



QUALIFICATION FILE

Software Developer

- ☐ 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: 4.0

Submitted By:

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

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Section 1: Basic Details

1.	Qualification Name	Software Developer	
2.	Sector/s	IT- ITeS	
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: Software Developer
4.	a. OEM Name b. Qualification Name (Wherever applicable)	NA	
5.	National Qualification Register (NQR) Code & Version (Will be issued after NSQC approval)	QG-04-IT-01987-2024-V1-NTTF	6. NCrF/NSQF Level: 4.0
7.	Award (Certificate/Diploma/Advance Diploma/ Any Other) (Wherever applicable specify multiple entry/exits also & provide details in annexure)	Advance Certificate	
8.	Brief Description of the Qualification	The Candidate will have skills catering to the demanding technologies, Web development, Software development, Software Testing, Data Analytic. Able to test, debug the software for deployment. Able to understand object-oriented programming, algorithmic problem-solving, and efficient coding techniques. The subjects covered in this Programme are – Oracle, Object Oriented Programming with C++, Information System and Organisation, Design Thinking, Artificial Intelligence, Unix, Dynamic Websites, Software Engineering, Software Testing, Business Intelligence, Java Programming, Enterprise Applications-Basics or ERP CRM, Employability Skill, OOP'S with C++ Lab, Artificial Intelligence Lab, Oracle Lab, Unix Lab, Java Programming Lab, Software Testing Lab, Dynamic Websites Lab, Business Intelligence Lab, OJT	

9.	Eligibility Criteria for Entry for Student/Trainee/Learner/Employee	a. Entry Qualification & Relevant Experience:																							
		Sl. No.	Academic/Skill Qualification (with Specialization - if applicable)			Required Experience (with Specialization - if applicable)																			
		1	12th Pass with Mathematics OR 10th + 2 years ITI in the following trades: Information and Communication Technology System Maintenance, Information Technology OR 10th + 2 years diploma /pursuing 3rd year of diploma in relevant trade. OR Certificate - Assistant Technician Information Technology (Level 3.5) from NTTF			NA																			
10.	Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))	Total Credit – 42			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>Training Delivery Modes</th> <th>Theory (Hours)</th> <th>Practical (Hours)</th> <th>OJT/Project Mandatory (Hours)</th> <th>OJT Recommended (Hours)</th> <th>Total (Hours)</th> </tr> </thead> <tbody> <tr> <td>Classroom (offline)</td> <td>480</td> <td>570</td> <td>90</td> <td>-</td> <td>1140</td> </tr> <tr> <td>Online</td> <td>120</td> <td>-</td> <td>-</td> <td>-</td> <td>120</td> </tr> </tbody> </table>	Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT/Project Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)	Classroom (offline)	480	570	90	-	1140	Online	120	-	-	-	120					
		Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT/Project Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)																		
		Classroom (offline)	480	570	90	-	1140																		
Online	120	-	-	-	120																				
(Refer Blended Learning Annexure for details)																									
14.	Aligned to NCO/ISCO Codes (if no code is available mention the same)	NCO Code – 2015/2512.0100, 2015/2512.0204 & 2015/2512.0205																							

15.	Progression path after attaining the qualification. (Please show Professional and Academic progression)	Professional Progression: After completion of 1 year, can work as Technician IT, Software Developer, Software code tester, 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: Diploma in Information Technology and Data Science, 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	
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 (In case of CS or MS, provide details of both Lead AB & Supporting ABs)	Name: Mr. R Rajagopalan Position in the Organization: Joint Managing Director Email: rg@nttf.co.in Tel. number: 080 - 28390215 Contact Number: 9844013448 Website: ntfttrg.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	NCr F/ NS QF 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)
Semester - 3																
23	Oracle	CP09316T, V1.0	Core	4.0	20	40	-	-	-	40	100	-	-	-	100	
24	Object Oriented Programming with C++	CP09317T, V1.0	Core	4.0		60	-	-	-	60	100	-	-	-	100	
25	Information System and Organisation	CP09318T, V1.0	Core	4.0		60	-	-	-	60	100	-	-	-	100	
26	Design Thinking	CP09319T, V1.0	Core	4.0		40	-	-	-	40	100	-	-	-	100	
27	Artificial Intelligence	CP09320T, V1.0	Core	4.0		40	-	-	-	40	100	-	-	-	100	
28	Unix	CP09321T, V1.0	Core	4.0		40	-	-	-	40	100	-	-	-	100	
29	OOP'S with C++ Lab	CP09322P, V1.0	Core	4.0		-	80	-	-	80	-	80	-	20	100	
30	Artificial Intelligence Lab	CP09323P, V1.0	Core	4.0		-	80	-	-	80	-	80	-	20	100	
31	Oracle Lab	CP09324P, V1.0	Core	4.0		-	90	-	-	90	-	80	-	20	100	
32	Unix Lab	CP09325P, V1.0	Core	4.0		-	40	-	-	40	-	80	-	20	100	
33	Employability Skill	CP09326T, V1.0	Core	4.0		30	-	-	-	30	75	-	-	25	100	
Duration (in Hours)/ Total Marks					20	310	290	-	-	600	675	320	-	105	1100	
Semester - 4																
34	Dynamic Websites	CP09411T, V1.0	Core	4.0	22	60	-	-	-	60	100	-	-	-	100	
35	Software Engineering & Testing	CP09412T, V1.0	Core	4.0		40	-	-	-	40	100	-	-	-	100	
36	Business Intelligence	CP09413T, V1.0	Core	4.0		40	-	-	-	40	100	-	-	-	100	
37	Java Programming	CP09414T, V1.0	Core	4.0		80	-	-	-	80	100	-	-	-	100	

38	Enterprise Applications-Basics or ERP CRM	CP09415T, V1.0	Core	4.0		40	-	-	-	40	100	-	-	-	100	
39	Java Programming Lab	CP09416P, V1.0	Core	4.0		-	90	-	-	90	-	80	-	20	100	
40	Software Engineering & Testing Lab	CP09417P, V1.0	Core	4.0		-	60	-	-	60	-	80	-	20	100	
41	Dynamic Websites Lab	CP09418P, V1.0	Core	4.0		-	90	-	-	90	-	80	-	20	100	
42	Business Intelligence Lab	CP09419P, V1.0	Core	4.0		-	40	-	-	40	-	80	-	20	100	
43	Employability Skill	CP09420T, V1.0	Core	4.0		30	-	-	-	30	75	-	-	25	100	
44	OJT	CP09421P, V1.0	Core	4.0		-	-	90	-	90	-	75	-	25	100	
Duration (in Hours)/ Total Marks					22	290	280	90	-	660	575	395	-	130	1100	
Total					42	600	570	90	-	1260	1250	715	-	235	2200	

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**Advance Certificate – Software Developer**

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	Explain about Relational Database Management System using Oracle. Demonstrate concepts such as classes, objects, inheritance, polymorphism, and encapsulation. Discuss about the purpose and function of information systems and their importance in modern organizations. Explain about the principles of human-cantered design. Describe about the fundamental concepts of AI, Machine Learning and natural language processing. Explain about the underlying architecture of Unix. Explain about server-side programming languages such as PHP, Python etc. to generate dynamic content on a website. Explain use of software engineering in software development life cycle and Software testing for user release. Demonstrate data analysis techniques using BI. Explain the execution of Java programs using tools and libraries. Describe about the business process optimization using ERP and CRM.	Able to design and implement databases that meet the requirements of users and stakeholders using oracle. Able to understand object-oriented programming, algorithmic problem-solving, and efficient coding techniques. Able to support and optimize business processes, such as sales, marketing, and accounting in an organization. Able to design research for user needs and preferences. Able to design, implement, and evaluate AI algorithms and models for image recognition, speech recognition, and predictive analytics. Able to perform various Unix commands and execute shell script. Able to test, debug the software for deployment. Apply Bi skills for business development. Able to develop java application using IDEs. (Eclipse, NetBeans, etc.)	4.0

Professional and Technical Skills/ Expertise/ Professional Knowledge	Able to perform installation, configuration, backup, and recovery and optimization using Oracle database. Able to perform various object-oriented programming, algorithmic problem-solving, and efficient coding techniques. Explain about AI algorithms and models for various applications for different applications. Demonstrate various tasks, such as file management, directory navigation, and process management, and in writing shell scripts to automate repetitive tasks. Create dynamic user website using HTML, CSS, JavaScript and PHP. Demonstrate the fundamental concepts of software engineering, software testing, such as test cases, test plans, test strategies, and test execution. Demonstrate various BI tools and techniques for reporting, analytics and data visualization. Creating java applications.	Able to develop high-performance computing applications -games and embedded systems. Able to develop applications in various industries (healthcare and finance). Applying Unix operating system for system administration, software development and computer networking. Able to build scalable, interactive web applications. Able to perform different types of software testing using Selenium automation tool. Develop web applications, desktop applications, mobile games and big data processing.	4.0
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	Explain Diversity, inclusion, gender sensitivity. Describe Goal setting and career development. Describe Analytical thinking and adaptive thinking. Explain about Financial & Legal literacy. Specify Occupational Safety, Health, and Environment education.	Propagate inclusiveness and team working. Propagate Personal development & team building. Developing creativity and reasoning, making decisions in dynamically challenging situations. Good understanding of various statutory and legal benefits and requirements of an employee. Knowledge of Occupational safety hazards and methods to mitigate them.	4.0

Broad Learning Outcomes/Core Skill	Able to implement, manage, and utilize ERP and CRM systems to optimize business processes, enhance productivity, and foster better customer relationships. Perform database administration, data engineering, software development, and business intelligence roles in various industries and organizations. Create intelligent systems that can augment human capabilities.	Developing a wide range of applications and solutions, from simple command-line programs to complex enterprise-level web applications and mobile apps. Able to deliver high-quality software, reduces the chances of defects reaching end-users, and enhances the reliability and usability of software applications. Able to use BI tools for supporting strategic decision-making and enhance business performance.	4.0
Responsibility	Awareness of safety Procedures and SOPs in the relevant work area. Identify, monitor & report occurrences in the work area.	Work effectively in any component assembly. Assist Maintenance activity in industry. Can work independently.	4.0

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

Sl. No.	Equipment	Quantity
1	IoT Kit	5
2	Arduino Kit	10
3	NODEMCU/ESP	10
4	Raspberry pi	10
5	Assorted Sensors	1 set

SOFTWARE REQUIREMENTS

Sl. No.	Software Details	Quantity
1	PYTHON – Open source	
2	ORACLE 11 G (CAL LICENSE) – Open source	
3	Ubuntu OS – Open source	
4	Turbo C Compiler – Open source	
5	ATOM 1.43, XAMPP SERVER 7.4.2 – Open source	
6	Visual Studio 2019 (10 users) – Open source	
7	NETBEANS 7.2 – Open source	
8	ECLIPSE (SDK) – Open source	
9	JUPYTER Notebook – Open source	
10	POWER BI – Academic Version Per user license	
11	Tableau – Academic Version – Open source	
12	Selenium Driver – Open source	
13	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:**2nd year of 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 3					
Oracle	Introduction to Oracle Database, - Understanding of Oracle data base	10	-	-	-
	History and architecture of Oracle Database-Understanding the architecture	30	-	-	-
	Working with DDL, DML and DQL Commands	30	-	-	-
	Working with PL/SQL Basics	15	-	-	-
	Working with -Sub programs: Procedures and Functions, Cursors and Triggers	15	-	-	-
	Total Marks	100			
Object Oriented Programming with C ++	Introduction to OOP and C++ Features-Understanding of OOP'S concepts	25	-	-	-
	Understanding of the Classes and Objects and Concept of OOPS	25	-	-	-
	Executing the File and Streams	25	-	-	-
	Understanding of Exception Handling	25	-	-	-
	Total Marks	100			
Information System and Organisation	Learning about Organizations and Information Systems-Understanding the types	25	-	-	-
	Organizational Strategy and IS, Evaluating IS AND Cultural Structural and Political Aspects of IS-Understanding of the IS-Understanding of IS.	25	-	-	-
	The 21st Century Organization, User Acceptance, and the Socio-technical Approach-Understanding of User acceptance.	25	-	-	-
	IS and Organizational Change and Benefits Management-Understanding of the benefits of IS	25	-	-	-
	Total Marks	100			
Design Thinking	Introduction to Design Thinking and Process-Human Centric approach type	25	-	-	-
	Define the design challenge, Ideate-Designing of the solution	25	-	-	-
	Prototype and Test-Developing a prototype	20	-	-	-
	Case Studies-Real time example to understand	30	-	-	-
	Total Marks	100			
Artificial Intelligence	Introduction to Artificial Intelligence-Understanding of AI	25	-	-	-
	Problem Solving Techniques-Uses and types	25	-	-	-
	Introduction to Machine Learning-Understanding of ML	20	-	-	-
	Data Preparation-Understanding of the Concept	15	-	-	-
	Machine Learning Libraries and Visualization-Exploring the uses	15	-	-	-
	Total Marks	100			
UNIX	Introduction to UNIX-Understanding the basics	10	-	-	-

	File System and File Attributes-Implementing the concepts	20	-	-	-
	Learning of about UNIX Editors and The Shel Script	25	-	-	-
	Verification of Simple Filters and Process	25	-	-	-
	Shell Programming-Concepts and implementation	20	-	-	-
	Total Marks	100			
Employability Skills	Diversity and Inclusion, Gender sensitivity PwD etc.	15	-	-	5
	Career development and Goal setting	20	-	-	10
	Entrepreneurship	15	-	-	5
	Analytical thinking and Adaptive Thinking	25	-	-	5
	Total Marks	100			
Object Oriented Programming with C++ Lab	Write a C++ Basic programs using class concept	-	15	-	5
	Create a class called DATE; accept two valid dates inform of dd/mm/yyyy.	-	15	-	5
	Create a base class called student (name, reg.no., gender, and branch) and using inheritance create a derived class	-	10	-	5
	Demo on Creating a base class and Derived Class	-	10	-	-
	Write a C++ program to overload pre-increment, decrement and post increment, decrement operators.	-	15	-	5
	Write a C++ program to demonstrate the Exception handling for Division by zero exception and Array Index out of bounds exception	-	15	-	-
	Total Marks	100			
Artificial Intelligence Lab	Create a data frame consisting of four columns add data to it, plot a scatter graph for any two columns.	-	20	-	5
	Verification of programs on python programs	-	15	-	5
	Checking SpaCy (in Python) - Case Study	-	15	-	5
	Project: Develop a Chat bot for NTTF admission activities.	-	15	-	5
	Classify Images Using Tensor Flow	-	15	-	-
	Total Marks	100			
Oracle Lab	Write a query to Create table using different data types and constraints	-	15	-	5
	Checking different Statements in Oracle	-	10	-	5
	Identify use of single row and multiple row sub queries sub queries to retrieve from multiple tables	-	15	-	-
	Write a PL/SQL program to declare and initialize variables	-	15	-	5
	Write a PL/SQL program to retrieve data from table using if statement	-	15	-	5
	PL/SQL program using cursor FOR loops, FOR UPDATE, WHERE CURRENT OF.	-	10	-	-
	Total Marks	100			
Unix Lab	Executing Basic Commands, Different operations by creating, viewing and different types of listing the files using the UNIX command cat, vi, vim, nano, touch and ls	-	25	-	5
	Different operations by Copying, moving and deleting the files between newly created directories	-	20	-	5

	Execute a privileged command by local user using command	-	15	-	5
	Shell script Programs		15	-	5
	Display the current Processes running on the terminal	-	5	-	-
	Total Marks		100		
Semester 4					
Dynamic Websites	Introduction to The Module, Designing and Coding A Website-Designing of the website	20	-	-	-
	Design and Developing for Mobile Websites and Design and Build a Database -Understanding and using in websites development	25	-	-	-
	Using Scripts-Writing of the scripts for the projects	20	-	-	-
	Web Development Tools and Web Development Tools	25	-	-	-
	Checking Web Services and Building A Dynamic Website, Evaluating	10	-	-	-
	Total Marks		100		
Software Engineering & Testing	Learning about Software Engineering, Testing Fundamentals and Testing Techniques	30	-	-	-
	Checking Software Testing Life Cycle and Defect Management	35	-	-	-
	Levels of Testing and Types of Testing-Understanding of the levels	35	-	-	-
	Total Marks		100		
Business Intelligence	Introduction to Business Intelligence and Essentials-understanding the basics	20	-	-	-
	Architecting the Data and Data Extraction-Creating the architecture	20	-	-	-
	Knowing about Business Intelligence Life Cycle	20	-	-	-
	Business Intelligence Issues and Challenges-Understanding the challenges	20	-	-	-
	Using of BI Tools	20	-	-	-
	Total Marks		100		
Java Programming	Introduction to Java-Understanding the basics java coding	20	-	-	-
	Using Operators & Statements and Working with OOP's-Usage of Concepts	20	-	-	-
	Working with Packages & Interfaces, Exceptions, Multithreading	20	-	-	-
	Working with java.io package, Applets & GUI, Event Handling	20	-	-	-
	Working with JDBC Servlets and JAVA Server Pages (JSP)	20	-	-	-
	Total Marks		100		
Enterprise Applications – Basics or ERP CRM	Introduction to ERP-understanding of the ERP	20	-	-	-
	An Overview of Enterprise-Understanding of the Organization.	20	-	-	-
	Checking ERP and Related Technologies	20	-	-	-
	ERP System and ERP Implementation Lifecycle-Examples	20	-	-	-
	Knowing about ERP Market and Customer Relationship Management and ERP	20	-	-	-
	Total Marks		100		
Java Programming Lab	Write a program to display your Information on the Console	-	20	-	5
	Verification of Conditional Statements, Control Statements	-	20	-	5
	Demonstrate Method Overloading & Method Overriding, Constructor	-	15	-	5

	Overloading.				
	Create a GUI Form (Applet) using all the possible awt Controls	-	15	-	5
	write a program to use implicit objects in JSP	-	10	-	-
	Total Marks	100			
Software Engineering & Testing Lab	Learning about Manual Testing	-	20	-	5
	Write the Test cases for Login Page of Gmail, Facebook.	-	20	-	5
	Current values displayed in database is (9 am, 10am, 11am, 12pm, 1pm, 2pm):Time dropdown box	-	25	-	5
	Selenium, Demonstrate URL check point	-	15	-	5
	Total Marks	100			
Dynamic Websites Lab	Create a home page and at least one other web page using HTML with external CSS.	-	20	-	5
	Verification of some user provided text and reverse it	-	20	-	5
	Create a php script that will allow you to input data into the database from a webpage	-	20	-	5
	Case Study with Demo	-	20	-	5
	Total Marks	100			
Business Intelligence Lab	Data Analysis with Excel	-	40	-	10
	Data Visualization in Python	-	40	-	10
	Total Marks	100			
Employability Skills	Financial and Legal Literacy	20	-	-	10
	Occupation safety, Health, and Environment education.	20	-	-	5
	Digital Literacy Skills	15	-	-	5
	Essential skills for success.	20	-	-	5
	Total Marks	100			
OJT	On the Job Training in the relevant sector	-	75	-	25
	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:

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

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

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.nttftg.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.nttftg.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 - 3		Module Name: Oracle	Module Code: CP09316T
Sl. No.	Module Details		Theory Hours 40
1	Introduction to Oracle Database		20h
2	PL/SQL		20h
Semester - 3		Module Name: Object Oriented Programming with C++	Module Code: CP09317T
Sl. No.	Module Details		Theory Hours 60
1	Introduction to OOP		4h
2	C++ Features		9h
3	Classes and Objects		15h
4	Concept of OOPS		18h
5	File and Streams		12h
6	Exception Handling		2h
Semester - 3		Module Name: Information Systems and Organizations	Module Code: CP09318T
Sl. No.	Module Details		Theory Hours 60
1	Organizations and Information systems		4h
2	Social Contexts and Perspectives on IS		4h
3	Internal IS and Enterprise Systems		5h
4	Organizational Strategy and IS		5h
5	Evaluating IS		8h
6	Cultural Structural and Political Aspects of IS		8h
7	People and IS Interpretation		5h
8	The 21st Century Organization		5h
9	User Acceptance and the Socio-technical Approach		4h
10	IS and the Customer		5h
11	IS and Organizational Change		4h
12	Benefits Management		3h
Semester - 3		Module Name: Design Thinking	Module Code: CP09319T
Sl. No.	Module Details		Theory Hours 40
1	What is Design Thinking and Why is it so popular?		3h
2	The Design Thinking Process		4h
3	Empathize with the people you design for		4h
4	Define the design challenge		4h
5	IDEATE		4h
6	Prototype and Test		4h
7	Case studies		17h
Semester - 3		Module Name: Artificial Intelligence	Module Code: CP09320T

Sl. No.	Module Details	Theory Hours 40
1	Introduction to Artificial Intelligence	8h
2	Problem Solving Techniques	8h
3	Introduction to Machine Learning	8h
4	Data Preparation	8h
5	Machine Learning Libraries and Visualization	8h
Semester - 3		
Module Name: UNIX		Module Code: CP09321T
Sl. No.	Module Details	Theory Hours 40
1	Introduction to UNIX	3h
2	File System	5h
3	File Attributes	4h
4	UNIX Editors	5h
5	The Shell	4h
6	Simple Filters	7h
7	The Process	5h
8	Shell Programming	7h
Semester - 3		
Module Name: OOPS with C++ Lab		Module Code: CP09322P
Sl. No.	Module Details	Practical Hours 80
1	Write a C++ program to add two numbers using class concepts	4h
2	Write a C++ program to swap two numbers using class concepts	4h
3	Write a C++ program to display student details by using class concepts	4h
4	Create an overloaded function in C++ to convert string to int and to convert string to float.	4h
5	Write a C++ program to perform overloading of binary operators	6h
6	Write a C++ program to create a class called as complex, and implements the following by overloading the function ADD that returns the COMPLEX number a) ADD (s1, s2) - where s1 is an integer (real part) and s2 is a COMPLEX number b) ADD (s1, s2) - where s1 and s2 are complex numbers c) Display the objects by using display function.	4h
7	Write a C++ program to create a class STRING and implement the following Display the results by overloading the operator <<after every operation a) STRING s1="NTTF-NEC" b) STRING s2 = " BANGALORE" c) STRING s3 = s1 + s2;	4h
8	Write a C++ program to create a class called MATRIX using two-dimensional array of integers. Implement the following by overloading the operator==, which checks the compatibility of two Matrices to be added and subtracted, perform the following by overloading + and – operators. The program should read the matrix using >> operator and display the results by overloading the operator	4h

	<pre><< if(m1==m2) { m3 = m1+m2;m4 = m1-m2; } else Display appropriate error message.</pre>	
9	Write a C++program to overload pre-increment, decrement and post increment, decrement operators.	4h
10	Write a C++ program to create a class called DATE; accept two valid dates inform of dd/mm/yyyy. Implement the following by overloading operators – and +. Display the results by overloading the operator << after every operation a) No of days=d1-d2 –where d1 and d2 are date objects. b) d1>=d2; and no_of_days is an integer c) d1 =d1+no_of_days where d1 is a date object and no_of_days is an integer	8h
11	Write a C++program to create a base class called student (name, reg no, gender, and branch) and using inheritance create a derived class exam with fields (subject, marks, and semester)enter at least 4 students. Find total and average marks for each semester separately and the average of all semester.	8h
12	Create a class EMPLOYEE contains members (emp_id, emp_name, basic salary, net salary). Create a derived class INCOME contains the members (DA, HRA). Another derived class DEDUCTION consists of (IT –Income Tax, LIC). Use appropriate functions to read data and calculate the net salary and print the complete data of multiple employees. (DA = 50% of the basic, HRA=25%ofBasic, IT=30%ofthe Gross salary, LIC=1800)	4h
13	Create a base class Student (roll_no, name, sem) from which derive two derived class Test (part A, part B marks) and Sports (sports mark). Create one more derived class Result (total) which has to inherit the properties of Test, Sports. Create appropriate functions in each class to read the data, calculate the total and display complete details in derived class by using Virtual Base class concept.	4h
14	Create a base class called Shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get data() to initialize base class data members and another member function display area() to compute and display the area of figures, Make display area() as a virtual function and redefine this function in the derived classes to suit their requirements	4h
15	There are 100 records present in a file with each record containing Item code, 20 characters Item name and an integer Quantity. Write A program to read these records, arrange them in ascending order and write in a same file over writing the earlier records.	4h
16	A book shop maintains the inventory of books that are being sold at the shop the list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book the sales person inputs the title and author and the system searches the list and displays whether it is available or not. If it is not an appropriate message is displayed. If it is, then the system displays the book details and request for the no. of copies required. If the requested copies are available the total cost of the requested copies is displayed, otherwise the message “Requested copies not available”	6h

	Write a C++program read book inventory records from a file and implement the same.	
17	Write a C++program to demonstrate the Exception handling for Division by zero exception and Array Index out of bounds exception	4h
Semester - 3 Module Name: Artificial Intelligence Lab Module Code: CP09323P		
Sl. No.	Module Details	Practical Hours 80
1.1	Create a data frame consisting of four columns add data to it, plot a scatter graph for any two columns.	4h
1.2	Create a one-dimensional array and plot a line graph for the array	4h
1.3	Create a data set for mark sheet of a student and insert a pie-chart for total marks in each subject.	4h
1.4	Load a csv file into python and add a column to it and create a scatter graph for that data.	4h
1.5	Load a csv file of fuel-consumption into python and plot a bar graph on it.	4h
1.6	Load a data set display it and filter it based on any column and display filtered data set and plot a graph for it.	4h
1.7	Create a data set consisting of 4 column data set consisting of hill name, height, latitude, longitude and filter the data based on hill height and plot a bar graph and scatter graph for it.	4h
1.8	Display HelloWorld using Tensor Flow.	4h
1.9	How to concatenate two array list using tensor flow.	4h
1.10	Addition and subtraction using tensor flow.	4h
2	SpaCy (in Python) – Case Study - About spaCy and Installation - SpaCy pipeline and properties - Tokenization - Pos Tagging - Entity Detection - Dependency Parsing - Noun Phrases - Word Vectors - Integrating spaCy with Machine Learning - Comparison with NLTK and CoreNLP Note : Algorithm used – SVMH	15h
3	Project: Develop a Chat bot for NTTF admission activities. (Tools: chatfuel, python or any other sdk.)	15h
4	Case Study Classify Images Using Tensor Flow Task 1: Download the Pre-trained model. Task 2: Implement Task 3: Remove the pre-training and retrain the model. Task 4: Evaluate	10h
Semester - 3 Module Name: Oracle Lab Module Code: CP09324P		
Sl. No.	Module Details	Practical Hours 90
	UNIT 1	24h

1	Write a query to create table using different data types and constraints	1
2	Write a query using the INSERT statement.	1
3	Write a query using the INSERT ALL statement.	4
4	Write a query to insert records to a table dynamically.	2
5	Write a query using the UPDATE statement.	3
6	Write a query using the DELETE statement.	3
7	Write a query using RECYCLEBIN, FLASHBACK and PURGE commands.	2
8	Write queries to alter table(ADD,DROP,RENAME,MODIFY)	1
9	Write query to display data using WHERE clause.	2
10	Write queries to sort records in a table using ORDER BY clause.	1
11	Write a query using COALESCE() function.	1
12	Write a query using NVL and NVL2 functions	2
13	Write a query for truncating and dropping a table.	1
	UNIT 2	15h
14	Identify features of views.	1
15	Write a query to create and perform various tasks for managing views.	1
16	Write a query for creating and dropping synonyms.	1
17	Write a query for creating and dropping indexes.	1
18	Identify the syntax for creating and using a sequence.	1
19	Write a query to perform various character functions.	1
20	Write a query to perform various mathematical functions.	1
21	Write a query to perform various date functions.	1
22	Write a query to convert data types.(to_char,to_num,to_date)	2
23	Write a query to perform aggregate functions.	1
24	Write a query to display records using GROUP BY and HAVING clauses	2
25	Demonstrate the use of CASE expand DECODE functions	2
	UNIT 3	9h
26	Identify use of single row and multiple row sub queries sub queries to retrieve from multiple tables.	2
27	Identify the syntax for performing multiple-column and correlated sub queries.	2
28	Identify the use of different types of join to retrieve data from multiple tables.	2
29	Generate a query using the following SET OPERATORS : UNION, UNION ALL, INTERSECT, MINUS	2
30	Write a query for controlling User Access. -- Create User, Grant, Revoke	1
	UNIT 4	15h
31	Write a PL/SQL program to declare and initialize variables.	2

32	Write a PL/SQL program for declaring variables using the % type attributes.	1
33	Write a PL/SQL program using % ROWTYPE attributes.	2
34	Write a PL/SQL program for creating a PL/SQL table based record.	2
35	Write a PL/SQL program for creating a PL/SQL cursor based record.	2
36	Write a PL/SQL program for creating a PL/SQL user defined record.	2
37	Write a PL/SQL program using nested blocks.	1
38	Write a PL/SQL program using various operators.	1
39	Write a PL/SQL program for manipulating data using DML Statements	2
	UNIT 5	12h
40	Write a PL/SQL program to retrieve data from table using if statement	2
41	Write a PL/SQL program to check whether given number is positive, negative or zero.	2
42	Write a PL/SQL program to display corresponding weekdays of entered number using	1
43	Write a PL/SQL program to print first 25 natural numbers using BASIC LOOP	2
44	Write a PL/SQL program to print first 25 even natural numbers using WHILE LOOP	2
45	Write a PL/SQL program to find factorial of a number using FOR LOOP	1
46	Write a PL/SQL program for controlling explicit cursors and use the attributes.	2
	UNIT 6	15h
47	Write a PL/SQL program using cursor FOR loops, FOR UPDATE, WHERE CURRENT OF.	2
48	Write a PL/SQL program for trapping system built in exceptions.	1
49	Write a PL/SQL program for trapping user defined exceptions.	1
50	Write a PL/SQL program for passing parameters to a stored procedure.	1
51	Write a PL/SQL program using stored procedures.(IN,OUT,IN OUT)	1
52	Write a PL/SQL program for creating PL/SQL function.	2
53	Write a PL/SQL program trapping predefined and user defined exception in subprogram.	1
54	Write a PL/SQL program for developing PL/SQL packages.	2
55	Write a PL/SQL program to create a trigger.	1
56	Write a PL/SQL program to show use of new and old keywords in a Trigger program.	2
57	Demonstrate the following TCL operations with suitable example COMMIT , SAVEPOINT, ROLLBACK	1

Semester - 3		Module Name: UNIX Lab	Module Code: CP09325P
Sl. No.	Module Details		Practical Hours 40
1	Begin exploring the use of UNIX commands by logging in with different virtual consoles, Confirming your login, The finger command, pwd command		4h

2	Perform different operations by creating, viewing and different types of listing the files using the UNIX command cat, vi, vim, nano, touch and ls	4h
3	Perform different operations by Copying, moving and deleting the files between newly created directories	4h
4	Display the current date, time, calendar in the given FORMAT 1. Abbreviated weekday name (e.g., Sun) 2. full month name (e.g., January) 3. full date; same as %Y-%m-%d 4. 12-hour clock time (e.g., 11:11:04 PM) 5. locale's date representation (e.g., 12/31/99) 6. Display prev/current/next month output. (using cal command) 7. Display Monday as the first day of the week. (using cal command)	4h
5	Run the different help commands in LINUX (man, info, help, whatis)	2h
6	Display the environment variable of unix system 1) Various environment variables 2) Accessing environment variable values 3) Set new environment variable values 4) Deleting environment variables	4h
7	Execute a privileged command by local user using su command	1h
8	1. Exploring the use of vi and ed editor by creating files, appending, saving, quitting, repeating, undoing, moving cursors, deleting datas, text insertion and line numbering. 2. Write a sed command that deletes the first character in each line in a file 3. Write a sed command that deletes the character before the last character in each line in a file. 4. Write a sed command that swaps the files and second words in each line in a file	4h
9	1. Create a file with some contents 2. Sort the file in ascending order 3. Perform numeric sort 4. Perform compare and difference between two files 5. Remove duplicate lines from input 6. remove duplicate adjacent lines from input	4h
10	Perform the following 1. Display the current Processes running on the terminal 2. Begin some jobs in the background 3. Bring back the background job into foreground 4. kill the process by referencing its job id	4h
11	Shell script Programs 1. Write a shell program to print even numbers [range 1 - 100] using while loop 2. Write a menu driven program to print the entered character is vowel, consonant or a digit using case	5h

	3. Write a shell script that accepts a file name starting and ending	
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Semester - 3		Module Name: Employability Skills	Module Code: CP09326T
Sl. No.	Module Details	Theory Hours 30	
1	Diversity and Inclusion, Gender sensitivity PwD etc.	7h	
2	Career development and Goal setting	8h	
3	Entrepreneurship	8h	
4	Analytical Thinking and Adaptive Thinking	7h	
Semester - 4		Module Name: Dynamic Websites	Module Code: CP09411T
Sl. No.	Module Details	Theory Hours 60	
1	Introduction to the Module	6h	
2	Designing and Coding a website	8h	
3	Design and Developing for Mobile Websites	6h	
4	Design and Build a Database (1)	3h	
5	Design and Build a Database (2)	5h	
6	Using Scripts (1)	5h	
7	Using Scripts (2)	5h	
8	Web Development Tools	3h	
9	Mobile Application Development Integration	5h	
10	Web Services	6h	
11	Building A Dynamic Website	4h	
12	Evaluating Website	4h	
Semester - 4		Module Name: Software Engineering & Testing	Module Code: CP09412T
Sl. No.	Module Details	Theory Hours 40	
1	Introduction to Software Engineering and Software Testing	8h	
2	Testing Techniques	8h	
3	Software Testing Life Cycle	6h	
4	Defect Management	6h	
5	Levels of Testing	6h	
6	Types of Testing	6h	
Semester - 4		Module Name: Business Intelligence	Module Code: CP09413T
Sl. No.	Module Details	Theory Hours 40	
1	Business Intelligence an Introduction	6h	
2	Business Intelligence Essentials	6h	
3	Architecting the Data	9h	
4	Data Extraction	7h	

5	Business Intelligence Life Cycle	5h
6	Business Intelligence Issues and Challenges	3h
7	Overview of BI Tools	4h
Semester - 4 Module Name: Java Programming Module Code: CP09414T		
Sl. No.	Module Details	Theory Hours 80
1	Introduction to Java	5h
2	Operators and Statements	2h
3	Working with OOP's	6h
4	Packages and Interfaces	5h
5	Exceptions	5h
6	Multithreading	2h
7	Basic IO	3h
8	Java.Lang package	3h
9	Java.util package	5h
10	Java.io package	3h
11	Applets and GUI	4h
12	Event Handling	6h
13	JDBC	11h
14	Servlets	9h
15	JAVA Server Pages (JSP)	11h
Semester - 4 Module Name: Enterprise Applications - Basics or ERP CRM Module Code: CP09415T		
Sl. No.	Module Details	Theory Hours 40
1	Introduction to ERP	3h
2	An Overview of Enterprise	3h
3	ERP and Related Technologies	5h
4	ERP System	15h
5	ERP Implementation Lifecycle	8h
6	ERP Market	3h
7	Customer Relationship Management and ERP	3h
Semester - 4 Module Name: Java Programming Lab Module Code: CP09416P		
Sl. No.	Module Details	Practical Hours 90
1	Write a program to display your Information on the Console.	1h
2	Write a program to use the Conditional Statements.	1h
3	Write a program to use the Control Statements.	1h
4	Write a program to pass Command Line Arguments and display the same on the console.	1h

5	Write a program to declare a String Array of with varying Width and display the content of the Array in the same manner in which the data is stored.	2h
6	Write a program to demonstrate the use of Operators.	3h
7	Write a program to demonstrate Pass by Value and passing the Objects as Parameters.	2h
8	Write a program to demonstrate Method Overloading and Method Overriding.	3h
9	Write a program to demonstrate Constructor Overloading.	2h
10	Write a program Create a Package and Import the same in the other class.	2h
11	Write a program to demonstrate Multiple Inheritance with the help of Interfaces.	2h
12	Write a program to handle the Exceptions use 'finally' & the Nested 'try' block.	3h
13	Write a program Demonstrate the use of 'try', 'catch', 'finally', 'throw' & 'throws' in Exception handling.	4h
14	Write a program to demonstrate the Life Cycle of Thread.	3h
15	Write a program to take the Input from the User using Basic IO and display the output.	2h
16	Write a program to use Array List, Sort the Elements, and retrieve the values and the Keys from the Map.	2h
17	Write a program to work with Collection Interfaces and Classes.	2h
18	Write a program to retrieve all the File Properties and display the same.	2h
19	Write a program to demonstrate the various Input and Output Streams (Character Streams, Byte Streams, and Object Streams).	2h
20	Write a program to display your information on to the Applet Window.	2h
21	Write a program to pass your information to the Applet & display the same on to the Applet Window (Using param tag).	2h
22	Write a program Demonstrate various Methods of Graphics class.	2h
23	Write a program Create a GUI Form (Applet) using all the possible awt Controls.	2h
24	Write a program Create a GUI Application form using all the possible awt Controls.	2h
25	Write a program Create a Notepad with all the functionalities.	2h
26	Write a program to demonstrate various Events in Java.	2h
27	Write a program to connect to a database using Connection, Statement and Result Set Interfaces.	5h
28	Write a program to demonstrate the use of Callable Statement.	2h
29	Write a program to demonstrate the use of Prepared Statement	3h
30	Write a program to demonstrate error and warning management in JDBC	3h
31	Write a program to implement cursor management in JDBC.	3h
32	Write a program to demonstrate the Servlet Life cycle and types of Servlets	3h
33	Write a program to demonstrate thread safety in servlets.	2h
34	Write a program to create a simple JSP	3h
35	Write a program to demonstrate the life cycle of JSP	2h
36	Write a program to demonstrate the use of JSP Scripting Elements	2h
37	Write a program to demonstrate the use of JSP directives	2h
38	Write a program to use implicit objects in JSP	2h
39	Write a program to create the JSP for Session Management	2h

40	Write a program to demonstrate using JDBC with JSP	2h
Semester - 4 Module Name: Software Engineering & Testing Lab Module Code:CP09417P		
Sl. No.	Module Details	Practical Hours 60
1	Manual Testing	36h
2	Introduction to Selenium and its components.	2h
3	Write a selenium web driver script for opening a login page of demo.actitime.com	2h
4	Demonstrate Title check point Text Checkpoint	2h
5	Demonstrate URL check point	2h
6	Demonstrate element checkpoint	2h
7	Demonstrate working with single select dropdown	2h
8	Demonstrate working with multi select dropdown.	2h
9	Demonstrate selecting and deselecting option from multi select dropdown	2h
10	Demonstrate to get all the option which are there in the dropdown and print it in the console.	2h
11	Demonstrate Synchronization	2h
12	Demonstrate how to work with IE browser	2h
13	Demonstrate how to work with chrome browser	2h
Semester - 4 Module Name: Dynamic Website Lab Module Code: CP09418P		
Sl. No.	Module Details	Practical Hours 90
1	Create a home page and at least one other web page using HTML with external CSS.	4h
2	Create a CSS file which includes the following elements: a. Background color b. Aligned content c. Menus (at least links to five – future pages) d. Animated banners e. Borders f. Page layout g. Font styles/families/sizes for different elements e.g. h1,h2, p h. Lists i. Table with border/padding etc. j. Viewport	5h
3	Create a home page and at least one other responsive web page which can be displayed on at least two different sized mobile devices.	4h
4	Create a CSS file which includes the following elements which can be viewed on mobile devices: a. Background color b. Menus (at least links to five – future pages) c. Borders	5h

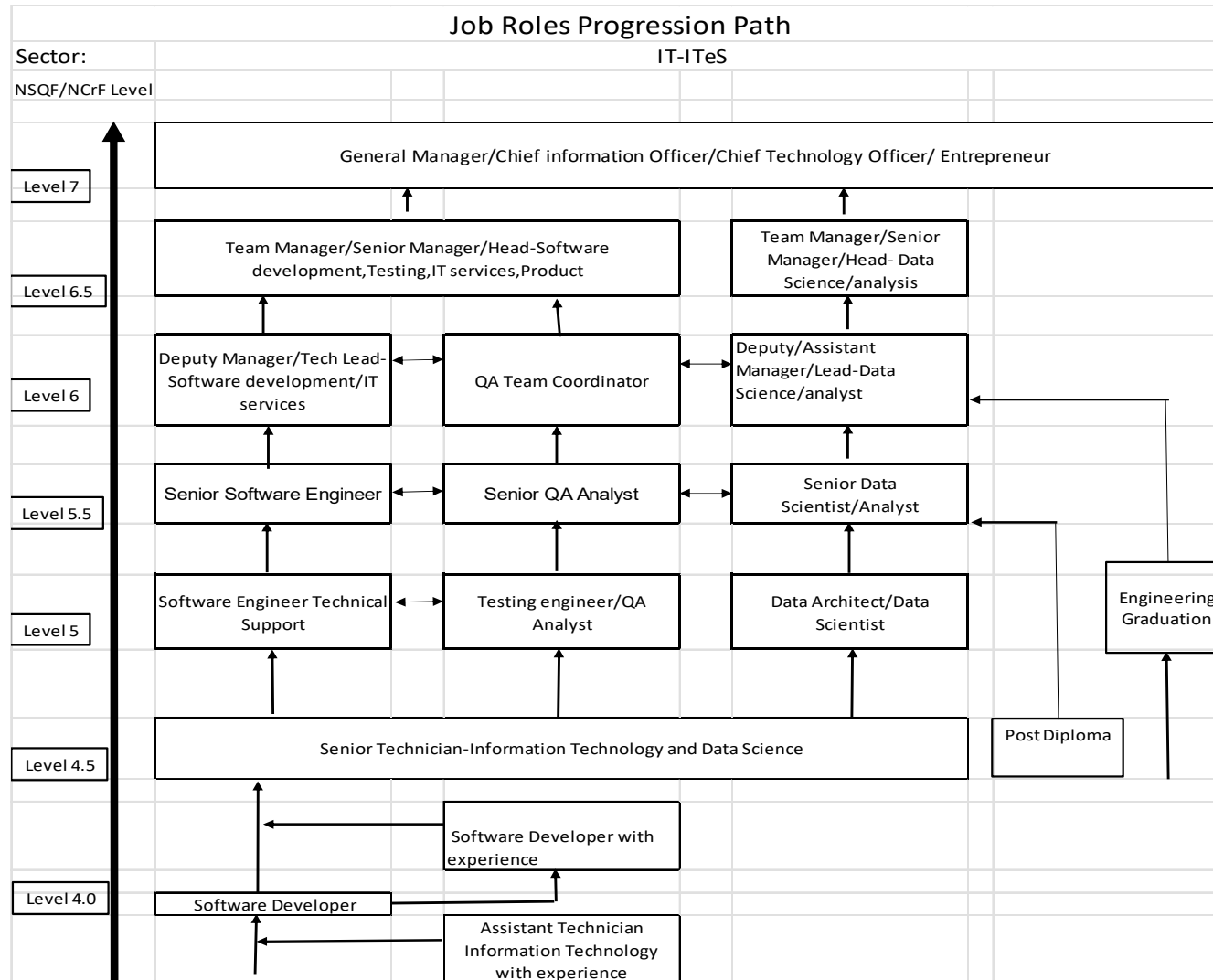
	d. Page layout e. Font styles/families/sizes for different elements eg. h1, h2, p Viewport	
5	Show the result of rolling a set of dice, with the number of dice and the number of faces on each dice decided by the user.	4h
6	Take in some user provided text and reverse it.	4h
7	Using Andy's Autos website, create a new webpage and add a feature which will allow the user to select one of four operations from a drop-down menu – add, subtract, multiply, or divide. Allow them to provide two numbers and perform the appropriate operation on them.	5h
8	Using Andy's Autos website, create the MySQL and PHP architecture for a login page. It should permit the following operations: 1. Register your account 2. Prevent people registering usernames that already exist 3. Report on successful logins 4. Prevent access from invalid username/password combinations 5. Create a database to store customer details including the following fields: a. customer ID b. first Name c. last Name d. address1 e. Town f. County g. postcode h. telNo i. mobNo j. eMail	5h
9	Create a php script that will allow you to input data into the database from a webpage which includes a registration form. The form should match the fields in the database.	5h
10	Making use of JavaScript, write web pages to Implement a dice roller	4h
11	Making use of JavaScript, add a script to Andy's Autos website which allows you to validate that a date of birth provided by a user is in a valid form (dd/mm/yyyy).	5h
12	Making use of jQuery, create at least two further web pages in Andy's Autos website that provide the following effects: 1. A form that slides out when a button is pressed. 2. A hyperlink that 'runs away' from the cursor when the user attempts to click on it. A series of nested bullet points that fade away, one after the other, when a button is clicked.	6h
13	Create an Ajax enabled web application linked to Andy's Autos that allows for creating, querying, browsing and manipulating a database of your own choice.	5h
	Case Study with Demo	

1	Make a mobile application for Andy's Autos and try to link this to the main web page you have created.	5h
2	Based on the mobile application you have created add in atleast one API and create a direct link from the mobile application to another mobile application of your choice through the app store.	6h
3	Making use of a plug-in of your choice from this list of REST-based web services, create a PHP script that consumes this resource, and an Ajax front-end that presents it to the user. Also add an RSS feed from the BBC website into Andy's Autos Website.	6h
4	Making use of a plug-in of your choice from this list of SOAP-based web services, create a PHP script that consumes this resource, and an Ajax front-end that presents it to the user. It should be a web service that performs a different task to the one you selected for the first exercise.	6h
5	Create a detailed setup web page for your stock portfolio application.	6h

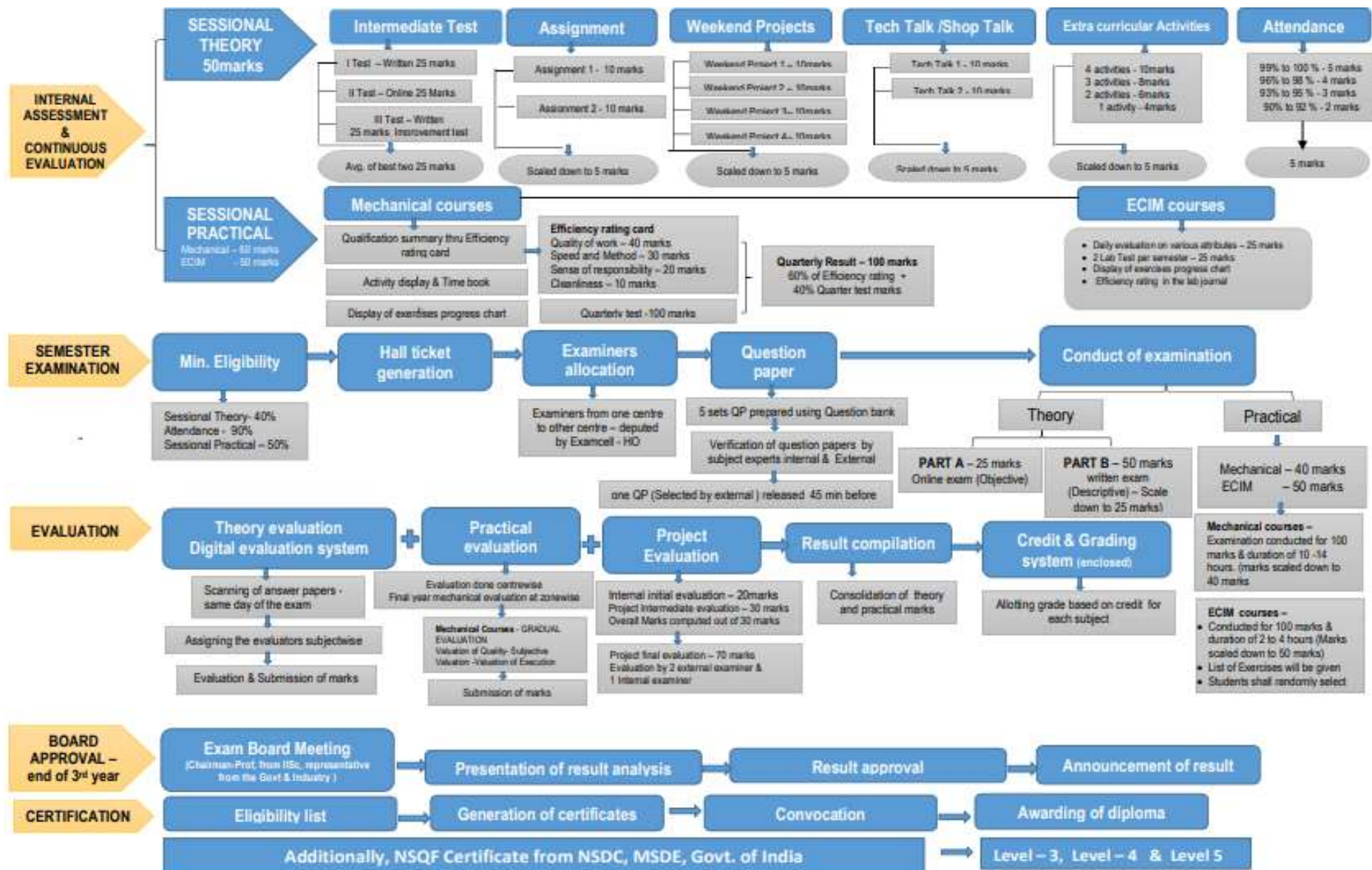
Semester - 4		Module Name: Business Intelligence Lab	Module Code: CP09419P
Sl. No.	Module Details	Practical Hours 40	
1	PHASE 1 - Data Analysis with Excel	20h	
1.1	Demonstrate the use of sort and filter	5h	
1.2	Demonstrate the use of Conditional formatting	5h	
1.3	Demonstrate the use of Charts	5h	
1.4	Demonstrate the use of Pivot tables and tables	5h	
2	PHASE 2 - Data Visualization in Python	20h	
2.1	Familiarization of Jupyter notebook and importing data sets	5h	
2.2	Demonstrate the use of Matplotlib and pandas	5h	
2.3	Demonstrate the use of seaborn	5h	
2.4	Demonstrate the use of ggplot	5h	

Semester - 4		Module Name: Employability Skills	Module Code: CP09420T
Sl. No.	Module Details	Theory Hours 30	
1	Financial and Legal Literacy	8h	
2	Occupation safety, Health, and Environment education.	7h	
3	Digital Literacy Skills	8h	
4	Essential skills for success.	7h	

Semester – 4		Module Name: OJT	Module Code: CP09421T
Sl. No.	Module Details	Practical Hours 90	
1	On the Job Training in the relevant sector	90h	
		Total Hours	90h

Annexure 9: Career Progression**Job Roles Progression Path**

Annexure 10: Assessment SOP



Annexure 11: Occupational Map**Sector Name : Computer and Information Technology - IT - ITeS**

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	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			
Level 7	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	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 5. Responsibility: Self and team responsibility – Sr. Technician or Master Technician	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	5. Responsibility: Self and team responsibility – Sr. Technician or Master Technician	2512 2519	Software Developer/Testing Engineer/Engineer Technical Support/QA Analyst/Computer Programmer	Data Architect/Data Scientist Electives: Data Analysis, Artificial Intelligence, Machine Learning

			Electives: Software Development, Full stack development, Information system management, Firmware development Options: IT services, BPM, Software Product, Engineering services	Options: IT services, BPM, 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 & Entrepreneurial readiness 4. Broad Learning Outcomes: Carry out Range of tasks and may provide range of solutions 5. Responsibility: Accountable/ responsible - Sr. Technician & Technician	3514 2512	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	
Level 4.0	1. Professional Theoretical Knowledge: Range of knowledge 2. Professional and Technical Skills/ Expertise: Range of technical skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Follows instructions. Team member 4. Broad Learning Outcomes: Carry out Range of tasks under minimum supervision 5. Responsibility: Technician	2512	Software Developer	

Annexure 12: Key Learning Outcome

SL. NO	SUBJECT NAME	KNOWLEDGE AND UNDERSTANDING	TECHNICAL & PROFESSIONAL SKILLS	APPLICATION OF KNOWLEDGE AND SKILLS
SECOND YEAR				
17	Oracle (CP09316T) Oracle Lab (CP09324P) Understanding relational database management system that is widely used in enterprise environments.	Learn about Oracle database administration tasks such as installation, configuration, backup, and recovery, as well as monitoring and optimizing Oracle database performance.	Able to design and implement databases that meet the requirements of users and stakeholders, using data modelling techniques such as ER diagrams, UML diagrams, and data flow diagrams.	Provides a foundation for understanding database architecture, programming, optimization, and administration, as well as integration with other technologies.
18	Object Oriented Programming with C++ (CP09317T) OOP'S with C++ Lab (CP09322P) Extension of the C programming language and supports both procedural and object-oriented programming paradigms.	Gain proficiency in concepts such as classes, objects, inheritance, polymorphism, and encapsulation.	Able to understand object-oriented programming, algorithmic problem-solving, and efficient coding techniques.	Able to do game development, embedded systems, and high-performance computing
19	Information System and Organisation (CP09318T) Two interconnected concepts that are critical to the success of modern businesses.	Understand the purpose and function of information systems and their importance in modern organizations.	Gain an understanding of how information systems are used to support and optimize business processes, such as sales, marketing, and accounting.	Using cloud computing, artificial intelligence, and blockchain to innovate and transform businesses.
20	Design Thinking (CP09319T) Problem-solving methodology that involves a user-cantered approach to creating innovative solutions.	Understanding the principles of human-cantered design, which puts the needs and experiences of users at the center of the design process.	Learn about design research methods such as user interviews, observation, and surveys, and how to use them to gain insights into user needs and preferences.	Can be applied to a wide range of industries, from product design to service design, and can lead to more innovative and user-friendly solutions.

21	Artificial Intelligence (CP09320T) Artificial Intelligence Lab (CP09323P) Rapidly growing field of computer science that has the potential to transform many industries and aspects of society.	Understanding the fundamental concepts of AI, including machine learning, natural language processing, computer vision, robotics, and expert systems.	Able to design, implement, and evaluate AI algorithms and models for various applications, such as image recognition, speech recognition, and predictive analytics.	Can develop applications in various industries, from healthcare and finance to entertainment and gaming.
22	Unix CP09321T) Unix Lab (CP09325P) Multi-user, multi-tasking OS that has become an industry standard for servers, workstations, and other computing systems.	Learn about the underlying architecture of Unix, including the kernel, file system, and network stack, and how they interact with each other.	Gain proficiency in using Unix commands to perform various tasks, such as file management, directory navigation, and process management, and in writing shell scripts to automate repetitive tasks.	Helps in system administration, software development, or computer networking, as Unix is a widely used operating system in these fields.
23	Dynamic Websites (CP09411T) Dynamic Websites Lab (CP09418P) Create dynamic web pages, which are generated in real-time based on user requests and interactions with the website.	Understanding server-side programming languages such as PHP, Python etc and how they are used to generate dynamic content on a website.	Understanding front-end web technologies such as HTML, CSS, PHP and JavaScript, and how they are used to create dynamic user interfaces for a website.	Can build scalable, interactive web applications.
24	Software Engineering & Testing (CP09412T) Software Engineering & Testing Lab (CP09417P) Identify defects, errors, or bugs in the software and ensure that it is of high quality before it is released to end-users.	Understanding the fundamental concepts of software engineering, software testing, such as test cases, test plans, test strategies, and test execution.	Learn about different types of software testing, such as functional testing, performance testing, security testing, and usability testing, and how to choose the appropriate testing approach based on the requirements of the software.	Valuable skill for anyone involved in software development, from developers to quality assurance engineers
25	Business Intelligence (CP09413T) Business Intelligence Lab (CP09419P) Business intelligence (BI) refers to	Understanding data analysis techniques and how to create and maintain a data warehouse to support BI initiatives.	Learn about various BI tools and technologies such as reporting, analytics, and data visualization tools, and how to use them to extract insights from data.	Apply knowledge in data analysis, business analytics, or business strategy

	the process of collecting, analysing and transforming data into meaningful insights to support better decision-making within an organization.			
26	Java Programming (CP09414T) Java Programming Lab (CP09416P) Popular programming language that is widely used for developing desktop, web and mobile applications	Learn about Java APIs and libraries, such as Java Collections Framework, Java IO, and Java Networking, and how to use them to develop Java applications.	Learn how to write Java code using popular development environments, such as Eclipse or and how to use Java build tools, such as Maven or Gradle.	Able to develop web applications, desktop applications, mobile games and big data processing
27	Enterprise Applications-Basics or ERP CRM (CP09415T) Complex, scalable, and integrated with other systems and applications used by the organization	Understanding how business processes work and how to optimize them using ERP and CRM systems.	Understanding of project management principles and how to apply them to ERP and CRM implementation projects.	Able to work in fields of business management, operations, or information technology.
28	Employability Skills (CP09326T) Employability Skills (CP09420T) Understand Entrepreneurship skills Ability to understand financial and legal aspects Understand Occupation safety, Health, and Environment related issues. Ability to use Essential skills.	Knowledge on various schemes and institutions promoting Entrepreneurs. Ways of setting enterprise, legal compliances, marketing, and budgeting etc. Knowledge and understanding on personal finance management, investments, returns, basics of taxes, awareness on financial frauds and prevention. Awareness on fundamental rights under the constitution and facilities available for recourse in the event of breach. Knowledge on Occupation safety	Explain the schemes promoted by various support institutions. Budgeting and evaluations. Explain the Occupations hazards and process of mitigation of such hazards. PPEs. Explain environment conservation, and other factors affecting them.	Apply and impart details to other people in the society. Decide, plan and implement various financial management ideas, taxations and benefits and legal compliance in the workplace. Enforce caution against financial frauds and addressal of frauds. Follow all safety norms laid by the industry to develop a safe workplace. Practice stress management techniques to ensure high productivity in the work area.

		and health, at workplace, Occupation Hazards, Accident prevention and PPEs, Environment, Pollution and protection of environment, Energy conservation, Global warming, Conservation of natural resources, waste management and disposal, Disaster Management. Understanding balancing Life and Career, Value based decision making, Types of stress and stress management.		
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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