



QUALIFICATION FILE

Senior technician-Information Technology and Data Science

- ☐ ☐ Short Term Training (STT) ☒ Long Term Training (LTT) ☐ Apprenticeship
☐ Upskilling ☐ Dual/Flexi Qualification ☐ For ToT ☐ For ToA
☒ General ☐ Multi-skill (MS) ☐ Cross Sectoral (CS) ☐ Future Skills ☐ OEM

NCrF / NSQF Level: 4.5

Submitted By:

NETTUR TECHNICAL TRAINING FOUNDATION
23/24, II PHASE, PEENYA INDUSTRIAL AREA,
BENGALURU - 560058, KARNATAKA

Table of Contents

Section 1: Basic Details	3
Section 2: Module Summary.....	6
Section 3: Training Related	8
Section 4: Assessment Related	8
Section 5: Evidence of the need for the Qualification.....	9
Section 6: Annexure & Supporting Documents Check List	10
Annexure 1: Evidence of Level.....	11
Annexure 2: Tools and Equipment (Lab Set-Up).....	14
Annexure 3: Industry Validations Summary	15
Annexure 4: Training & Employment Details	17
Annexure 5: Blended Learning.....	18
Annexure 6: Detailed Assessment Criteria	19
Annexure 7: Assessment Strategy	22
Annexure 8: Model Curriculum	26
Annexure 9: Career Progression	32
Annexure 10: Assessment SOP	33
Annexure 11: Occupational Map.....	34
Annexure 12: Key Learning Outcome	37
Annexure: Acronym and Glossary	40

Section 1: Basic Details

1.	Qualification Name	Senior Technician- Information Technology and Data Science	
2.	Sector/s	Computer and Information Technology	
3.	Type of Qualification: ☒ New ☐ Revised ☐ Has Electives/Options ☐ OEM	NQR Code & version of existing/previous qualification: (change to previous, once approved)	Qualification Name of existing/previous version: Senior technician Information Technology and Data Science
4.	a. OEM Name b. Qualification Name (Wherever applicable)	NA	
5.	National Qualification Register (NQR) Code & Version (Will be issued after NSQC approval)	QG-4.5-IT-01988-2024-V1-NTTF	6. NCrF/NSQF Level: 4.5
7.	Award (Certificate/Diploma/Advance Diploma/ Any Other) (Wherever applicable specify multiple entry/exits also & provide details in annexure)	Certificate	
8.	Brief Description of the Qualification	The Candidate of Information Technology and Data Science will have skills catering to the demanding technologies, Web development, Full stack Development, Software development, Software Testing, Artificial Intelligence and Machine Learning, Data Analytics and Data warehousing. The subjects covered in this Programme are Full Stack Development, R – Programming, Artificial Intelligence and Machine Learning English Technical Writing, Information System Analysis, System Documentation, Principles of Business Operations, Employability Skill, Business IT Project, Artificial Intelligence and Machine Learning Lab, Full Stack Development Lab, R – Programming Lab, OJT	

9.	Eligibility Criteria for Entry for Student/Trainee/Learner/Employee	a. Entry Qualification & Relevant Experience: <table border="1"> <tr> <th data-bbox="907 256 1031 354">Sl. No.</th> <th data-bbox="1031 256 1753 354">Academic/Skill Qualification (with Specialization - if applicable)</th> <th data-bbox="1753 256 2032 354">Required Experience (with Specialization - if applicable)</th> </tr> <tr> <td data-bbox="907 354 1031 435">01</td> <td data-bbox="1031 354 1753 435">Advance Certificate - Software Developer (Level 4.0) from NTTF</td> <td data-bbox="1753 354 2032 435">NA</td> </tr> </table>						Sl. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)	01	Advance Certificate - Software Developer (Level 4.0) from NTTF	NA												
Sl. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)																							
01	Advance Certificate - Software Developer (Level 4.0) from NTTF	NA																							
10.	Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))	Total Credits – 40		11. Common Cost Norm Category (I/II/III) (Wherever applicable): NA																					
12.	Any Licensing requirements for Undertaking Training on This Qualification (wherever applicable)	NA																							
13.	Training Duration by Modes of Training Delivery (Specify Total Duration as per selected training delivery modes and as per requirement of the qualification)	☐ Offline ☐ Online ☒ Blended <table border="1"> <thead> <tr> <th data-bbox="907 683 1178 781">Training Delivery Modes</th> <th data-bbox="1178 683 1304 781">Theory (Hours)</th> <th data-bbox="1304 683 1444 781">Practical (Hours)</th> <th data-bbox="1444 683 1640 781">OJT/Project Mandatory (Hours)</th> <th data-bbox="1640 683 1871 781">OJT Recommended (Hours)</th> <th data-bbox="1871 683 2018 781">Total (Hours)</th> </tr> </thead> <tbody> <tr> <td data-bbox="907 781 1178 829">Classroom (offline)</td> <td data-bbox="1178 781 1304 829">260</td> <td data-bbox="1304 781 1444 829">380</td> <td data-bbox="1444 781 1640 829">440</td> <td data-bbox="1640 781 1871 829">-</td> <td data-bbox="1871 781 2018 829">1080</td> </tr> <tr> <td data-bbox="907 829 1178 878">Online</td> <td data-bbox="1178 829 1304 878">120</td> <td data-bbox="1304 829 1444 878">-</td> <td data-bbox="1444 829 1640 878"></td> <td data-bbox="1640 829 1871 878">-</td> <td data-bbox="1871 829 2018 878">120</td> </tr> </tbody> </table> (Refer Blended Learning Annexure for details)						Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT/Project Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)	Classroom (offline)	260	380	440	-	1080	Online	120	-		-	120
Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT/Project Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)																				
Classroom (offline)	260	380	440	-	1080																				
Online	120	-		-	120																				
14.	Aligned to NCO/ISCO Codes (if no code is available mention the same)	NCO Code – 2015/2512.0100, 2015/2514.9900, 2015/2512.0204, 2015/3514.0300																							
15.	Progression path after attaining the qualification. (Please show Professional and Academic progression)	Professional Progression: After Completion of 3 years of Full Time Programme and after 3 years of Industry Experience the Job holder can work as Software Developer, Web Developer, FullStack Developer, Test Engineer, Data Analyst and Quality Assurance Specialist. Academic Progression: Post-Diploma, B.VoC. and B.Tech. Degree Course in Relevant areas.																							

16.	Other Indian languages in which the Qualification & Model Curriculums are being submitted	Hindi	
17.	Is similar Qualification(s) available on NQR-if yes, justification for this qualification	☐ Yes ☒ No URLs of similar Qualifications: NA	
18.	Is the Job Role Amenable to Persons with Disability	☐ Yes ☒ No If "Yes", specify applicable type of Disability:	
19.	How Participation of Women will be Encouraged	Yes - Admission open to women candidates (30% seats reserved for women)	
20.	Are Greening/ Environment Sustainability Aspects Covered (Specify the NOS/Module which covers it)	☒ Yes ☐ No Principles of Business Operations Module code: CP09515T	
21.	Is Qualification Suitable to be Offered in Schools/Colleges	Schools ☐ Yes ☒ No Colleges ☐ Yes ☒ No	
22.	Name and Contact Details of Submitting / Awarding Body SPOC <i>(In case of CS or MS, provide details of both Lead AB & Supporting ABs)</i>	Name: Mr. R Rajagopalan Position in the Organization: Joint Managing Director Email: rg@nttf.co.in Tel. number: 080 - 28390215 Contact Number: 9844013448 Website: ntftftrg.com	
23.	Final Approval Date by NSQC: 31 Jan 2024	24. Validity Duration: 3 Years	25. Next Review Date: 01 Feb 2027

Section 2: Module Summary**NOS/s of Qualifications** (In exceptional cases these could be described as components)**Mandatory Module/ NOS/s:** Specify the training duration and assessment criteria at NOS/ Module level. For further details refer curriculum document. – In Annexure**Th.-Theory Pr.-Practical OJT-On the Job Man.-Mandatory Training Rec.-Recommended Proj. -Project**

Sl. No.	NOS/Module Name	NOS/ Module Code & Version	Core/ Non-Core	NCrF/ NSQ F Level	Credits as per NCr F	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
Semester - 5																
1	Advanced HTML, CSS, W3 & Full Stack Development	CP09506T, V1.0	Core	4.5	20	60	-	-	-	60	100	-	-	-	100	
2	English Technical Writing	CP09508T, V1.0	Core	4.5		60	-	-	-	60	100	-	-	-	100	
3	Information System Analysis & System Documentation	CP09509T, V1.0	Core	4.5		60	-	-	-	60	100	-	-	-	100	
4	R-Programming	CP09510T, V1.0	Core	4.5		60	-	-	-	60	100	-	-	-	100	
5	Principles of Business Operations	CP09515T, V1.0	Core	4.5		40	-	-	-	40	100	-	-	-	100	
6	Advanced HTML, CSS, W3 & Full Stack Development Lab	CP09511P, V1.0	Core	4.5		-	100	-	-	100	-	80	-	20	100	
7	Business IT Project	CP09514P, V1.0	Core	4.5		-	120	-	-	120	-	80	-	20	100	
8	R-Programming Lab	CP09516P, V1.0	Core	4.5		-	80	-	-	80	-	80	-	20	100	
9	Employability Skill	CP09517T, V1.0	Core	4.5		20	-	-	-	20	75	-	-	25	100	
Duration (in Hours)/ Total Marks					20	300	300	-	-	600	575	240	-	85	900	
Semester – 6																
10	Project	CP09601P, V1.0	Core	4.5	20	-	-	140	-	140	-	80	-	20	100	
11	OJT	CP09604P, V1.0	Core	4.5		-	-	300	-	300	-	75	-	25	100	
12	Artificial Intelligence and Machine Learning	CP09602T, V1.0	Core	4.5		40	-	-	-	40	100	-	-	-	100	
13	Artificial Intelligence and Machine Learning Lab	CP09603P, V1.0	Core	4.5		-	80	-	-	80	-	80	-	20	100	
14	Employability Skill	CP09602T, V1.0	Core	4.5		40	-	-	-	40	75	-	-	25	100	
Duration (in Hours)/ Total Marks					20	80	80	440	-	600	175	235	-	90	500	
Total					40	380	380	440	-	1200	750	475	-	275	1400	

Elective Modules / NOS/s: NA

Sl. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/ Non-Core	NCrF/NSQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
1.																
2.																
Duration (in Hours) / Total Marks																

Optional Modules / NOS/s: NA

Sl. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/ Non-Core	NCrF/NSQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
1.																
2.																
Duration (in Hours) / Total Marks																

Assessment - Minimum Qualifying Percentage

Please specify **any one** of the following:

Minimum Pass Percentage: (Every Trainee should score specified minimum aggregate passing percentage at qualification level to successfully clear assessment)

To pass the Qualification, the trainee should score Minimum 40% in each Theory module, 50% in each Practical module and 60% in Project.

Section 3: Training Related

1.	Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	Diploma in relevant field with 3 years as trainer or industry experience B. Tech or BE with 2 years of trainer or industry experience
2.	Master Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	Diploma in relevant field with 5 years as trainer or industry experience B. Tech or BE with 5 years of trainer + industry experience
3.	Tools and Equipment Required for Training	☒ Yes ☐ No (If "Yes", details to be provided in Annexure)
4.	In Case of Revised Qualification, Details of Any Upskilling Required for Trainer	NA

Section 4: Assessment Related

1.	Assessor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	Diploma with 4 years as trainer or industry experience B. Tech or BE with 3 years as trainer or industry experience
2.	Proctor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	Diploma or B. Tech or BE with 2 years of experience
3.	Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	Diploma with 4 years as trainer or industry experience B. Tech or BE with 3 years as trainer or industry experience
4.	Assessment Mode (Specify the assessment mode)	Blended theory (online and offline in the centre) and practical
5.	Tools and Equipment Required for Assessment	Same as for training ☒ Yes ☐ No (details to be provided in Annexure-if it is different for Assessment)

Section 5: Evidence of the need for the Qualification*Provide Annexure/Supporting documents name.*

1.	Research Reports: The following reports establish the Skilled Resource requirement for Computer Hardware and IT areas. 1. MSDE/ NSDC Report on Human Resources and Skill Requirements in the IT and ITes Sector (2013- 2017, 2017 – 2022) 2. Annual Report 2021-22 of Ministry of Electronics and Information Technology The above Reports predict Higher growth in IT Sector
2.	Latest Market Research Reports or any other source (not older than 2 years) (Yes/No): Yes Report by India Brand EQUITY Foundation on Indian IT and BPM Industry-2022 The Report Forecast a higher growth in demand for Skilled Manpower with Computer and IT skills.
3.	Government /Industry initiatives/ requirement (Yes/No): Yes 1. Study on Job Role of the Future by Indian Institute of Skills. 2. National policy for skill Development and Entrepreneurship 2015 by MSDE has predicted skilled manpower requirement across key sectors by 2022 and has framed many initiatives.
4.	Number of Industry validation provided: 41
5.	Estimated nos. of persons to be trained and employed: 300 / year
6.	Evidence of Concurrence/Consultation with Line Ministry/State Departments: (Letter to be sent to the concerned ministry and copy attached) If “No”, why: Under Process

Section 6: Annexure & Supporting Documents Check List*Specify Annexure Name / Supporting document file name*

1.	Annexure 1: NCrf/NSQF level justification based on NCrf Level / NSQF descriptors (<i>Mandatory</i>)	Yes
2.	Annexure 2: List of tools and equipment relevant for qualification (<i>Mandatory, except in case of online course</i>)	Yes
3.	Annexure 3: Industry Validations Summary	Yes
4.	Annexure 4: Training & Employment Details	Yes
5.	Annexure 5: Blended Learning (<i>Mandatory, in case selected Mode of delivery is “Blended Learning”</i>)	Yes
6.	Annexure 6: Detailed Assessment Criteria (<i>Mandatory</i>)	Yes
7.	Annexure 7: Assessment Strategy (<i>Mandatory</i>)	Yes
8.	Annexure 13: Multiple Entry-Exit Details (<i>Mandatory, in case qualification has multiple Entry-Exit</i>)	No
9.	Annexure: Acronym and Glossary (<i>Optional</i>)	Yes
10.	Supporting Document: Model Curriculum (<i>Mandatory – Public view</i>)	Digital content available to trainees through Edusquares ERP (Will be made public after the qualification is approved) (Annexure 8)
11.	Supporting Document: Career Progression (<i>Mandatory – Public view</i>)	Yes (Annexure 9)
12.	Supporting Document: Occupational Map (<i>Mandatory</i>)	Yes (Annexure 11)
13.	Supporting Document: Assessment SOP (<i>Mandatory</i>)	Yes (Annexure 10)
14.	Supporting Document: Key Learning Outcome	Yes (Annexure 12)
15.	Any other document you wish to submit:	No

Annexure 1: Evidence of Level

NCrF/NSQF Level Descriptors	Key requirements of the job role/ outcome of the qualification	How the job role/ outcomes relate to the NCrF/NSQF level descriptor	NCrF/NSQF Level
Professional Theoretical Knowledge/Process	Develop codes to meet the requirements of software Products and applications. Develop media content and graphic designs for web applications. Work on both front-end and back-end development Processes. Carry out manual/automated tests on software Products/applications/modules. Identify the objective of Data analysis, Define the type, Volume, Key Variables, Format and Structure for the dataset. Will have Capability to Organize and Perform by self and work with others to develop software products and applications.	Job Holder responsible for using specialized knowledge on software programming languages, databases, software integration and delivery platforms to build software products and deliver business solutions. Job holder responsible for designing tests for software products/applications/modules and carry out manual/automated tests on them. Job holder responsible to identify and fix missing and incorrect data values in the imported data set and perform operations to validate the data using appropriate tools and processes.	4.5
Professional and Technical Skills/ Expertise/ Professional Knowledge	Knowledge on developing codes to meet the requirements of software products and applications. Knowledge on preparing test cases using software testing tools. Knowledge on web development tools and Technologies. Knowledge on data bases and connecting the front end and back end. Knowledge on the purpose of the statistical analysis being undertaken.	Interpret and follow different design specifications. Can do basic program structures, software products and software applications using appropriate technologies. Apply the concepts of designing and developing web applications. Establish database connectivity. Identify common design defects, resolve and to recreate failure scenarios.	4.5

	Knowledge on Organizational policies, Procedures and guidelines which relate to importing data from various data sources Knowledge on Organizational policies and procedures to share data. Knowledge of whom to consult when importing and pre-processing data. Knowledge on the range of standard templates and tools available and how to use them.	Perform analysis on different datasets. Learn to deploy appropriate methods, guidelines and tools associated with importing and pre- processing data.	
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	Able to communicate Effectively with Peers and Supervisors in the work area. Good Knowledge on Organization, ethical & moral values and Practice Time Management Able to Analyze solutions Critically and Logically for fine decision making. Able to work Effectively in a Team and lead a Team. Knowledge of the latest Technologies and Industrial Trends. Will have good Ingenuity and Creativity. Will have good Leadership Skills and have an entrepreneurial for small start up	Good Communication with Peers, Superiors both verbal and written, Good on Presentation Skills, QC, 5S and KAIZEN. Can Analyze situations Critically and Logically. Adopt latest Technologies emerging in the Domain. Can lead a group to work Effectively. Can solve, adopt to new Situations Creatively.	4.5
Broad Learning Outcomes/Core Skill	Apply Mathematical Knowledge in his/her domain. Prepare emails for correspondence. Use Internet to get additional Technical Information Safety and standard operating Procedures and Practices in the work area.	Ability to make technical reports and Presentation using MS Office. Correspond through emails. Ability to retrieve necessary technical details from the Internet.	4.5

	Communicate with Peers and Superiors. Critical Thinking, Creativity and Logical thinking. Data collection, analysis, decision making ability. Solve problems using QC tools and contribute for Kaizen in the work areas. Knowledge on effective 5S, TPM and TQM activities	Will follow all safety norms and standard operating Procedures in the work area. Verbal and written communication, computer literacy. Maintain Good Relationship with Peers and Superiors and Will be able to Win Good will and Trust of Peers. Analyze Critical problems in work area and real life. Decision Making ability. Process improvement and problem-solving skills. Able to develop and deploy of intelligent systems that can perform tasks typically requiring human intelligence.	
Responsibility	Aware of Personal/Industrial goals Adapt to changes in the work area. Thorough understanding of safety Procedures and SOPs in the relevant work area Supervise, evaluate and improve the activities of team in the shop floor	Able to Carry out Design and Integration of Hardware/Software Systems Under Minimum Supervision Guide Junior Technicians in Fulfilling Tasks Assigned to them. Maintaining professional and software ethics and confidentiality of the organization.	4.5

Annexure 2: Tools and Equipment (Lab Set-Up)
Tools and Equipment requirement for a batch of 30 Trainees

SOFTWARE REQUIREMENTS

Sl. No.	Software Details	Quantity
1	ATOM 1.43, XAMPP SERVER 7.4.2 – Open source	
2	J2EE – Open source	
3	Visual Studio 2019 – Open source	
4	ECLIPSE (SDK) – Open source	
5	R Studio PRO Server Standard (Student Version) – Open source	
6	NETBEANS 7.2, ECLIPSE 2019 -06, JDK 16.0, Visual Studio 2019 – Open source	
7	All Browser – Open source	

Note:

- The Tools and Equipments and other lab facilities are shared between Qualifications and batches.
- During admission the trainees are supplied with Laptop and toolkit.

Classroom Aids

The aids required to conduct sessions in the classroom are:

1. White board
2. Projector with screen / Smart TV
3. Laptop / computer

Annexure 3: Industry Validations Summary

Provide the summary information of all the industry validations in table. This is not required for OEM qualifications.

Sl. No.	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile (if available)
1	Anvation Lab	Mr. Alok Pugalia		Bangalore	8297188867	alok.pugalia@anvationlabs.com	
2	Godigit	Mrs. Deepthy		Bangalore	7219166216	deepthy.m@godigit.com	
3	Lucidimaging	Mrs. Vidhya		Bangalore	7619211007	vidhya@lucidimaging.in	
4	Applied Materials	Mr. John		Bangalore	8066283840 338636327	John_Kumar@contractor.amat.com	
5	Thought works India	Mr. Ganesh		Bangalore	8754491374	stepchennai@thoughtworks.com	
6	Samsung	Mr. Sumit		Bangalore	8826363651	sumit.premi@samsung.com	
7	By tech India Pvt Ltd	Mr. Murali		Bangalore	7760965733	hadmin.blr@bytechindia.com	
8	Unibiz	Mrs. Prachi		Bangalore	080-40431501	Prachih@in.unibiz.com	
9	Aliment Software Technologies	Mrs. Jayanthi		Bangalore	9900179294	jayanthi@alimentglobal.com	
10	Happiest minds	Mr. Balaji		Bangalore	8061960731		
11	Uncanny Vision	Mr. Kiran		Bangalore	9743607299	kiran.sonar@uncannyvision.com	
12	Tosibha	Mr. Sermaichamy		Bangalore	8884575263	seemai@wimerasys.com	
13	Smart Ice	Mr. Ravikumar		Bangalore	8867106900		
14	Diya systems	Mr. Srinivas bhat		Bangalore	7022627311	shrinivas.b@glowtouch.com	
15	HGS	Mr. Thomotharan		Bangalore	9743501143		
16	Tata Elxsi Ltd	Ms. Chaitra.M		Bangalore	8022979687	chaithram@tataelxsi.co.in	
17	Pari automation	Mr. Dheraj		Bangalore	8380097138	dhirajc@parirobotics.com	
18	National Instruments	Mr. Harsha Thammaiah		Bangalore	9591997400	niranjan.bv@ni.com	
19	L&T	Mr. Samir Mahato		Bangalore	9740800907	Samir.Mahato @LntTechservices.com	
20	Shiksha-infotech	Mrs. Jyothi		Bangalore	9976048657	jyoti.katare@shikshainfotech.com	
21	Everest IMS	Mrs. Soumya		Bangalore	9663375546	hr@everest-ims.com	
22	Quali test	Mr. Mathew		Bangalore	9620774897	mathai.mathe w@qualitestgroup.com	
23	Uncanny Vision Solutions Pvt. Ltd.	Mr. Kiran		Bangalore	9743607299	saroj@uncannyvision.com	
24	Covalense systems	Mr. Ravi V		Bangalore		ravi.veeraswamy@covalensedigital.com	

25	Nxtgen	Mr. Suveen		Bangalore	9886302009	suveen@nxtgen.com	
26	Frontier Software	Mrs. Renee		Bangalore	9844244299	renee@frontier.in	
27	Tarams Technologies	Mr. Prashanth Murunnikara		Bangalore	9886488014	prasanth.murunnikara@tarams.com	
28	Computer Sciences Corporation India Pvt Ltd	Mr. Arham Husain		Bangalore	9980076150	ahusain2@csc.com	
29	Melange Systems Private Limited	Mr. Sairam Kummara/Mr.vijay		Bangalore		sairam.kummarara@melangesystems.com	
30	Tata elxsi Ltd	Ms. Chaitra.M		Bangalore	9008033720	chaithram@tataelxsi.co.in	
31	Skypro Technologies	Mr. Hussain		Bangalore	9886886884	hussain@skyprotechnologies.com	
32	Kites Softwares Pvt Ltd	Mr. Sreejith		Bangalore	9916320857	sreejith@kitesnet.com	
33	Terrance System Pvt Ltd	Mr.Nandan		Bangalore	09846700726, 0484-2345686	nandan.ajeton@gmail.com	
34	Future Focus Infotech	Mr.Sidhartha Ahiuwalia		Bangalore	9845029428	sidhartha@focusite.com	
35	Virtual Technologies	Mr.P.Viswanathan		Bangalore	9845481482	virtualtech@vsnl.net	
36	Baryons Software Solutions	Ms.Shweta		Bangalore	9448352924, 080-25563591	shweta@baryonssoftsolutions.com	
37	Aliment Software Technologies	Mrs.Jayanthi		Bangalore	9886038812	jayanthi@alimentglobal.com	
38	Acropetal Technologies	Mrs.Vandana		Bangalore	2536 6478 / 2554 2904 / 2554 4348	vandana.rao@acropetal.com	
39	Delopt (Deepthi Research)	Mrs.Seema		Bangalore	40870707	seema@delopt.co.in	
40	Thought Works	Mr.Rajani,Mr.Ganesh		Bangalore	9845094553	stepchennai@thoughtworks.com , stepadvisor@thoughtworks.com	
41	Collabera technologies	Mrs.Devaki S		Bangalore	0-89391-82320,+91 44 49018400	devaki.selvarangam@collabera.com	

Annexure 4: Training & Employment Details**Training and Employment Projections:** *Data to be provided year-wise for next 3 years*

Year	Total Candidates		Women		People with Disability	
	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities
2023	150	More than 2000	75	More than 750	-	
2024	250	More than 2000	125	More than 1250	-	
2025	400	More than 2000	200	More than 2000	-	

Training, Assessment, Certification, and Placement Data for previous versions of qualifications: (Previous years)

Qualification Version	Year	Total Candidates				Women				People with Disability			
		Trained	Assessed	Certified	Placed/ Higher Studies	Trained	Assessed	Certified	Placed/ Higher Studies	Trained	Assessed	Certified	Placed
	2017- 2020	31	26	25	25	11	11	10	10	NIL			
	2018 - 2021	53	49	47	47	16	16	15	15				
	2019 - 2022	74	68	62	62	25	25	24	24				

*Applicable for revised qualifications only, data to be provided year-wise for past 3 years.***List Schemes in which the previous version of Qualification was implemented:**

Three years Full Time Programme

Content availability for previous versions of qualifications:
☐ Participant Handbook ☐ Facilitator Guide ☒ Digital Content ☐ Qualification Handbook ☒ Any Other: In NTTF LMS and Edusquares ERP

Languages in which Content is available: English.

Annexure 5: Blended Learning**Blended Learning Estimated Ratio & Recommended Tools:**

Refer NCVET “Guidelines for Blended Learning for Vocational Education, Training & Skilling” available on:

<https://ncvet.gov.in/sites/default/files/Guidelines%20for%20Blended%20Learning%20for%20Vocational%20Education,%20Training%20&%20Skilling.pdf>

Sl. No.	Select the Components of the Qualification	List Recommended Tools – for all Selected Components	Offline : Online Ratio
1	Theory/ Lectures - Imparting theoretical and conceptual knowledge	Physical classroom, LMS, Web based	80:20
2	Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners	Physical classroom, Workshops, Mock sessions, Case study, Role play, Group Discussions, LMS	85:15
3	Showing Practical Demonstrations to the learners	Workshop / Lab, Video recording, Simulators	70:30
4	Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training	Workshop machines, Lab equipment, Simulators, Mini projects, Project	70:30
5	Tutorials/ Assignments/ Drill/ Practice	Class assignments, LMS assignments, Simulators	60:40
6	Proctored Monitoring/ Assessment/ Evaluation/ Examinations	Physical classroom, Labs, Workshop, Quiz tests, Project	75:25
7	On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training	Industry	100:00

Annexure 6: Detailed Assessment Criteria

Detailed assessment criteria for each NOS/Module are as follows:

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Semester 5					
Advanced HTML, CSS, W3 & Full Stack Development	Learning about Retake (Understanding web for 2019 and beyond)	25	-	-	-
	Using Frontend, Code Management and Debugging and M Server-Side Scripting	25	-	-	-
	Database, Database and Web Security	25	-	-	-
	Web Servers and Extras (Testing, PWAs)	25	-	-	-
	Total Marks	100			
English Technical Writing	Learning about Email Writing, Report Writing and Resume Building	35	-	-	-
	Telephonic Conversation and Personal Interview Skills	35	-	-	-
	Business Etiquettes and Personal Grooming-Understanding the etiquettes	30	-	-	-
	Total Marks	100			
Information System Analysis & System Documentation	Introduction to Information Systems Analysis-Understanding of ISA	25	-	-	-
	Object-Oriented IS Methodologies-Understanding and using of methods	25	-	-	-
	Techniques Associated with Requirements Capture	20	-	-	-
	Process-Oriented IS Methodologies-Case Study and System Documentation	20	-	-	-
	Design or Evaluate an Interface with regard to the Requirements and Characteristics of its Users	10	-	-	-
	Total Marks	100			
R - Programming	History and Overview of R-Programming	20	-	-	-
	Data In and Out of R- Programming	25	-	-	-
	Interfaces to the Outside World-Practicing with R Programming	25	-	-	-
	Control Structures and Functions and Scoping Rules of R-Understanding and implementation	20	-	-	-
	Loop Functions-Practical Programs to run to understand	10	-	-	-
	Total Marks	100			
Principles of Business Operations	Introduction to Operations-Understanding of the Business operations	25	-	-	-
	Goods and Services-Understanding and usage	25	-	-	-
	Supply Chains and Facilities Location-Understanding and usage	25	-	-	-
	Capacity, Resources, Quality and Managing -Case study with Operations	25	-	-	-
	Total Marks	100			
Advanced HTML, CSS, W3 & Full Stack Development Lab	Start with Basic HTML and CSS and W3	-	20	-	5
	The basic layout, Forms and Responsive web design	-	20	-	5
	Started with JavaScript and In depth JavaScript with ES6	-	20	-	5
	Using Angular JS, Angular JS and Node js with Mongo DB	-	20	-	5
	Total Marks	100			

Business IT Project	Synopsis	-	10	-	-
	Design	-	20	-	5
	Coding	-	15	-	5
	Testing	-	15	-	5
	Implementation	-	20	-	5
	Total Marks		100		
R – Programming Lab	Write R program to demonstrate (Create Vector, Mixing Objects)	-	20	-	5
	sub setting a matrix, Factors and Binary Formats	-	20	-	5
	Removing NA values and Simulation using rnorm(), clnorm (), pnorm(), pnorm(), rpois()	-	20	-	5
	Case study Movie Recommendation in R	-	20	-	5
	Total Marks		100		
Employability Skills	Leadership and Motivation	25	-	-	5
	Quality Management	25	-	-	10
	Critical thinking and Problem solving	25	-	-	10
	Total Marks		100		
Semester 6					
Project	Internal Practical	-	25	-	-
	Semester Practical	-	55	-	20
	Total Marks		100		
OJT	OJT	-	75	-	25
	Total Marks		100		
Artificial Intelligence and Machine Learning	Introduction to Generative Artificial Intelligence	15	-	-	-
	Foundations of generative AI	15	-	-	-
	Large Language Models	25	-	-	-
	NLP and Prompt Engineering	20	-	-	-
	Generative AI's consideration	25	-	-	-
	Total Marks		100		
Artificial Intelligence and Machine Learning Lab	Data Preprocessing	-	5	-	2
	Label encoding, Logistic regression classifiers	-	5	-	2
	Naive Bayes classifier, Confusion matrix	-	10	-	2
	Classifying income data using Support Vector Machines	-	5	-	2
	Neural networks construction, Convolutional Neural Networks	-	10	-	2
	Weight clustering in Keras	-	5	-	2
	Generative Adversarial Networks (GAN) using TF	-	5	-	2
	Tensor Board	-	5	-	2
	Pytorch Case study 1: AI in Health care	-	15	-	2
	Case study 2: AI in sustainable energy management	-	15	-	2
	Total Marks		100		
Employability Skills	Labour Welfare and Legislation	15	-	-	5

	Customer Interaction/ Service	15	-	-	5
	Conflict resolution and Negotiation	15	-	-	5
	Getting ready for Entrepreneurship	15	-	-	5
	Job readiness and Exam Preparation	15	-	-	5
	Total Marks	100			

Annexure 7: Assessment Strategy

1. ASSESSMENT STRATEGY

The Criteria for assessment is based on Modules, and. will be assigned marks proportional to its importance.

The assessment for the semester-based qualification is carried out by conducting Formative and Summative Assessments.

Regarding Theory – Sessional is based on Intermediate Tests, File / Assignments & Viva –voce: Semester end examination wherein for each Individual batch, A&E dept. at Corporate office, Bangalore creates unique question papers for theory part as well as practical – Theory comprises MCQ and descriptive questions drawn randomly from Question Bank.

Regarding the practical part, the experiments/ exercises are performed by the trainees during the LAB Hours and the trainees are allowed to record the learning of it which will be carried as their Record Marks & one Lab Test and semester end examination. Semester end examination is outcome-based experiments/ exercises of the course will be given to trainees to perform and based on the performance the mark will be awarded. The passing criteria is based on practical's performance, viva or oral exam, Test and final semester end examination.

Theory and practical Examinations are carried out by Examiners under the overall supervision of the Assessment and Evaluation Dept.

Evaluation of Theory and Practical examination is carried out by the Trained Assessors (NTTF faculty members) under the supervision of Shopfloor Manager / senior faculty in a fair manner as per the assessment criteria set by A&E dept. of NTTF.

The Tabulation and processing of results shall be carried out under EDUSQUARE campus Software.

Assessment comprises the following components:

- Job carried out in Labs / workshops
- Record book
- ONLINE Examination
- Answer sheet of assessment
- Viva-voce
- Semester end examination
- ON-THE-JOB training
- Tech Talk / Shop Talk
- Extracurricular and Co-curricular Activities
- Projects
- Attendance and punctuality

2. ASSESSORS

Evaluation of Theory & Practical examination is carried out by the Trained Assessors (NTTF faculty members) in a fair manner as per the assessment criteria set by A&E dept. of NTTF.

Assessors / Faculties are trained from time to time to upgrade their skills on various aspects such as conduct of assessments, teaching methodology etc.

3. ELIGIBILITY TO APPEAR FOR THE EXAM

- The candidates should have an attendance of a minimum 90% in a semester.
- The candidates should have secured minimum Sessional Marks in Theory & Practical

4. PASS CRITERIA

To pass the Qualification, every trainee should score a minimum of 40% in each Theory and 50% in each Practical and 60% in OJT / Projects.

5. RESULTS AND CERTIFICATION

The assessment results are backed by evidence collected by assessors. Successful trainees are awarded the Diploma certificate by NTTF Corporate Office.

6. ON THE JOB

1. The candidate must score 60% to successfully complete the OJT.
2. Tools of Assessment that will be used for assessing whether the candidate is having desired skills and etiquette of dealing with customer needs and requirements and perform Soft Skills effectively:
 - Videos/photos of Trainees during OJT
 - Suggestions / Kaizens from trainees
 - Rewards and appreciation to trainees as applicable
3. Assessment will ensure the following:
 - Effective engagement with the customers
 - Understand the working of various tools and equipment.

7. SYSTEM OF GRADING

An alphabetical letter grade will be assigned for each subject based on the total marks scored in the sessional and end semester examination.

Equivalent Grade Points are used: A = 9.5, B = 8.5, C = 7.5, D = 6.5, E = 5.5, F = 0 (FAIL), I = Incomplete (MP/AB/SP) Supplementary cleared = E

The student will be issued Semester Grade Report calculating SGPA / CGPA as follows:

$$\text{Semester Grade Point Average (SGPA)} = \frac{\sum (\text{No. of Credits} \times \text{Grade Point})}{\sum (\text{No. of Credits for the Program})}$$

$$\text{Cumulative Grade Point Average (CGPA)} = \sum (\text{SGPA} \times \text{total Credits of each semester})$$

 Total credits Acquired
Awarding of class:**a) Awarding of class for semester:**

SGPA	Classification
8.5 and above	First class with distinction
7.5 to 8.4	First class
6.0 to 7.4	Second class
5.5 to 5.9	Pass class

b) Awarding of class for Programme:

First class with Distinction	Should have scored CGPA 8.5 and above and should have cleared all Semesters in the first attempt.
First class	Should have scored CGPA 7.5 to 8.4
Second class	Should have scored CGPA 6.0 to 7.4
Pass class	5.5 to 5.9

8. ASSESSMENT TOOLS

All assessment and evaluation activities are carried out under EDUSQUARE campus software which includes Formative assessment and Summative assessment.

- EDUSQUARE : NTTF ERP/CRM used for academic purpose EDUSQUARE erp.nttftg.com used as SaaS (software as a service) mode
- Digital Valuation System: Digital Valuation system is an innovative software solution which automates manual evaluation and help institutions to minimize the time, effort and human errors in the entire valuation process.
- Remote proctoring which includes AI based Auto Proctoring, Student authentication and Multi secure Exam browser as and when the need arises.

List of ICT Tools:

Desktop and laptops
Interactive White Board
CCTV Camera
Pen Drive

Video Conferencing

Biometric

Edusquare: NTTF ERP/CRM used for academic purpose Edusquare erp.nttftrg.com used as SaaS (Software as a Service) mode

Networking: Includes Wireless access Points, Switches, Routers, Controllers across all NTTF

AWS Cloud: AWS Cloud computing platform to host NTTF website www.nttftrg.com and used as backup storage.

Firewall: Network security device protecting our network by filtering traffic and blocking outsiders.

Microsoft (O365/M-365) – Email/office (Word, Excel, PPT, One Drive for all staff/students are provided using Microsoft O365 MDM (BYOD) policies implemented through M365 used as SaaS.

Annexure 8: Model Curriculum

Semester - 5		Module Name: Advanced HTML, CSS, W3 & Full Stack Development CP09506T	Module Code:
Sl. No.	Module Details	Theory Hours 60	
1	Module 1: Retake (Understanding web for 2019 and beyond)	4h	
2	Module 2: Frontend	14h	
3	Module 3: Code Management and Debugging	6h	
4	Module 4: M Server-Side Scripting	12h	
5	Module 5: Database	8h	
6	Module 6: Web API	5h	
7	Module 7: Web Security	4h	
8	Module 8: Web Servers	4h	
9	Module 9: Extras (Testing, PWAs)	3h	

Semester - 5		Module Name: English Technical Writing	Module Code: CP09508T
Sl. No.	Module Details	Theory Hours 60	
1	Email Writing	5h	
2	Resume Building	5h	
3	Report Writing	5h	
4	Passage Writing and Extempore	5h	
5	Status Reporting, Minutes of the Meeting	5h	
6	Presentation Skills	6h	
7	Group Discussion	7h	
8	Personal Interview Skills	5h	
9	Telephonic Conversation	5h	
10	Blogging, Storytelling and Effective use of social media	4h	
11	Business Etiquettes and Personal Grooming	4h	
12	Business Requirement Documentation	4h	

Semester - 5		Module Name: Information Systems Analysis	Module Code: CP09509T
Sl. No.	Module Details	Theory Hours 60	
1	Introduction to Information Systems Analysis	6h	
2	Hard Approaches to the Analysis of Information Systems and system documentation	6h	
3	Soft Approaches to the Analysis of Information Systems and system documentation	4h	
4	Combined Soft/Hard Approaches to the Analysis of Information Systems	5h	
5	Techniques Associated with Requirements Capture	4h	

6	Organization-Oriented and People-Oriented IS Methodologies	7h
7	Process-Oriented IS Methodologies	4h
8	Object-Oriented IS Methodologies	6h
9	Analytical Techniques for Understanding a Complex Organizational Environment	6h
10	Analysis of Factors Influencing a Business Problem	6h
11	Principles of Interface Design and the Requirements and Characteristics of Users that Motivate These	4h
12	Design or Evaluate an Interface with regard to the Requirements and Characteristics of its Users	2h
Semester - 5		
Module Name: R Programming		Module Code: CP09510T
Sl. No.	Module Details	Theory Hours 60
1	History and Overview of R	6h
2	Getting Started with R and R Nuts and Bolts	6h
3	Getting Data In and Out of R	6h
4	Using the readr Package and Using Textual and Binary Formats for storing data	6h
5	Interfaces to the Outside World	6h
6	Subsetting R Objects, Vectorized Operations & Dates and Times	6h
7	Managing Data Frames with the dplyr package	6h
8	Control Structures and Functions	6h
9	Scoping Rules of R	6h
10	Loop Functions	6h
Semester - 5		
Module Name: Principles of Business Operations		Module Code: CP09515T
Sl. No.	Module Details	Theory Hours 40
1	Introduction to Operations	3h
2	Value Chains and Global Operations	3h
3	Frameworks for Operations Management	3h
4	Operations for Business Competitiveness	4h
5	Using Technology	4h
6	Goods and Services	3h
7	Facilities Design	4h
8	Supply Chains and Facilities Location	4h
9	Capacity	3h
10	Resources	2h
11	Quality	4h
12	Managing Operations	3h
Semester - 5		
Module Name: Advanced HTML, CSS, W3 & Full Stack Development Lab		Module Code: CP09511P
Sl. No.	Module Details	Practical Hours 100

1	Getting started with HTML	4h
2	Getting started with CSS and W3	4h
3	The basic layout	4h
4	Forms	3h
5	Responsive web design	16h
6	Getting started with JavaScript	25h
7	In depth JavaScript with ES6	15h
8	Angular JS	15h
9	Node JS	4h
10	Node JS with Mongo DB	10h
Semester - 5		Module Name: R Programming Lab
		Module Code: CP09516P
Sl. No.	Module Details	Practical Hours 80
1	Write R program to demonstrate: a) How to Create Vector, Mixing Objects b) Explicit Coercion c) Subsetting a vector d) Vectorized Operations e) Vectorized Matrix Operations	3h
2	Write R program to demonstrate: a) Matrices b) Subsetting a matrix c) Dropping matrix d) Lists e) Subsetting Lists f) Subsetting nested elements of a list and extracting multiple elements of list	5h
3	Write R program to demonstrate: a) Factors b) Missing values c) Data frames, names	2h
4	Write R program to demonstrate: a) Using dput () and dump() b) Binary Formats c) File Connections d) Reading lines of a Text File and reading from a URL connection	4h
5	Write R program to demonstrate: a) Partial Matching b) Removing NA values	3h

	c) dates and times and operations on it in R	
6	Write R program for Installing dplyr package using: a) select() b) filter() c) arrange() d) rename () e) mutate() f) group by()	3h
7	Write R program to demonstrate: a) Control Structure-if-else statements b) For loops and Nested For loops c) While loop, repeat loop, next, break	7h
8	Write R program to demonstrate function i) using: a) lapply() b) sapply() c) split() d) tapply () e) Vectorizing a function	4h
9	Write R program to demonstrate: a) Scoping Rules of R b) Application Optimization c) Plotting Likelihood d) Using system. Time ()	4h
10	Write R program to demonstrate Debugging using: a) Nan b) Using traceback () c) Using debug () d) Using recover ()	4h
11	Write R program to demonstrate: a) Simulation using rnorm(), clnorm(), pnorm(), pnorm(), rpois() b) for setting the random numbers of seed c) for simulating a Linear Model d) for Random Sampling	5h
12	Case study Movie Recommendation in R	8h
13	Case Study Customer Segmentation	8h
14	Case Study Sentiment Analysis	7h
15	Case Study Uber Data Analysis	6h
16	Case Study Credit Card Fraud Detection	7h

Semester - 5		Module Name: Business IT Project	Module Code: CP09514P
Sl. No.	Module Details		Hours
1	Project		120h

Semester - 5		Module Name: Employability Skills	Module Code: CP09517T
Sl. No.	Module Details		Theory Hours 20
1	Leadership and Motivation		7h
2	Quality Management		6h
3	Critical thinking and Problem solving		7h

Semester - 6		Module Name: Project	Module Code: CP09601P
Sl. No.	Module Details		Practical Hours 140
1	The objective of project work is to demonstrate the candidates' skill and knowledge in solving a real work Engineering problem involving web designing, data base designing, data analysis and Machine learning.		140h

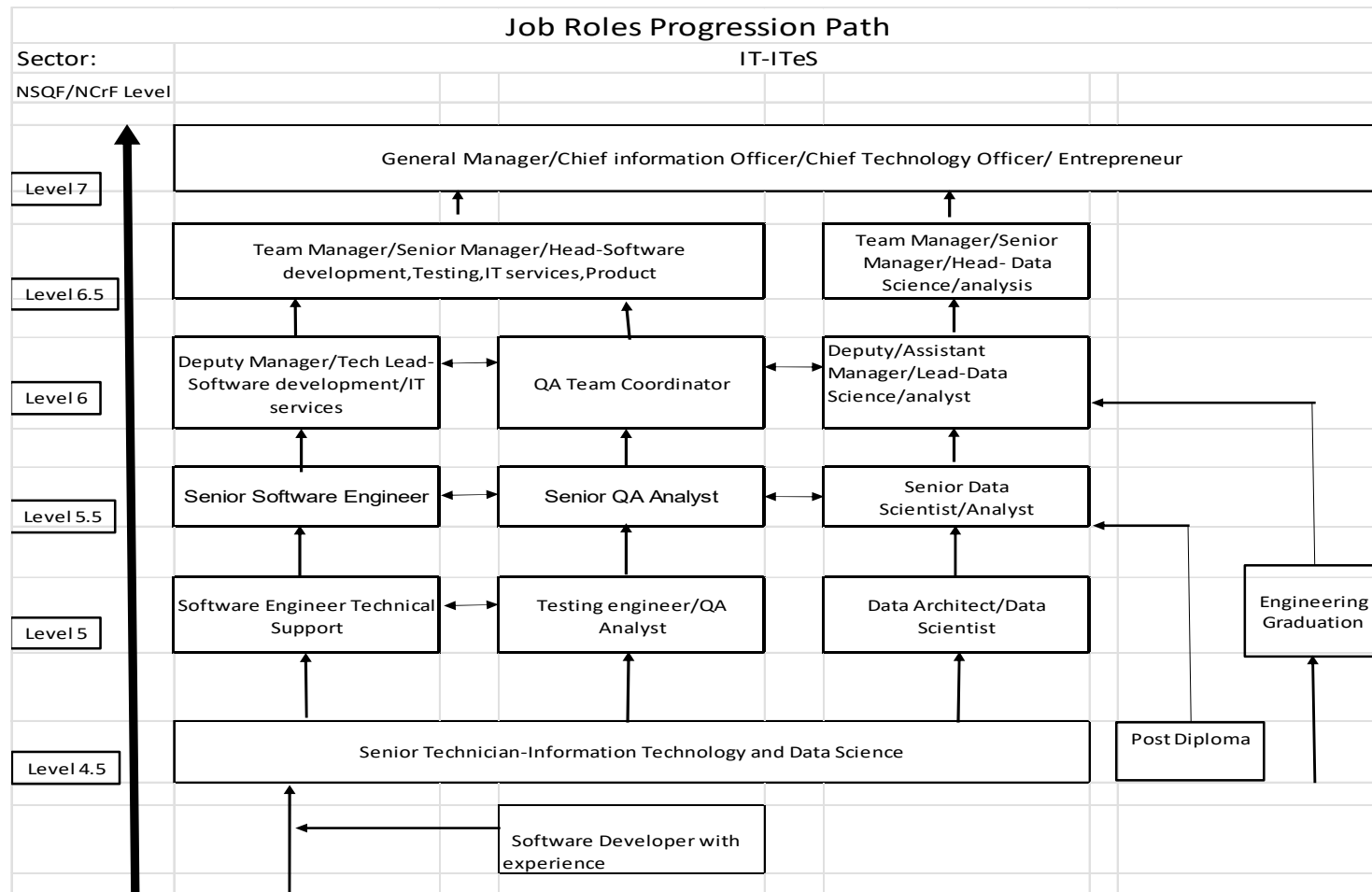
Semester - 6		Module Name: OJT	Module Code: CP09604P
Sl. No.	Module Details		Hours
1	OJT- On the Job Training in the Industry		300h

Semester - 6		Module Name: Artificial Intelligence and Machine Learning	Module Code: CP09602T
Sl. No.	Module Details		Theory Hours 40
1	Introduction to Generative Artificial Intelligence		6
2	Foundations of generative AI		8
3	Large Language Models		8
4	NLP and Prompt Engineering		8
5	Generative AI's consideration		10

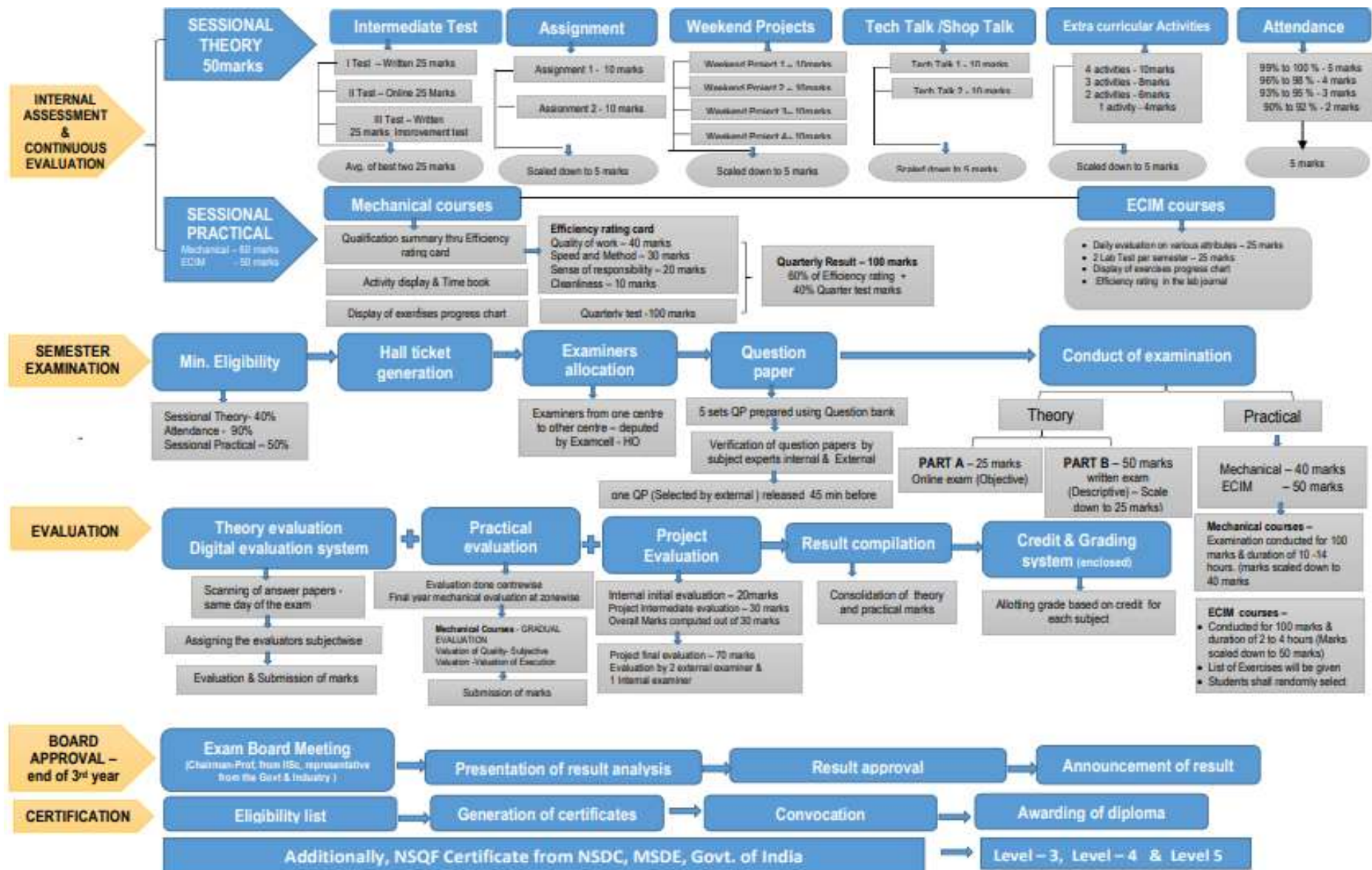
Semester - 6		Module Name: Artificial Intelligence and Machine Learning Lab	Module Code: CP09603P
Sl. No.	Module Details		Practical Hours 80
1	Data Pre-processing: Binarization, Mean Removal, Scaling , Normalization		8h
2	Label encoding		4h
3	Logistic regression classifiers		4h
4	Naive Bayes classifier		4h
5	Confusion matrix		4h
6	Classifying income data using Support Vector Machines		4h
7	Neural networks construction		8h
8	Convolutional Neural Networks		4h

9	Weight clustering in Keras	6h
10	Generative Adversarial Networks (GAN) using TF	8h
11	TensorBoard	6h
12	Pytorch Case study 1: AI in Health care	10h
13	Case study 2: AI in sustainable energy management	10h

Semester - 6		Module Name: Employability Skills	Module Code: CP09604T
Sl. No.	Module Details	Theory Hours 40	
1	Labour Welfare and Legislation.	8h	
2	Customer Interaction/ Service.	8h	
3	Conflict resolution and Negotiation	8h	
4	Getting ready for Entrepreneurship	8h	
5	Job readiness and Exam Preparation	8h	

Annexure 9: Career Progression

Annexure 10: Assessment SOP



Annexure 11: Occupational Map

As per NCrf		As per NCO-2015	Sub-Sector 1/IT Services, BPM, Software products, Engineering Services	
NCrf Level (1-8)	Level Descriptors	NCO-15 - Family (First 4 digits code/s for the given level cross cutting the OM Sub-Sectors/ Occupations)	Occupation 1/ Software Developer, Testing, IT Services	Occupation 2/ Data Science/management
Level 8.0	1. Professional Theoretical Knowledge: Mastery of knowledge / Innovation driven/ Comprehensive knowledge 2. Professional and Technical Skills/ Expertise: Most advanced Technical and Managerial skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Significant authority, transformational leadership, Social intelligence 4. Broad Learning Outcomes: Lead large transformational projects 5. Responsibility: Business Vision Chairperson/ Board Member / CMD	1120	Managing Director	Managing Director
Level 7.0	1. Professional Theoretical Knowledge: Advanced knowledge with critical understanding of emerging developments 2. Professional and Technical Skills/ Expertise: Highly specialized skills, transdisciplinary skills, leadership skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Cross cultural competency, transformational leadership 4. Broad Learning Outcomes: Apply acquired advanced technical skills, technical appraisal and reviews 5. Responsibility: Business Management (like GM/ CEO / CXO, etc.)	1330	General Manager /Chief Information officer/Chief Technology Officer/Entrepreneur	General Manager /Chief Information officer/Chief Technology Officer/Entrepreneur

Level 6.5	1. Professional Theoretical Knowledge: Advanced multidisciplinary and specialized knowledge 2. Professional and Technical Skills/ Expertise: Advanced Technical and Managerial Skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Leadership, effective resource management 4. Broad Learning Outcomes: Judgement in complex problems 5. Responsibility: Vertical/ Business unit management – Manager or Senior Manager	2356 2512 2514	Team Manager/Senior Manager/Head-Software development, Testing, IT services, Product Electives: Software Development, Full stack development, Information system management, Firmware development Options: IT services, BPM, Software Product, Engineering services	Manager/Senior Manager/Head-Data Science/analysis Electives: Data Analysis, Artificial Intelligence, Machine Learning Options: IT services, BPM, Software Product, Engineering services
Level 6.0	1. Professional Theoretical Knowledge: Multidisciplinary and specialized knowledge 2. Professional and Technical Skills/ Expertise: Range of skills along with specialized domain skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Entrepreneurial mindset, self-management 4. Broad Learning Outcomes: Judgement / decision making – specialized 5. Responsibility: Team leader – Junior technical supervisor, Technical supervisor or junior/ deputy manager	2512 2514 2519	Deputy Manager/Tech Lead-Software development, IT services/QA Team Coordinator Electives: Software Development, Full stack development, Information system management, Firmware development Options: IT services, BPM, Software Product, Engineering services	Deputy/Assistant Manager/Lead-Data Science/analyst Electives: Data Analysis, Artificial Intelligence, Machine Learning Options: IT services, BPM, Software Product, Engineering services
Level 5.5	1. Professional Theoretical Knowledge: Specialized knowledge 2. Professional and Technical Skills/ Expertise: Specialized skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Team readiness, self-entrepreneurship readiness 4. Broad Learning Outcomes: Specialized/ complex jobs/tasks	2512 2514 2519	Senior Software Engineer/Senior QA Analyst Electives: Software Development, Full stack development, Information system management, Firmware development Options: IT services, BPM, Software Product, Engineering services	Senior Data Scientist/Analyst Electives: Data Analysis, Artificial Intelligence, Machine Learning Options: IT services, BPM, Software Product, Engineering services
Level 5.0	5. Responsibility: Self and team responsibility – Sr. Technician or Master Technician	2512 2519	Software Developer/Testing Engineer/Engineer Technical Support/QA Analyst/Computer Programmer Electives: Software Development,	Data Architect/Data Scientist Electives: Data Analysis, Artificial Intelligence, Machine Learning Options: IT services, BPM,

			Full stack development, Information system management, Firmware development Options: IT services, BPM, Software Product, Engineering services	Software Product, Engineering services
Level 4.5	1. Professional Theoretical Knowledge: Range of knowledge 2. Professional and Technical Skills/ Expertise: Range of technical skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Team readiness & Enterpreurial readiness 4. Broad Learning Outcomes: Carry out Range of tasks and may provide range of solutions 5. Responsibility: Accountable/ responsible - Sr. Technician & Technician	2514 2512 3514	Senior technician-Information Technology and Data Science Electives: Software Development, Full stack development, Information system management, Firmware development Options: IT services, BPM, Software Product, Engineering services	

Annexure 12: Key Learning Outcome

SL. NO.	SUBJECT NAME	KNOWLEDGE AND UNDERSTANDING	TECHNICAL & PROFESSIONAL SKILLS	APPLICATION OF KNOWLEDGE AND SKILLS
1	Advanced HTML, CSS, W3 & Full Stack Development – (CP09506T) Advanced HTML, CSS, W3 & Full Stack Development Lab (CP09511P) Developing both the front-end and back-end of a web application	Learn popular front-end technologies such as HTML, CSS, W3, JavaScript, and front-end frameworks	Learn how to develop both the client-side and server-side components of web applications.	Handle all aspects of web development and build complete and fully functional web applications.
2	English Technical Writing (CP09508T) Communicating technical information in a clear, concise and effective manner	Making clear and concise language, precise terminology, and careful attention to audience and structure	Planning documents visualising the data and information editing and proof reading	Write Business Letters Reports as necessary in Profession. Interact, Communicate during Interviews, debates, and Group Discussion for Career Development. Develop Presentation Skills.
3	Information System Analysis & System Documentation (CP09509T) The goal of this analysis is to ensure that the information system is effective, efficient, and meets the needs of its users	Gain an understanding of business processes and how they are supported by information systems and their documentation.	Developing problem-solving, critical thinking, communication, and technical knowledge that are essential in many careers related to information systems and technology.	Managing projects, including defining project scope, planning, budgeting, and monitoring progress.
4	R-Programming (CP09510T) R-Programming Lab (CP09516P) Open-source language used for statistical computing and graphics.	Learn to apply statistical concepts, such as probability theory and hypothesis testing, to real-world problems.	Develop skills in statistical analysis, data manipulation and visualization, programming, and collaboration.	Industries including finance, healthcare, marketing, and scientific research in data analysis.
5	Principles of Business Operations (CP09515T)	Able to know the fundamental concepts and strategies involved in	Able to manage the production process, including scheduling,	Supply chain management, Service operations management,

	Prioritize the needs and wants of their customers	managing the operations of a business, such as supply chain management, quality control, and inventory management.	resource allocation, quality control, and cost optimization.	Quality control, Project management
6	Business IT Project (CP09514P) Using information technology (IT) to support business goals and objectives.	Understanding of the business processes and the ability to identify areas for improvement using IT solutions.	Develop skills in project management, technical skills, communication, analytical skills, and collaboration that are essential in many careers related to IT and business.	Able to develop real time projects including web application, mobile application & App development to a requirement etc
7	Project (CP09601P) / OJT (CP09604P) Develop and understand the use of software, web-based applications, Artificial intelligence/Machine Learning applications and manage cyber security.	Knowledge on Software Development Life Cycle. Various Programming languages for development. Scripting languages for managing, configuring, provisioning servers. IOT, Artificial Intelligence/Machine Learning.	Develop applications and solutions including Software and Hardware. Use tools in–Artificial Intelligence/Machine Learning, Cloud Platform, Various web Frameworks. Execute task in Infrastructure maintenance, support and security.	Development of New Project based on industry/customer requirement.
8	Employability Skills (CP09517T) / Employability Skills (CP09604T) Understand Labour Welfare and Legislation. Understand the concept of Quality Management Getting ready for Employment/ Entrepreneurship Learn to interact with customers/ provide service.	Knowledge on benefits guaranteed under various Acts, legislations, Factories act, Apprenticeship Act, ESI, EPF Acts, Payment of wages act, women's compensation Act, POSH, and other industrial laws. Understanding of Quality concepts, QMS, PDCA QC Tools, 5S, Kaizen. ISO Process. Distinguishing between Job and Career, Awareness of different job roles in the related sector. Understanding on the pathway and progression. Creating resume and	Explain various Acts enacted for labour welfare by various Governments. Attend mock interviews, create Resume documents. Body language, relationship building, probing techniques.	Use of various QC tools and Kaizen for problem solving and Quality improvement themes. Customer handling from greeting, grievance handling.

		apply for Jobs.		
09	Artificial Intelligence and Machine Learning (CP09602T) Artificial Intelligence and Machine Learning Lab (CP09603P)	Knowledge of Generative AI types and applications Understand Foundations of Generative AI Knowledge of types of Language Models Understand considerations of Generative AI	Explain types of generative AI. Demonstrate applications of generative AI. Explain different foundations of generative AI. Explain working of LLM. Explain considerations of generative AI.	Use of data preprocessing methods. Case studies on AI applications. Study future implementation of AI

Annexure: Acronym and Glossary**Acronym**

Acronym	Description
AA	Assessment Agency
AB	Awarding Body
ISCO	International Standard Classification of Occupations
NCO	National Classification of Occupations
NCrF	National Credit Framework
NOS	National Occupational Standard(s)
NQR	National Qualification Register
NSQF	National Skills Qualifications Framework
OJT	On the Job Training

Glossary

Term	Description
National Occupational Standards (NOS)	NOS define the measurable performance outcomes required from an individual engaged in a particular task. They list down what an individual performing that task should know and also do.
Qualification	A formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards
Qualification File	A Qualification File is a template designed to capture necessary information of a Qualification from the perspective of NSQF compliance. The Qualification File will be normally submitted by the awarding body for the qualification.
Sector	A grouping of professional activities on the basis of their main economic function, product, service or technology.
Long Term Training	Long-term skilling means any vocational training program undertaken for a year and above. https://ncvet.gov.in/sites/default/files/NCVET.pdf