, bush both external and internal.
- Form/profile grinding by dressing the wheel, taper grinding- internal and external.
- Design Software

Semester - V

1. Fluid Mechanics

- Properties of fluid (Density, Specific weight, Specific volume, Specific gravity), Surface tension, Capillarity, Capillary rise and fall.
- Fluid Static – Pressure, Pressure head, Pascal's law, Atmospheric pressure, Gauge and absolute pressure, Measurement of pressure, Total pressure and centre of pressure, forces on surfaces, Archimedes principle,

Buoyance, Centre of buoyancy, Meta- centre, Meta-Centric height ,condition of equilibrium of floating body.
- Fluid motion – Type of fluid flow, Classification of fluid.
- Hydro- electric power generation :-
  Component of hydro-electric power plant, Turbine (Reaction, Impulse and Cross-flow turbine), Bernoulli's equation, Venturimeter, Pitot tube, Suction head, Discharge measurement.

2. Design of Machine Elements
- Design of Shafts: Material selection, Design of Shaft , Maximum Bending Moment, Twisting Moment
- Design of Bolt: Material selection, Design of Bolt, Design of Pin & Key, Design of Cotter Joint and Couplings
- Design of Belts: Material selection, Design of Belts, Design of V-Belts, Power Design of V-Belt Drives
- Design of Bearings: Material selection, Design of Ball and Radial Bearing, Design of Roller Bearing, Design of Cylindrical Bearing
- Design of Levers and gears: Material selection, Design of Levers, Design of Gears, Design of Spur Gears.

3. Mould Design-I
- Study of plastic components- various plastic materials use in plastic components and their applications, advantages and limitation of plastic materials.
- Basic design features of injection moulds- design rule, selection of moulding machine, determination of number of cavities, selection of material.
- Feed system- Design criteria of sprue, runner and gate.
- Selection of gate- Sprue gate, rectangular edge gate, overlap gate, fan gate, tab gate, diaphragm gate, film gate, pin-point gate, sub-surface gate, wrinkle gate.
- Mould temperature control- cooling system, types of cooling system, cooling circuit, mould venting and selection of daylight mould.
- Methodical approach in practical design- mould design calculation, design of cavity insert, design of core layout, design of stripper plate, design of core and core holding plate, design of dowel pin/guide pillar and guide bush, design of gate and runner
- Preparation of assembly drawing- plan view in open condition of mould, cross-sectional elevation and side view.
- Ejection system- design criteria of ejector plate assembly, different parts of ejector assembly and ejection method.

4. Press Tool Design-I
- Strip layout- single run, double run, single punch, double punch.
- Progressive tool- using fixed stock pin and pilot punch, blanking and piercing, cutting and non-cutting operation.
- Compound tool - blanking and piercing.
- Bending tool - V-bending, U-bending.

5. Jigs & Fixtures Design-I
- Location design.
- Design of clamping device
- Design of indexing device.
- Fool-profing.
- Design of drill jig- jig bush, jig base, body, ejection system, guiding device.

6. Workshop Practice
- Working on CNC lathe, CNC milling, exposure to non-conventional machining.

Semester - VI

1. Hydraulics and Pneumatics
- Physical properties of hydraulic fluid. Energy and power in hydraulic system. Hydraulic medium, equipment

used to create hydraulic and pneumatic energy, reservoirs.

- Hydraulic pump, pump theory, pump classification, cooler, strainer and filter. Hydraulic valve, directional control valve, pressure control valve, flow control valve, servo valve, proportional control valve cartridge valve.
- Pneumatic: air preparation and component, properties of air, perfect gas law, compressors, fluid conditioners, analysis of moisture removal from air, airflow rate control, with orifices, air control valve, pneumatic actuators.
- Ancillary hydraulic devices, reservoirs, accumulators, pressure intensifier sealing devices, heat exchangers, pressure gauge, and flowmeter. Cylinder, rams, single acting cylinder or rams, double acting cylinder, telescoping cylinders, ram actuators/presses.

2. Workshop Presentation

- Preparation and presentation of Technical papers
- Group discussion
- Seminars/debates.
- Mock interviews.
- Games.
- Personality development.

3. Press Tool Design-II

- Cut off tool.
- Combination tool - blanking and drawing.
- Drawing tool - using pressure pad and without pressure pad.

4. Mould Design-II

- Hot runner mould- hot runner unit, design of manifold block, advantages and limitations of hot runner unit, torpedo.
- Mould Cooling calculation.
- Compression mould design- design of cavity insert, design of core/plunger layout, design of core/plunger and core holding plate, ejection units, and assembly drawing of compression mould.
- Transfer mould design- design of cavity insert, design of core/plunger layout, design of core/plunger and core holding plate, design of pot, runner, gate, ejection units, and assembly drawing of transfer mould.
- Blow mould design- blow moulding terminology, stages and design considerations for designing of blow mould, blow ratio, blow mould cavity drawing.

5. Jigs & Fixtures Design-II

- Milling fixtures- location, clamping device, indexing.
- Turning fixtures- location, clamping, self-centering chuck, face plate fixture for odd jobs, mandrels, threaded mandrel, expanding mandrel.
- Welding and assembly fixture- location, clamping, wing nut welding fixture and angle frame welding fixture.

6. Workshop Practice

- Manufacturing of mould, press tool, jigs & fixtures and precision jobs.

Semester - VII

1. Workshop Practice

• Working on production job in training department/ production shop in the tool room or outside. Objective of this training programmes is to give experience to the students in actual working condition of an industry so that they are confident for taking up any job in the industry.

Semester - VIII

1. Workshop Practice

• Working on production job in training department/ production shop in the tool room or outside. Objective

of this training programmes is to give experience to the students in actual working condition of an industry so that they are confident for taking up any job in the industry.

Appendix- III
Rules of Conduct (for Trainees)

1. Every trainee shall be present at his/her place of training in accordance with the programme prepared and notified by the Chief Executive Officer/Principal. He/she shall maintain utmost punctuality in time keeping. If he/she is not found in his/her place of training without any justification to the satisfaction of his/her batch in charge or any other officer or expert of the Centre, he/she be marked absent for the day, in addition to disciplinary action which might be taken against him.
2. No late comer shall be allowed. Depending on whether a trainee is late in the forenoon or in the afternoon his/her late attendance shall be treated as half day absence either in the first half or in the second half.
3. Every trainee shall take permission from concerned officer to leave his/her place of training.
4. **80% of attendance will be required to be eligible to appear the Main Semester Examination. However, maximun period of 5 days shall be considered for students with genuine medical reasons.**
5. Trainee shall attend training classes (theory as well as a practical) in prescribed uniform and in such dress and shoes as may be prescribed from time to time by the Centre keeping in view the safety and other training requirements. Trainees shall at their cost arrange uniform, full shoes etc.
6. Trainees shall maintain their uniform neat and tidy. They shall replace the broken buttons etc, and mend damaged uniform. They shall exchange the washed uniform at such time and place as may be notified by Training Manager Adviser from time to time.
7. Trainees shall arrange at their cost stationery, drawing and other instruments and books prescribed for the course. Centre may however at its sole discretion, issue some stationery for the sake of uniformity wherever necessary
8. Trainees may borrow such books from the centre as the centre may earmark for the purpose from time to time in accordance with the rules laid down for the purpose from time to time.
9. (a) During the course of training, trainees shall handle and maintain Center's property, namely machines, instruments, tools and equipment, special and standard accessories, electrical equipment including switch boards, switches, lights, fans, hand tools, furniture items, sanitary & water supply fitting, building and other civil structures, lawns, raw materials, consumables and other articles of the centre, with the outmost care so as not to cause any damage excessive wear and tear, reduction of utility and usefulness or otherwise deface or tarnish the appearance or good looks. Trainees should refrain from writing any thing on the walls, other civil structure, plant and equipment and other aforesaid articles or otherwise marking or sticking bills, posters etc.

(b) Trainees shall strictly follow the procedures introduced from time to time and instructions issued by the Chief Executive Officer/Principal or any other official of the centre authorized to do so with regard to the following :-

i. Issue and return of instruments, tools etc from stores.
ii. Deposit of finished and semi-finished practical exercises/jobs
iii. Reporting of breakages
iv. Proper maintenance of machines and other plant equipments, accessories etc, including periodic lubrication.
v. Disposal of borings and turnings and other scraps.
vi. Cleanliness of machines including cleaning of shop floor m/c.
vii. Lights and fans.
viii. Operation of machines including cleaning of shop floor m/c.
ix. Tools and materials go downs.
x. Industrial lockers.

xi. Tool lockers and material lockers.
xii. Handing over and taking over of machines and other equipments.
xiii. Allotment and operation of machines etc.
xiv. Any other subject not included above.

(c) Any loss or damage to the center's property arising out of a willful act of a trainee or due to his neglect or noncompliance of operating instructions, safety rules or any other instructions issued or the established and conventional norms of use of that property shall be recovered from the trainee and/or his surety/guardians. The decision of the Chief Executive Officer/Principal as to whether the loss or damage has occurred due to willful act or neglect or noncompliance as aforesaid. or not. About the amount of loss/damages, shall be final and binding on the trainee & his/her surety and guardians.

10. The Centre shall provide opportunities of the training for the course to trainees\who of their own free will decide to undergo training on the terms and conditions known and understood by them including the power of the Governing Council and other competent authorities to amend the terms and conditions at any time and without notice to formulate and amend procedures and rules whenever necessary. Trainees shall not resort to make organized claims and collective bargaining. Difficulties experienced. If any, by them should be brought to the notice of the batch-in charge or other officials of the centre in individuals capacities, in manner which may be prescribed from time to time by the Chief Executive Officer/Principal shall be looked into. No Union or Association formed by the trainees shall be recognized.
11. No meeting shall be conducted by the trainees inside the premises of the Centre including any other Sub-office, Cell or any building, without the permission of the Chief Executive Officer/Project advisor or any other authority competent to give such permission.
12. Period spent by the trainees even if it is within NTTC premises in a manner otherwise than according to programme of training including examination, class tests,etc. shall be treated as full day's absence for this purpose.
13. Inviting others to act in any manner which goes against the interest and objectives of the Centre or against the intention and purpose of any rules of the Centre or instructions issued, shall be treated as gross-misconduct of the trainee(s).

a). Insubordinate or disobedience whether alone or in combination with others.
b). Theft, fraud, any dishonest act, bribery or any illegal gratification with others.
c). Possession, distribution and display, within the Centre's premises, of unauthorised bills, pamplets, books, placards, banners.
d). Coming to the centre in drunken condition or under the effect of any intoxicants, narcotics or possessions of any such things or any lethal weapons in the Centre's premises.
e). Gambling within the Centre's premises including any other sub-office, building of the Centre.
g). Refusal to receive official documents.
h). Deliberate false statemetns, falsification of records, impersonation, sppression of facts.
i). Wilful failure to report occurrances or any information which may endanger others' life or Centre's property.
j). Private or personal work within NTTC premises and Centre's facilities whatsoever.
k). Staying inside Centre's premises outside training hours except when permitted or authorised.
l). Violation or non-compliance of any rule or instructions issued.
m). Any other act which goes against the interest and objectives of the centre or against the intention and purpose of any rules, procedures and standing instructions.

14. During the course, the trainees shall not apply for any employment, scholarship, travelship, part time work and any other training otherwise than through the Chief Executive Officer/Asstt. Principal. They shall submit application through proper channel which will be considered on merits of each case.
15. Trainees shall not commercialise any discovery made in the course of raining or patent of the Centre.

Guidelines for on the job training (OJT)

1. Students of DTDM course will have to undergo OJT for a period of 1 (one) year, which is part of the course and is mandatory.

2. All arrangements with Company for OJT will be made by the Institute.
3. Student's remuneration, facility during OJT at a Company will depend on their performance/merit.
4. Accommodations are to be arranged by the Students.
5. Students shall abide by the rules and regulations set forth by the Institution/ Company where s/he is undergoing OJT.
6. Any Student(s) failing to continue the OJT in the company arranged by the Institute will have to make alternate arrangements on their own and join immediately.
7. Students should always observe discipline and right conduct.
8. Students' attendance shall be observed strictly during the OJT period. Any Student(s) failing to achieve the minimum required attendance, the OJT period shall be extended.
9. Students are expected to submit their Daily work dairy, Company's certificate, Proof of attendance and other necessary documents for assessment at the time of reporting to the Institute.
10. At the end of OJT, Student's performance shall be evaluated by conducting written examination and viva-voce.
11. Stringent action shall be taken to any Student(s) submitting False/ Fake Company's Certificate.

Prospect of 'Diploma in Tool and Die Making' (DTDM) Course

1. The Tool Room & Training Centre has a vital role to play in the national economy. There is hardly any sector of economic activity which does not need the contribution of Tool Room, starting from agriculture, defence, automobiles, electronic, tele-communication, space research, machine building, etc. Tool Room technology was transplanted to India from the most advanced countries like, Germany, Denmark, Switzerland. Students who had successfully completed this Diploma in Tool & Die Making course from different Institutes have been well accepted by the industries all over India as well as Countries like, Singapore, Taiwan, Dubai, Malaysia, U.S.A., Bangladesh, Canada, Italy, Australia, Germany, etc.

2. The DTDM is a specialized engineering course. During the training period, trainees shall develop knowledge and skills in designing and manufacturing of Tools, Dies, Moulds, Jigs, Fixtures, etc. and shall be able to work with Computer Aided Design and Manufacturing software (CAD/CAM), shall learn programming and operation of Computer Numerical Control (CNC)/Automation machines.

3. Industries/ Companies who prefer to employ Diploma in Tool and Die Making passed students are:

   Alex Grinders Pvt. Ltd(Maharashtra), Jyoti Tooling Press Components Pvt. Ltd (Maharashtra), ENCO Engineers Combine Pvt. Ltd, Amina Continental International Consultants Pvt. Ltd, Sahyog Engineering, Pune, Minda Kosei Aluminium Ltd, Vee Gee Auto Components Pvt. Ltd, Jay Bharat Maruti Ltd Automobile, Lumax Industries Pvt.Ltd, JNS Instruments Pvt. Ltd, T.G Minda Pvt.Ltd, Sheet Kraft Automobile Pvt.Ltd, Krishna Maruti Ltd., P.K Motor Workshop, Imphal, Okusa Toyota ,Dimapur, Turbo Engineering, Kohima, Tata Motors, Maruti Suzuki etc.

4. Students of Diploma in Tool and Die Making are trained with the required skill set which are in high demand at various industries. They gain technical exposure during the course of the training which gives them the confidence to venture into different trades. The Centre aims to promote and develop skill development and entrepreneurship among the students/ trainees providing them opportunities towards self-sustainance and earn livelihood. DTDM Students after completion of the Course can take up Entrepreneurship through various Schemes such as Micro Units Development and Refinance Agency (MUDRA), Credit Guarantee Fund Scheme for Micro and Small Enterprises (CGTMSE), Credit Facilitation through bank scheme by National Small Industries Corporation (NSIC) and Prime Minister's Employment Generation Programme (PMEGP) under Khadi & Village Industries Commission. Also, students having Entrepreneurial Skills/ Innovative Ideas can be incubated and developed through Start-Up India Scheme, Government of India.

STATE COUNCIL FOR TECHNICAL EDUCATION NAGALAND

KOHIMA : : NAGALAND

Below Civil Secretariat Complex, Kohima – 797004

CERTIFICATE OF AFFILIATION

NO	001			Date	03-04-2022	
Sl. No	**Registration No.**	**Name of Course**	**Name of Institute**	**Type**	**Validity**	**Remarks**
1	SCTE/001/2018	DIPLOMA IN TOOL & DIE MAKING	NAGALAND TOOL ROOM AND TRAINING CENTRE	UNDER GOVERNMENT SOCIETY	2022-23	

- Renewal of Affiliation is to be done annually except for NBA Accreditated course/s which shall be for 2 (Two) years subject to fulfilment of Norms and Guidelines of the Council

State Council for Technical Education Nagaland : Kohima

SECRETARY
SCTE
Directorate of Technical Education
Nagaland : Kohima

Secretary
SCTE
Directorate of Technical Education
Nagaland:Kohima

PHOTO GALLERY

Group Photo of Diploma Students at NTTC, Dimapur

6th Semester students during Techinical Festival 'Naga Tech' at Kohima

Students of 6th Semester at TECHBLITZ, Kaziranga University (Jorhat)

INDUSTRIAL TOUR AS PART OF THE CURRICULUM

CIPET, Imphal

Nagaland State Mineral Development Corporation Ltd., Chumukedima

Okusa Toyota, Dimapur

Viva Beverages, Dimapur

Students at Practical Class

GOVERNMENT OF NAGALAND
DEPARTMENT OF HIGHER AND TECHNICAL EDUCATION
NAGALAND; KOHIMA

N O T I F I C A T I O N

Dated Kohima, the 13th Feb.2014

NO.HTE/TE/10-3/04 (Pt) : As decided in the 7th Meeting of State Council for Technical Education held on 12th September 2013, the Governor of Nagaland is pleased to recognize "4-year Diploma in Tool & Die Making" being taught at Nagaland Tool Room & Training Centre, Dimapur, as equivalent to 3-year Diploma in Mechanical Engineering.

Sd/- F.P.SOLO
Commissioner and Secretary to the Govt. of Nagaland

NO.HTE/TE/10-3/04 (Pt) **Dated Kohima the 13th Feb. 2014**

Copy to:

1. The Sr. PS to Hon'ble Parliamentary Secretary, Technical Education, Nagaland, Kohima.
2. The Comm. & Secretary to the Govt. of Nagaland, Deptt. of Industries & Commerce, Nagaland, Kohima.
3. The Director of Technical Education, Nagaland, Kohima.
4. The Director of Industries & Commerce, Nagaland, Kohima.
5. Chief Executive Officer, Nagaland Tool Room & Training Centre, Dimapur.
6. Publisher, Nagaland Gazettee for Publication in the next issue.
7. Office copy/Guard file.

13/02/14

(IMTIMENLA)
Deputy Secretary to the Govt. of Nagaland

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