**CONTACT DETAILS OF THE AWARDING BODY FOR THE QUALIFICATION**

**Name and Address of Awarding Body:**

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Indo Danish Tool Room,

M4,Part 6,Tata Kandra Road,Gamharia

Jamshedpur-0657,2201261/62

**Name and contact details of individual dealing with the submission**

**Name:**

Mr. Anand Dayal

General Manager

Indo Danish Tool Room,

M4,Part 6,Tata Kandra Road,Gamharia

Jamshedpur-

**Tel number(s):** 0657,2201261/62

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**SUMMARY**

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| **Qualification Title: MASTER CERTIFICATE COURSE IN COMPUTER AIDED TOOL ENGINEERING** |
| **Nature and Purpose of the Qualification:**  **Nature:** Master Certificate Course  **Purpose:** Learners who attain this qualification are competent in Tool Engineering and can get a job as Tool Engineer or become an entrepreneur.   * Qualifying learners attain skills to work in Design department to carry out designing of Press Tools and Moulds using CAD/CAM software. |
| **Body/bodies which will award the Qualification:**  **Indo Danish Tool Room , Jamshedpur.** |
| **Body which will accredit providers to offer courses leading to the qualification:**  **Indo Danish Tool Room , Jamshedpur.** |
| **Body/bodies which will be responsible for assessment:**  **Indo Danish Tool Room , Jamshedpur.** |
| **Occupation(s) to which the Qualification gives access:**  Tool Engineer. |
| **Proposed level of the Qualification in the NSQF:**  Level-6 |
| **Anticipated volume of training /learning required to complete the Qualification:**  780 Hours |
| **Entry requirements/recommendations:**  Preferably Diploma/ Degree  (Mech. Engineering or equivalent) |
| **Progression from the qualification:**  After completion of course and after 4 years of experience the trainee can work as a Sr. Tool Engineer after 8 years of experience job holder can work as Manager (Tool Engineering). |
| **Planned arrangements for the Recognition of Prior Learning (RPL)**  Yes |
| **International comparability where known:**Not Known |
| **Date of Planned review 1.1.2019** |

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| **Formal structure of the qualification** | | | | |
| SR. NO | Title and identification code of component. | Mandatory /  Optional | Estimated size  (learning hours) | Level |
| 1 | Computer Aided Design  (CAD-Auto CAD and Solid works) | Mandatory | 120 | Level 6 |
| 2 | Computer Aided Design & Computer Aided manufacturing  (Unigraphics CAD & Unigraphics CAM) | Mandatory | 120 | Level 6 |
| 3 | Computer Aided Engineering  ( ANSYS & HYPERMESH) | Mandatory | 120 | Level 6 |
| 4 | Advance Computer Aided Design  (CREO Parametric) | Mandatory | 80 | Level 6 |
| 5 | Design of Press Tools | Mandatory | 100 | Level 6 |
| 6 | Design of Moulds | Mandatory | 100 | Level 6 |
| 7 | Entrepreneurship | Mandatory | 20 | Level 6 |
| 8 | Course-work: Project | Mandatory | 120 | Level 6 |

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| **Body/Bodies which will carry out Assessment:**  A separate department / body – Training Assessment Wing of Indo Danish Tool Room, Jamshedpur. |
| **Will the Assessment Body be responsible for RPL Assessment?**  Yes, Assessment body will be responsible for RPL assessment.  Learners who have met the requirements of any Unit Standard that forms part of this qualification may apply for recognition of prior learning to the relevant Education body. The applicant must be assessed against the specific outcomes and with the assessment criteria for the relevant Unit Standards. |
| **Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, consistent and fair and show that these are in line with the requirements of the NSQF.**  **1. ASSESSMENT GUIDELINE:**   * Criteria for assessment based on each learning outcome, will be assigned marks proportionately to its importance. * The assessment for the theory & practical part is based on knowledge bank of questions created by trainers and approved by **Examination Cell of Indo Danish Tool Room , Jamshedpur..** * For each Individual batch, Examination cell will create unique question papers for theory part as well as practical for each examination. * To pass the Qualification, every trainee should score a minimum of 70% cumulatively (Theory and Practical) * Assessment comprises the following components: * Exercises carried out in labs/workshop * Presentation * Answer sheet of assessment * Viva –voce * Student Progress chart * Attendance and punctuality   **2. ASSESSORS:**  **Indo Danish Tool Room , Jamshedpur** faculty looking after the course “**MASTER CERTIFICATE COURSE IN COMPUTER AIDED TOOL ENGINEERING**”, also assesses the students as per guidelines set by **Examination Cell of Indo Danish Tool Room , Jamshedpur** Faculties have been trained from time to time to upgrade their skills on various aspects such as conduct of assessments, teaching methodology etc.  **3. ELIGIBILITY TO APPEAR IN THE EXAM:**  Minimum 70% attendance is compulsory for the students to appear for the assessments.  **4. MARKING SCHEME:**   |  |  |  |  | | --- | --- | --- | --- | | **Sr. No.** | **Method of Assessments** | **Weightage** | **Evaluator** | | **1** | Design of Press Tool & Mold | 25 | **Trainer + Moderator (Head of Dept)+ Examiner nominated by Examination cell (IDTR)** | | **2** | Written test | 20 | | **3** | CNC Programming on CAD / CAM | 15 | | **4** | Computer Aided Engineering | 10 | | **5** | Project | 10 | | **6** | Communication/Employability  skills | 10 | | **7** | Internal assessment | 10 | | **Total** | | **100** |  |   **5. PASSING MARKS:**  **5. PASSING MARKS:**  Passing criteria is based on marks obtain in attendance record, term works, assignments, practical’s performance, viva or oral exam, module test, class test, practical exam and final exam.  Minimum Marks to pass practical exam –60%  Minimum Marks to pass theory exam – 40%  Minimum Marks to class test –40%  Minimum Marks to pass viva / oral exam –60%  Minimum Marks to pass Project report and presentation exam –60%  Grade Equivalents: -  >85% Ex  >65% & <85% A  >50% & <65% B  >35% & <50% C  <35% D  **6. RESULTS AND CERTIFICATION:**  The assessment results are backed by evidences collected by assessors. Successful trainees ar e awarded the certificates by **Indo Danish Tool Room , Jamshedpur.** |

**ASSESSMENT EVIDENCE:**

Assessment evidence comprises the following components document in the form of records:

* 1) Job carried out in labs/workshop
* 2) Record book/ daily diary
* 3) Answer sheet of assessment
* 4) Viva –voce
* 5) Progress chart
* 6) Attendance and punctuality

**Title of Component: Master Certificate Course in Computer Aided Tool Engineering**

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| **LO** | **Assessment outcome description** | **Theory** | **Practical** | **Total** |
| Identify customer’s requirement and create Conceptual Design of Tool. | * Gather accurate information on the requirements of the customer from various sources e.g. 2D component drawing (Hard / soft copy), 3D model, and Existing sample. * Identify any unique or specific features that need particular consideration and types of press tool & mould * record all relevant information in the appropriate information systems for future use * confirm the operational and functional requirements and quality criteria of the design * Identify clearly any design constraints i.e. component material details e.g. component material, shear strength, ultimate tensile strength, material behavior, cutting clearance etc. * ensure that the design brief captures all the requirements of the customer * Save the design brief and communicate it to the relevant people, as per organizational process. * Identify types of press tool & Mould. Ensure that the machine details like types of machine, press capacity; min. shut height, stroke length, bed-table size, stroke,mold size, molding capacity, size of machine, shrinkage, component weight, feed system weight etc. * Obtain functional and specific requirement of component like die & punch material, gate location and type, parting line constraint, ejection mark constraint. * Using standard parts and organizational standard e.g.Tolerance, marking standard. * Using standard unit system as customer’s requirement. |  |  |  |
| Develop plan for Tool Engineering process | * Identify the design activities to be undertaken * establish the responsibilities for developing specific aspects of the design * identify the activities that make up the design process * establish the responsibility for each activity * Identify the resources necessary to undertake the design process. * Develop a schedule for the design process e.g. works order date, plan date, actual completion date. * Design and develop various activities plan date and actual work date by include remarks. E.g. conceptual design & review, design review/approval from internal and customers, BMO release, presentation of tool, verification of tool, preparation of tools. * agree the schedule with the appropriate people * Establish priorities for completion of the design process within deadlines. * ensure that the design process complies with all relevant regulations, directives and guidelines obtain approvals of the relevant people for the design plan * save and store the design documentation as per organizational guidelines * communicate information to the appropriate people using various company specific media. |  |  |  |
| Create and evaluate Tool Engineering option | * Obtain and review existing information with reference to the specified design requirement like 2D drawing and 3D model, existing sample, etc. * Prepare outline ideas for the designs by using conceptual design work or collect similar information. * Carry out the design process, utilizing the appropriate technology e.g. Tool/die is suitable/compliable to specified machines. * Obtain the tool part can be manufactured and assemble easily. * Select the material suitable for the type of tool. * document all facets of the design activity and Communicate the outcomes of the design process. * deliver the designs in the appropriate format to the customers * confirm and agree understanding of the design requirements * deal with problems relating to the design requirements and agreed solutions |  |  |  |
| Describe tool Design procedure | **Press tool**   * Identify types of press tool as per needs * Calculate cutting clearance * Determine punch and die size * Decide best suitable strip layout based on efficiency * Calculate die dimensions like margin, thickness length & width * Calculate total height of punch, area of punch block * Select Die set and fasteners standard size * Bill of material * Draw assembly drawing * **Mould** * Identify types of mould tool * Analyze number of cavity * Calculate core & cavity size * Determine the sizes of core and cavity plate * Select standard mould base * Draw conceptual design with tentative bill of material * Validate design in consultation with group/faculty * Final design |  |  |  |
| Design and Development of Mould | * Describe terminology in moulds * List different types moulds & elements of moulds * Describe the functions of element / component of tools * To select standard moulds system * To explain significance of parting surface * To select split molds * To use standard parts for split molds * Understand side cores and cavities * Design molding with undercuts * To identify and apply various design features * To draw the conceptual drawing for appropriate mould * Perform design calculation for tooling * To select different standard element. * To draw final tool design. * Prepare bill of material | 40 | 60 | 100 |
| Design and Development of Press tool | * Understand and classify Press machines * Describe the characteristics of press machines * Understand feeding and unloading equipment * Have fundamental knowledge of Design principles of presses * Explain shearing theory * List different type of tools * Perform mathematical calculations for designing * Will be able to calculate best economy for production. * Describe and select elements of press tool * Perform Design calculation for elements * Apply alignment system design for press tool, * Explain compound and progressive dies * Design Compound and progressive tool | 40 | 60 | 100 |
| Develop tool design using CAD software & analyze tool using CAE Software | * plan the modeling activities before starting them * use appropriate sources to obtain the required information * access and use the correct modeling software and tools * create entities in 3D space as per job requirement * modify entities in 3D space as per job requirement * create 3-D views on the screen by manipulating drawing planes and inserting 3-D geometric shapes * creating swept, extruded and revolved solids in 3-D space * produce sectioned models (cutting planes and cross hatching) * identify and use key features of solid modeling software package to produce models * identify and use key features of solid modeling software package to produce models Key features: extrude, extrude cut, solid model, mirror, revolve, wire frame, radius/chamfer, hide, rib, rectangular pattern, fillet, cut/remove, circular pattern, shell, development view, motion analysis, animation, defining material property, exploded views * Modify parts in the assembly environment using the following features: constrained parts and assemblies, straight lines, insertion of standard components, hidden detail, dimensions, symbols and abbreviations, hatching and shading. * produce 3-D drawings incorporating section views with all necessary annotation * confirm that the model is as per job specifications and contains all relevant information * save the models in the appropriate file type and location * produce hard copies of the finished models, with sufficient detail to allow production * Analyze using CAE software, interpret of output and apply CAE in Tool Engineering. | 120 | 200 | 320 |
| Develop CAM Programming using  CAM software | * To draw final tool design. * Prepare bill of material * Plan the machining activities before starting them. * Access and use the correct CAM software and tools e.g. using UG-CAM software * Calculate parameters like speed feed , depth of cut etc. and set a references for the various operations * create / import entities in 3D space as per job requirement * modify entities in 3D space as per job requirement * create 3-D views on the screen by manipulating drawing planes and inserting 3-D geometric shapes * identify and use key features of CAM software package to produce program * perform programming for solid modeling * produce CAM program which comply with organizational guidelines; statutory regulations and codes of practice; CAM software standards; national and international standards * confirm that the program is as per job specifications and contains all relevant information * use appropriate techniques to create program that are sufficiently and clearly detailed * use codes and other references that follow the required conventions * make sure that programs are checked and approved by the appropriate person * save the program in the appropriate file type and location | 60 | 60 | 120 |
| Develop entrepreneurship skills | * Meaning and importance of entrepreneurship * Enterprise Registration. * Business Skills - Motivation and Leadership * Book keeping Inventory and Working * Management * Effective Communication. * Managerial Accounting. * Financial Analysis and Planning * Developing a Business Plan * Interpersonal Relationships | 20 |  | 20 |
| Work on project | * gather accurate information on project concept and requirements * identify different design options which will meet requirements and design specification * Analyze project concepts to meet design requirements * identify problems with work planning, procedures, output and behavior and their implications e.g. unpredictable behavior of material in sheet metal, mould   and die casting during validation Identify effective resolution techniques.   * select and apply resolution techniques   take decisions within if within own jurisdiction or take approval for case outside own jurisdiction |  | 120 | 120 |

**EVIDENCE OF RECOGNITION AND PROGRESSION**

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| **What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?**  Relevant information was collected from Industries and allied sector working in this area.  The Automotive Components industries are recruiting people based on the qualification acquired. Maximum of the industries accept this as qualification for selection/short listing of the individual approved by members.  **Vertical Pathway:**  The Occupational Map has been created & attached.  The Tool Engineer has a clear pathway  **Horizontal Pathway:**  The individual can migrate within the Automotive Components related industries. |