ASIIN Seal

Accreditation Report
Based on the previous Evaluation procedure

Degree Programme
National Diploma of Engineering in Applied Science and Technology in Computer Science

Provided by
IT Business School (ITBS) Nabeul

Version: 25 March 2025

Table of Content

A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
National Diploma of Engineering in Applied Science and Tech-nology in Computer Science	National Diploma of Engineering in Applied Science and Tech-nology in Computer Science	ASIIN	–	04
Date of the contract: 29.02.2024 **Submission of the Progress Report:** 13.01.2025 **Review of Progress Report:** February 2025 (desktop and online)				
Peer panel: Prof. Dr. Georg Schneider, University of Applied Sciences Trier Prof. Dr. Moncef Tagina, ENSI/University of Manouba Dr. Burkhard Petin, privacy/design GmbH Islem Agrebi, Student at EPI Sousse				
Representative of the ASIIN headquarter: Dr. Siegfried Hermes				
Responsible decision-making committee: Accreditation Commission for Degree Programmes				

[1] ASIIN Seal for degree programmes

[2] TC: Technical Committee for the following subject areas: TC 04 - Informatics/Computer Science

Criteria used:

European Standards and Guidelines as of May 15, 2015

ASIIN General Criteria as of December 07, 2021

Subject-Specific Criteria of Technical Committee 04 – Informatics/Computer Science as of March 29, 2018

B Characteristics of the Degree Programme

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Applied Science and Tech-nology in Computer Science	National Diploma of Engineering	- Software Engineering, Applications, Network and Services - Business Intelligence - Embedded Systems	7	Full time / blended learning	/	6 semesters	180 ECTS	Annually/ 2016

According to the Progress Report, graduates of the program with the specialization *Software Engineering, Applications, Network and Service* have acquired the following **learning outcomes**:

Families	Specific Skill code	Specific Skills
F1 : Scientific and technical tools	CS1	Master scientific tools for computing
	CS2	Master Database Management System
F2: IT Technologies	CS3	Master advanced databases architecture and administration
	CS4	Implement and test dynamic cross-platform solutions
	CS5	Conduct architectural, methodological and technical choice for software development
	CS6	Master Devops strategies and security networks administration
	CS7	Master software design, implementation and test software
F3 : Communication and management	CS8	Master technical concepts in foreign languages and digital communication
	CS9	Master managerial skills and industrial culture
F4: Self-development, innovation and projects	CS10	Practice self-development and implement innovative projects

According to the Progress Report, graduates of the program with the specialization *Business Intelligence* have acquired the following **learning outcomes**:

Families	Specific Skill code	Specific Skills
F1 : Scientific and technical tools	CS1	Master scientific tools for computing
	CS2	Master Database Management System
F2: IT Technologies	CS3	Master advanced databases architecture and administration
	CS4	Implement and test dynamic cross-platform solutions
	CS5	Conduct architectural, methodological and technical choice for software development
	CS6	Master Big Data analysis and visualization
	CS7	Design, implement and interpret dashboards
F3 : Communication and management	CS8	Master technical concepts in foreign languages and digital communication
	CS9	Master managerial skills and industrial culture
F4: Self-development, innovation and projects	CS10	Practice self-development and implement innovative projects/Research projects

[3] EQF = The European Qualifications Framework for lifelong learning

According to the Progress Report, graduates of the program with the specialization *Embedded Systems* have acquired the following **learning outcomes**:

Families	Specific Skill code	Specific Skills
F1 : Scientific and technical tools	CS1	Master scientific tools for computing
	CS2	Master Database Management System
F2: IT Technologies	CS3	Master advanced databases architecture and administration
	CS4	Implement and test dynamic cross-platform solutions
	CS5	Conduct architectural, methodological and technical choice for software development
	CS6	Design, build and validate IOT systems
	CS7	Master administration system and native development
F3 : Communication and management	CS8	Master technical concepts in foreign languages and digital communication
	CS9	Master managerial skills and industrial culture
F4: Self-development, innovation and projects	CS10	Practice self-development and implement innovative projects

Preliminary Note

The following paragraphs are fully based on the *evaluation report* concerning the same degree programmes dated from 22 December 2023, in particular the results of the peers' analysis and assessment summarized in chapter F of the evaluation report. Thus, the evaluation report is the main reference document and substantial base of the accreditation procedure. This report is drafted entirely along the lines of the ASIIN General Criteria and the Subject-Specific Criteria of the relevant Technical Committee 04 – Informatics/Computer Science. Therefore, compliance with ESG parts 1.1 to 1.10 is fully assessed in the combined evaluation and accreditation procedure, as well as in the related findings of the experts and the Technical Committee (see Sections E and F) and the final decision of the Accreditation Commission (see Section G).

Since the evaluation procedure is designed from the outset with a possible accreditation in mind, the results of the evaluation are summarised accordingly. This ensures that they can be easily translated into a proposal by the experts for the final decision of the Accreditation Commission on the accreditation of the programme. As a result, the accreditation procedure could be shortened, in particular by dispensing with the regular expert group visit. However, the HEI's response to the evaluation report is a regular part of this procedure and is usually taken into account in the experts' assessment.

C Results of the Evaluation Procedure concerning the ASIIN Seal

In the evaluation report, the analysis of the expert group has resulted in the following statement regarding the fulfilment of the ASIIN criteria:

ASIIN General Criteria + Subject-Specific Criteria 04 – Informatics / Computer Science	**Meeting the Standards**			
	sufficient	*sufficient minor reservations / suggestions*	*partly sufficient major reservations*	*not sufficient critical reservations*
1 Degree programme: Concept, Content & Implementation				
1.1 Objectives and learning outcomes				**x**
1.2 Title of the degree programme		**x**		
1.3 Curriculum (including SSC 04 for Master programme)				**x**
1.4 Admission requirements			**x**	
1.5 Workload & credit points			**x**	
1.6 Didactics and Teaching Methodology	**x**			
2 Exams: System, Concept and Organisation				
2 Exams: System, Concept and Organisation				**x**

ASIIN General Criteria + Subject-Specific Criteria 04 – Informatics / Computer Science	**Meeting the Standards**			
	sufficient	*sufficient minor reservations / suggestions*	*partly sufficient major reservations*	*not sufficient critical reservations*
3 Resources				
3.1 Staff and staff development				**x**
3.2 Funds and equipment				**x**
4 Transparency and Documentation				
4.1 Module descriptions			**x**	
4.2 Diploma and Diploma Supplement	**x**			
4.3 Relevant rules	**x**			
5 Quality Management: Quality Assessment and Development				
5 Quality Management: Quality Assessment and Development				**x**

Based on its analysis, the peer group has drawn the following conclusions:

Critical concerns

C1 (ASIIN 1.1, 1.3) Redesign the program so that it adheres to EQF level 7. This must be done in two ways: First, the level of the contents taught must be increased. Second, missing fundamental and theoretical contents must be integrated into the curriculum.

C2 (ASIIN 1.1, 1.3) In order to adhere to EQF level 7, students must be enabled to conduct research and must acquire scientific and academic writing skills.

C3 (ASIIN 2) The level of the exams must be increased. As a consequence, the form of examination must be chosen appropriately in order to test whether the learning outcomes have been achieved.

C4 (ASIIN 2) The final thesis must conform to the requirements of a scientific publication.

C5 (ASIIN 3.1) Ensure a sufficient number of qualified staff to successfully implement the program.

C6 (ASIIN 3.2) Provide a sufficient number of and adequately equipped labs.

C7 (ASIIN 5) Introduce a quality management system.

Major Recommendations

R1 (ASIIN 1.3; 4.1) It is strongly recommended to revise and standardize the module descriptions and add missing contents as indicated in the. (cf. criterion C-10)

R2 (ASIIN 1.3) It is strongly recommended to introduce bigger modules in which contents are reasonably combined and linked. In this regard, titles of the modules should be chosen so that they reflect the actual contents.

R3 (ASIIN 1.3) It is strongly recommended to credit the internships, as they are compulsory parts of the curriculum.

R4 (ASIIN 1.3) It is strongly recommended to introduce measures and mechanisms in order to enable student mobility.

R5 (ASIIN 1.4) It is strongly recommended to clearly define the entry level and competencies that are required for applicants in order to start this program.

R6 (ASIIN 3.1) It is strongly recommended to introduce support mechanisms for staff in order to conduct research.

R7 (ASIIN 3.2) It is strongly recommended to provide adequate access to academic/scientific literature.

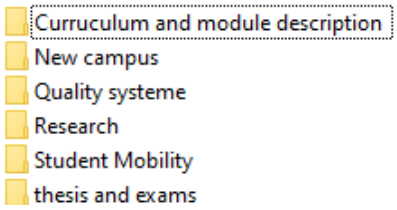
Minor Recommendations

R8 (ASIIN 1.2) It is recommended to rename the specialization “Software Engineering, Applications, Networks and Services” to “Software Engineering”.

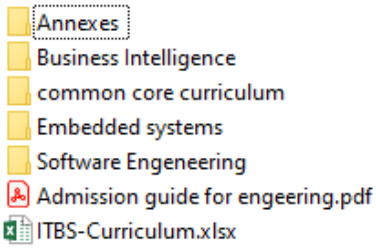
D Comment of the Higher Education Institution (13.01.2025)

After the completion of the preceding evaluation, the institution provided a progress report as well as the following additional documents:

Overall

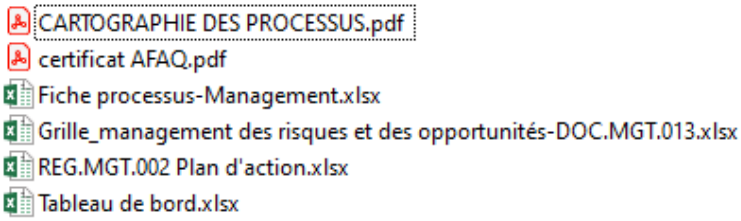


Curriculum and module description

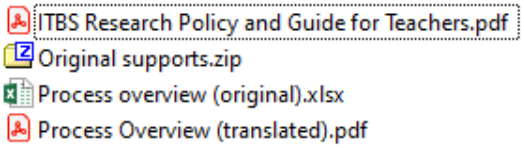


New campus (pictures)

Quality system



Research



Student Mobility

Theses and exams

Exams

Full Copy-Algorithmic Complexity.pdf
Full Copy-Artificial Intelligence and Machine Learning.pdf
Full Copy-Compilation.pdf
Full Copy-Data Warehouse.pdf
Full Copy-Graph Theory and Information Processing.pdf

In addition, two **End-of-study project's reports**.

E Assessment of the experts (10.03.2025)

Potential Conditions

C 1. (ASIIN 1.1, 1.3) Redesign the program so that it adheres to EQF level 7. This must be done in two ways: First, the level of the contents taught must be increased. Second, missing fundamental and theoretical contents must be integrated into the curriculum.

Initial Treatment	
Experts	not fulfilled Justification: Obviously, ITBS has performed a review of the curriculum in order to integrate some missing basic and theoretical courses. However, there is only little evidence in the module handbook on how the necessary theoretical background can be achieved. There is still a lack of advanced theoretical courses that are critical for EQF Level 7. The integration of more in-depth theoretical knowledge is essential to ensure that the programme meets the expected academic standards. Almost all modules mainly consist of practical content such as mastering the usage of tools and systems or configuring existing solutions.

C 2. (ASIIN 1.1, 1.3) In order to adhere to EQF level 7, students must be enabled to conduct research and must acquire scientific and academic writing skills.

Initial Treatment	
Experts	not fulfilled Justification: • **Research Integration**: ITBS has introduced workshops on research methodology and scientific writing, but these activities are limited to the first semester, with no follow-up in later semesters. A continuous focus on research across the entire programme would better equip students with the skills needed for high-level academic work. • **Research Projects**: There is also a lack of research projects that would allow students to apply the skills they learn in a practical, academic context. This is crucial for developing research and writing abilities that align with EQF Level 7 standards.

C 3. (ASIIN 2) The level of the exams must be increased. As a consequence, the form of examination must be chosen appropriately in order to test whether the learning outcomes have been achieved.

Initial Treatment	
Experts	not fulfilled Justification: According to the statement, ITBS has adapted the exam formats; some examples in the Admission Guide look good. However, most of the samples provided by the university are rather level EQF6 than 7. It is necessary that students are continuously trained to work independently and scientifically throughout their studies (cf. condition 2). This will enable ITBS Nabeul to raise the level of the exams and the students to pass these exams successfully.

C 4. (ASIIN 2) The final thesis must conform to the requirements of a scientific publication.

Initial Treatment	
Experts	not fulfilled Justification: Although there seems to be some improvement in the final year project reports, still work is to be done, particularly in the analysis and critique of results. The Exemplary Graduation Project Reports do not yet meet the methodological and scientific requirements of a final thesis. This must be achieved in order to meet the expectations of a Master's qualification, regardless of the application or research orientation of the programme. Again, the continuous exposure of students to the methods of scientific work and the related tasks is indispensable for the fulfilment of this condition. The experts suggest that a slightly adapted formulation of this condition should be maintained.

C 5. (ASIIN 3.1) Ensure a sufficient number of qualified staff to successfully implement the program.

Initial Treatment	
Experts	not fulfilled Justification: The available information on the quantity and quality of the teaching staff is not conclusive. In particular, the report does not provide clear information regarding the supervision rate of students, particularly for thesis projects, nor does it mention opportunities for faculty development and training. Both are essential for maintaining high-quality teaching and academic support for students.

C 6. (ASIIN 3.2) Provide a sufficient number of and adequately equipped labs.

Initial Treatment	
Experts	not fulfilled Justification: Based on the information provided this cannot be positively stated. While ITBS has made efforts to expand lab space, there are concerns that the available resources, particularly for specialized fields such as embedded systems, are still insufficient. The lack of detailed information about the equipment available in these labs makes it difficult to assess whether they are adequately prepared for the technical demands of the program.

C 7. (ASIIN 5) Introduce a quality management system.

Initial Treatment	
Experts	not fulfilled Justification: ITBS provided some evidence for an ISO 27001 certification, but no proof of the operational effectiveness with respect to the ASIIN criteria. However, this would be necessary to comply with the standard.

Potential Requirements

A 1. (ASIIN 1.3; 4.1) Revise and standardize the module descriptions and add missing contents as indicated in the report.

Initial Treatment	
Experts	not fulfilled Justification: In its present state, the module descriptions in many ways do not provide consistent and carefully checked information. For example, the intended learning outcomes of many modules are not described appropriately. Partially, they refer to the motivation and the content of the module rather than the intended knowledge, skills and competences.

A 2. (ASIIN 1.3) Introduce bigger modules in which contents are reasonably combined and linked. In this regard, titles of the modules should be chosen so that they reflect the actual contents.

Initial Treatment	
Experts	not fulfilled Justification: This (potential) requirement is closely linked to the fulfilment of the conditions related to the Master's level qualification, in particular C 1. The experts' conclusions are therefore consistent with their assessment.

A 3. (ASIIN 1.3) Internships must be credited, as they are compulsory parts of the curriculum.

Initial Treatment	
Experts	not fulfilled Justification: The issue remains unclear as the Final Project and Internships module appears to address both internships and the final project without specifying whether and how internships will receive an appropriate number of credits. However, this is the essence of the requirement and needs to be clarified and communicated transparently.

A 4. (ASIIN 1.3) Introduce measures and mechanisms in order to enable student mobility.

Initial Treatment	
Experts	not fulfilled Justification: There is no concrete plan or mechanism in place to facilitate student mobility. The programme lacks evidence of established partnerships with other institutions, exchange programmes, or initiatives that would allow students to benefit from international experiences. Additionally, no statistics or data have been provided on student mobility or exchange activities. Implementing such programmes, along with tracking and sharing mobility statistics, would enhance students' global perspective and provide valuable opportunities to experience different educational and cultural environments.

A 5. (ASIIN 1.4) Clearly define the entry level and competencies that are required for applicants in order to start this program.

Initial Treatment	
Experts	not fulfilled Justification: The programme includes a score calculation for applicant selection, but there is no information on the admission threshold or the acceptance rate. Moreover, there are no statis-

	tics available regarding the number of applicants or the admission outcomes. This lack of transparency makes it difficult to evaluate how the programme ensures that incoming students meet the necessary competencies and qualifications for successful participation.

A 6. (ASIIN 3.1) Introduce support mechanisms for staff in order to conduct research.

Initial Treatment	
Experts	not fulfilled Justification: While ITBS has recruited additional staff, there is no clear evidence of support mechanisms for staff to engage in research activities. Initiatives such as research funding, dedicated time for research or opportunities for collaboration with other institutions are absent. Such mechanisms are essential for fostering a research culture and enabling staff to conduct high-level research.

A 7. (ASIIN 3.2) Provide adequate access to academic/scientific literature.

Initial Treatment	
Experts	not fulfilled Justification: There is insufficient information about access to academic and scientific literature. While a new campus has been opened, there is no clear description of the library facilities or the resources available, including whether students and faculty have access to the latest research publications, journals, and academic databases. If a library exists at the new campus, its resources and availability need to be properly presented to ensure that students and faculty can engage with current and relevant academic literature.

F Summary: Expert recommendations (10.03.2025)

Taking into account the additional information and the comments given by the ITBS Nabeul, the experts summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
NED Engineering in Applied Science and Technology in Computer Science	*Suspension*			

Conditions

C1 (ASIIN 1.1, 1.3) The program must be re-designed in such manner that it adheres to EQF level 7. This must be done in two ways: First, the level of the contents taught must be increased. Second, missing fundamental and theoretical contents must be integrated into the curriculum.

C2 (ASIIN 1.1, 1.3) In order to adhere to EQF level 7, students must be enabled to conduct research and must acquire scientific and academic writing skills.

C3 (ASIIN 2) The level of the exams must be increased.

C4 (ASIIN 2) It must be demonstrated that the final projects generally meet the methodological and scientific requirements of a Master's thesis.

C5 (ASIIN 3.1) A sufficient number of qualified staff to successfully implement the program must be ensured.

C6 (ASIIN 3.2) A sufficient number of and adequately equipped labs must be provided.

C7 (ASIIN 5) A quality management system must be introduced.

Potential Requirements

A 1. (ASIIN 1.3; 4.1) Revise and standardize the module descriptions and add missing contents as indicated in the report.

A 2. (ASIIN 1.3) Introduce bigger modules in which contents are reasonably combined and linked. In this regard, titles of the modules should be chosen so that they reflect the actual contents.

A 3. (ASIIN 1.3) Internships must be credited, as they are compulsory parts of the curriculum.

A 4. (ASIIN 1.3) Introduce measures and mechanisms in order to enable student mobility.

A 5. (ASIIN 1.4) Clearly define the entry level and competencies that are required for applicants in order to start this program.

A 6. (ASIIN 3.1) Introduce support mechanisms for staff in order to conduct research.

A 7. (ASIIN 3.2) Provide adequate access to academic/scientific literature.

Potential Recommendation

E 1. (ASIIN 1.2) It is recommended to rename the specialization “Software Engineering, Applications, Networks and Services” to “Software Engineering”.

G Comment of the Technical Committee 04- Informatics/Computer Science (13.03.2025)

Assessment and analysis for the award of the ASIIN seal:

The TC discusses the procedure and follows the experts‘ assessment without any changes.

The Technical Committee 04 – Informatics/Computer Science recommends the award of the seals as follows:

Degree Programme	**ASIIN Seal**	**Maximum duration of accreditation**	**Subject-specific label**	**Maximum duration of accreditation**
NED Engineering in Applied Science and Technology in Computer Science	*Suspension*			

H Decision of the Accreditation Commission (25.03.2025)

Assessment and analysis for the award of the subject-specific ASIIN seal:

The Accreditation Commission discusses the procedure and follows the assessment of the experts and the technical committee without any changes. In addition, the Accreditation Commission argues that a possible resumption must also be linked to a new on-site audit.

The Accreditation Commission decides to award the following seals:

Degree Programme	**ASIIN Seal**	**Maximum duration of accreditation**	**Subject-specific label**	**Maximum duration of accreditation***
NED Engineering in Applied Science and Technology in Computer Science	*Suspension*			

Conditions

C1 (ASIIN 1.1, 1.3) The program must be re-designed in such manner that it adheres to EQF level 7. This must be done in two ways: First, the level of the contents taught must be increased. Second, missing fundamental and theoretical contents must be integrated into the curriculum.

C2 (ASIIN 1.1, 1.3) In order to adhere to EQF level 7, students must be enabled to conduct research and must acquire scientific and academic writing skills.

C3 (ASIIN 2) The level of the exams must be increased.

C4 (ASIIN 2) It must be demonstrated that the final projects generally meet the methodological and scientific requirements of a Master's thesis.

C5 (ASIIN 3.1) A sufficient number of qualified staff to successfully implement the program must be ensured.

C6 (ASIIN 3.2) A sufficient number of and adequately equipped labs must be provided.

C7 (ASIIN 5) A quality management system must be introduced.

Potential Requirements

A 1. (ASIIN 1.3; 4.1) Revise and standardize the module descriptions and add missing contents as indicated in the report.

A 2. (ASIIN 1.3) Introduce bigger modules in which contents are reasonably combined and linked. In this regard, titles of the modules should be chosen so that they reflect the actual contents.

A 3. (ASIIN 1.3) Internships must be credited, as they are compulsory parts of the curriculum.

A 4. (ASIIN 1.3) Introduce measures and mechanisms in order to enable student mobility.

A 5. (ASIIN 1.4) Clearly define the entry level and competencies that are required for applicants in order to start this program.

A 6. (ASIIN 3.1) Introduce support mechanisms for staff in order to conduct research.

A 7. (ASIIN 3.2) Provide adequate access to academic/scientific literature.

Potential Recommendation

E 1. (ASIIN 1.2) It is recommended to rename the specialization “Software Engineering, Applications, Networks and Services” to “Software Engineering”.

Appendix: Curriculum and Specialisation Tracks

In the annexes to its progress report, ITBS Nabeul presents the following **revised curriculum** for the National Engineering Diploma programme Applied Science and Technology in Computer Science:

Degree: National Engineering Diploma in n Applied Science and Technology

Year: 1st

Semester	UNITS	Unit Credit	Unit Workload with self Work	Courses	Module Workload	Worload division				Self Work	Total Workload with SelfWork
						C	DW	PrW	PeW		
1	UE1: Introductory Programming Module	6	175	Python Programming	42	28	14			35	77
				JAVA Mini project	63	14		28	21	35	98
	UE2: Engineering Mathematics 1	6	150	Graphs theory and Data processing	42	28	14			33	75
				Algorithmic Complexity	42	28	14			33	75
	UE3: Information Systems	5	126	Advanced modeling of information system	21	14	7			21	42
				C# Mini Project	63	28		14	21	21	84
	UE4: Networks and Database systems	6	150	DataBase Programming with SQL	42	28	14			33	75
				CCNA1 Preparation to Certification	42	28	14			33	75
	UE5: Auto-développement et mise en œuvre des projets innovants 1	7	178	English for specific purposes 3	42	30			12	13	55
				Research methodology and engineering culture	21	14	7			13	34
				design thinking	21	14	7			13	34
				Elective Module * (at least 42 H one of *)	42		12		30	13	55
				Python for every body							
				Oracl SQL Databases							
Total S1		**30**	**779**		**483**	**254**	**103**	**42**	**84**	**296**	
					100%	**53%**	**21%**	**9%**	**17%**		

Semester	UNITS	Unit Credit	Unit Workload with self Work	Courses	Module Workload	Worload division				Self Work	Total Workload with SelfWork
						C	DW	PrW	PeW		
2	UE1: Engineering Mathematics 2	5	126	Metha-heuristic optimization	42	28	14			21	63
				Fourier Analysis	42	28	14			21	63
	UE2: business Intelligence and Web Te	5	126	Introduction to Business Intelligence	21	14	7			21	42
				Advanced Web technology Mini Project	63	14		28	21	21	84
	UE3: System and networks 2	7	175	CCNA2 Preparation to certification	42	28		14		25	67
				Introduction to Embedded systems	21	14	7			20	41
				Linux LPI 101 Preparation to certification	42	28		14		25	67
	UE4: Programming and advanced datal	6	150	Advanced Python Programming	63	14		28	21	25	88
				Oracle : Database Programming PL/SQL	42	14	14	7	7	20	62
	UE5: Auto-développement et mise en o	7	180	English for specific purposes 4	42	30			12	25	67
				Digital transformation	21	14	7			25	46
				Office on the web Frame							
				Elective Module * (at least 42 H one of *)	42		12		30	25	67
				Python 3 programming							
				IBM Introduction to Machine Learning							
Total S2		**30**			**483**	**226**	**75**	**91**	**91**	**275**	
					100%	**47%**	**16%**	**19%**	**19%**		

Semester	UNITS	Unit Credit	Unit Workload with self Work	Courses	Module Workload	Worload division				Self Work	Total Workload with SelfWork
						C	DW	PrW	PeW		
3	UE1: Artificial Intelligence	5	125	Artificial Intelligence and Machine Learning	42	28	14			31	73
				Artificial intelligence Mini Project	21			7	14	31	52
	UE2: Software Engineering	7	181	Advanced Object Oriented Programming	42	28		14		20	62
				Frameworks Full stack web	42	28		14		20	62
				LPI 102 Preparation	42	28		14		15	57
	UE3: Systems and Networks 3	5	118	CCNA3	42	28		14		25	67
				Cryptography	21	14		7		30	51
	UE4:Engineering Mathematics 3	6	149	Compilation Theory	42	14	14	14		35	77
				Stochastic Process and Modeling	42	14	14	14		30	72
	UE5: Communication and self develop	7	181	English (preparation TOEIC 1)	42	30			12	10	52
				Smart Object Mini Project	21	7			14	10	31
				Project Management	42	28	14			25	67
				Elective Module * (at least 42 H one of *)	21		7		14	10	31
				Meta Front-End Developer							
Total S3		**30**	**754**		**462**	**247**	**63**	**98**	**54**	**292**	

Business Intelligence Track

Semester	UNITS	Unit Credit	Unit Workload with self Work	Courses	Module Workload	Worload division				Self Work	Total Workload with SelfWork
						C	DW	PrW	PeW		
4	UE1: Data Analysis and Deep Learning	5	124	Data Analysis with R	42	14	14	14		20	62
				Deep learning Capstone Project	42	21		7	14	20	62
	UE2: n-tier Architecture and Mobile pr	7	177	Event-driven Programming .Net	42	28		14		17	59
				JEE Development	42	14			28	17	59
				Mobile Programming	42	28		14		17	59
	UE3: Advanced Database	4	103	Database administration (SQL Server)	42	21		21		20	62
				Data Warehouse	21	14	7			20	41
	UE4: Cloud and decision information systems	5	124	Cloud, Virtualization & Containers	42	21			21	20	62
				Data Integration Services	42	14		14	14	20	62
	UE5: Final Year Project	3	102	BI Mini Project	42	14			28	60	102
	UE6: Communication and self development	6	149	Financial accounting	21	14	7			20	41
				English (preparation TOEIC 2)	21	14		7		20	41
				Elective Module * (at least 42 H one of *)	42	12			30	25	67
				Introduction to Cloud Computing							
				Deep learning							
Total S4		**30**	**779**		**483**	**229**	**28**	**91**	**135**	**296**	
					100%	**47%**	**6%**	**19%**	**28%**		

Semester	UNITS	Unit Credit	Unit Workload with self Work	Courses	Module Workload	Worload division				Self Work	Total Workload with SelfWork
						C	DW	PrW	PeW		
5	UE1: Agile approach, SOA and Microse	7	175	Agile aproach and Scrum Methodology	21	7		7	7	25	46
				SOA and web services	42	14		14	14	25	67
				Microservices Architectures	42	14	14	14		20	62
	UE2: Advanced information systems	5	126	Database administration Oracle	42	14	14	14		21	63
				Data Mining	42	28		14		21	63
	UE3: Bigdata Engineering	6	150	Big Data	42	14		28		33	75
				NoSQL Database	42	14		28		33	75
	UE4: Advanced Business Intelligence	6	150	Talend Data Integration	42	14		14	14	33	75
				Data Analysis & Reporting: SSAS, Power BI	42	14		14	14	33	75
	UE5: Communication and self develop	6	168	Certification TOEIC	42	14	14		14	25	67
				Accounting professions	21	7	7		7	13	34
				Elective Module	42	12			30	25	67
				Advanced Data Science with IBM							
				Data Engineering, BigData and Machine Learning on GCP							
Total S5		**30**	**769**		**462**	**166**	**49**	**147**	**100**	**307**	
					100%	**36%**	**11%**	**32%**	**22%**		

0 Appendix: Curriculum and Specialisation Tracks

Semester	UNITS		Unit Credit	Courses	Total Workload	Worload division				Self Work
						C	DW	PrW	PeW	
6	Final Project and Internship		30	First year internship	750				450	300
				Second year internship						
				Graduation Project						
Total S6					750				450	300
					100%					

Software Engineering Track

Semester	UNIT	Unit Credit	Unit Workload with self Work	Courses	Module Workload	Worload division				Self Work	Total Workload with SelfWork
						C	DW	PrW	PeW		
4	UE1: Cloud and deep learning	5	126	Deep Learning	42	21			21	21	63
				Cloud, Virtualization & Containers	42	14		14	14	21	63
	UE2: Mobile Programming and BPM	5	126	Business Process Management (BPM) Mini Project	42	14		14	14	21	63
				Mobile Programming	42	14	14	14		21	63
	UE3: N-tiers architectures	5	126	JEE Development	42	14	14	14		21	63
				.Net Development	42	14	14	14		21	63
	UE4: Big Data and decisions Systems	7	165	Data warehousing	21	14	7			20	41
				Introduction to Big Data	42	28	14			20	62
				DevOps Tools	42	28	14			20	62
	UE5: Final Year Project	3	75	RPA	42	14			28	33	75
	UE6: Languages and cultures 3	5	134	Financial accounting	21	7	7		7	13	34
				English (preparation TOEIC 2)	21	7		7	7	13	34
				Elective Module * (at least 42 H one of *)	42	14			28	25	67
				Introduction to Cloud Computing							
				Deep learning							
Total S4		30	752		483	203	84	77	119	269	
					100%	42%	17%	16%	25%		

Semester	UNIT	Unit Credit	Unit Workload with self Work	Courses	Module Workload	Worload division				Self Work	Total Workload with SelfWork
						C	DW	PrW	PeW		
5	UE1: Agile approach and SOA	5	125	Agile Approach and Scrum	21	14		7		31	52
				SOA Architecture and web service	42	14	14	14		31	73
	UE2: Test, MLOps and Microservices	7	177	Software testing	42	28	14			17	59
				MLOps	42	14		14	14	17	59
				Micro Services Architecture	42			28	14	17	59
	UE3: System information engineering	5	129	Database administration	42	28		14		33	75
				ERP Programming	21	14		7		33	54
	UE4: Big data and storage	6	150	Framework and Big Data technologies	42	14		28		33	75
				NoSQL Database	42	28	14			33	75
	UE5: Languages and professional integration	7	168	Certification TOEIC 5	42	30			12	25	67
				Accounting Professions	21	14	7			13	34
				Elective Module	42	12			30	25	67
				Advanced Data Science with IBM							
				Data Engineering, BigData and Machine Learning on GCP							
Total S5		30	749		441	210	49	112	70	308	
					100%	48%	11%	25%	16%		

Semester	Units		Unit Credit	Courses	charge totale	Worload division				Self Work	
						C	DW	PrW	PeW		
6	Final Project and Internship		30	First year internship	750				450	300	
				Second year internship							
				Graduation Project							
Total S6					750				450	300	
					100%						

Embedded Systems Track

Semester	UNITE	Unit Credit	Unit Workload with self Work	Courses	Module Workload	Worload division				Self Work	Total Workload with SelfWork
						C	DW	PrW	PeW		
4	UE1: Cloud and Programming	6	150	Mobile Programming	42	28		14		33	75
				Cloud, Virtualization & Containers	42	21		21		33	75
	UE2: Systems	4	103	Linux : System Administration	42	28		14		20	62
				New Generation Embedded Linux	21	14		7		20	41
	UE3: Embedded Computer Systems	4	103	HDL and Programmed circuits	42	14	14	14		20	62
				Real Time System	21	14	7			20	41
	UE4: Embedded Electronics	7	225	Design of embedded chips	42	21		21		15	57
				Micro-Controlor	42	14	14	14		15	57
				Numerical circuits technologies	42	21			21	33	75
				Sensors and actuators	21	14		7		15	36
	UE5: Final Year Project	3	75	Embedded Mini Project	42	14		28		33	75
	UE6: Languages and cultures 3	6	153	Financial accounting	21	14	7			22	43
				English (preparation TOEIC 2)	21	14		7		22	43
				Elective Module * (at least 42 H one of *)	42	12			30	25	67
				Real-Time Embedded Systems							
				Internet of Things and AI Cloud							
Total S4		30	809		483	243	42	147	51	326	
					100%	50%	9%	30%	11%		

0 Appendix: Curriculum and Specialisation Tracks

Semester	UNITE	Unit Credit	Unit Workload with self Work	Courses	Module Workload	Worload division				Self Work	Total Workload with SelfWork
						C	DW	PrW	PeW		
5	UE1: Agile approach and SOA	5	126	Agile Scrum Methodology	42	14		14	14	21	63
				SOA Architecture and web service	42	14	14	14		21	63
	UE2: Embedded Systems Security	6	150	Computer Systems Security	42	28	14			33	75
				Embedded Systems security	42	14	14	14		33	75
	UE3: Embedded technologies	6	150	Smart sensor networks	42		14	28		33	75
				internet of Things (IOT)	42	28		14		33	75
	UE4: Programmed advanced circuits	6	150	Programmed advanced circuits	42	14		28		33	75
				General purpose SoC architecture	42	28	14			33	75
	UE5: Languages and professional integ	7	177	Certification TOEIC 5	42	28	14			17	59
				Professional integration	42	28	14			17	59
				Elective Module	42	14			28	17	59
				Developing Industrial Internet of							
				Linux System Administration with							
Total S5		**30**	**753**		462	210	98	112	42	291	
					100%	45%	21%	24%	9%		

Semester	Units		Unit Credit	Courses	charge totale	Worload division				Self Work	
						C	DW	PrW	PeW		
6	Final Project and Internship		30	First year internship	750				450	300	
				Second year internship							
				Graduation Project							
Total S6					750				450	300	
					100%						