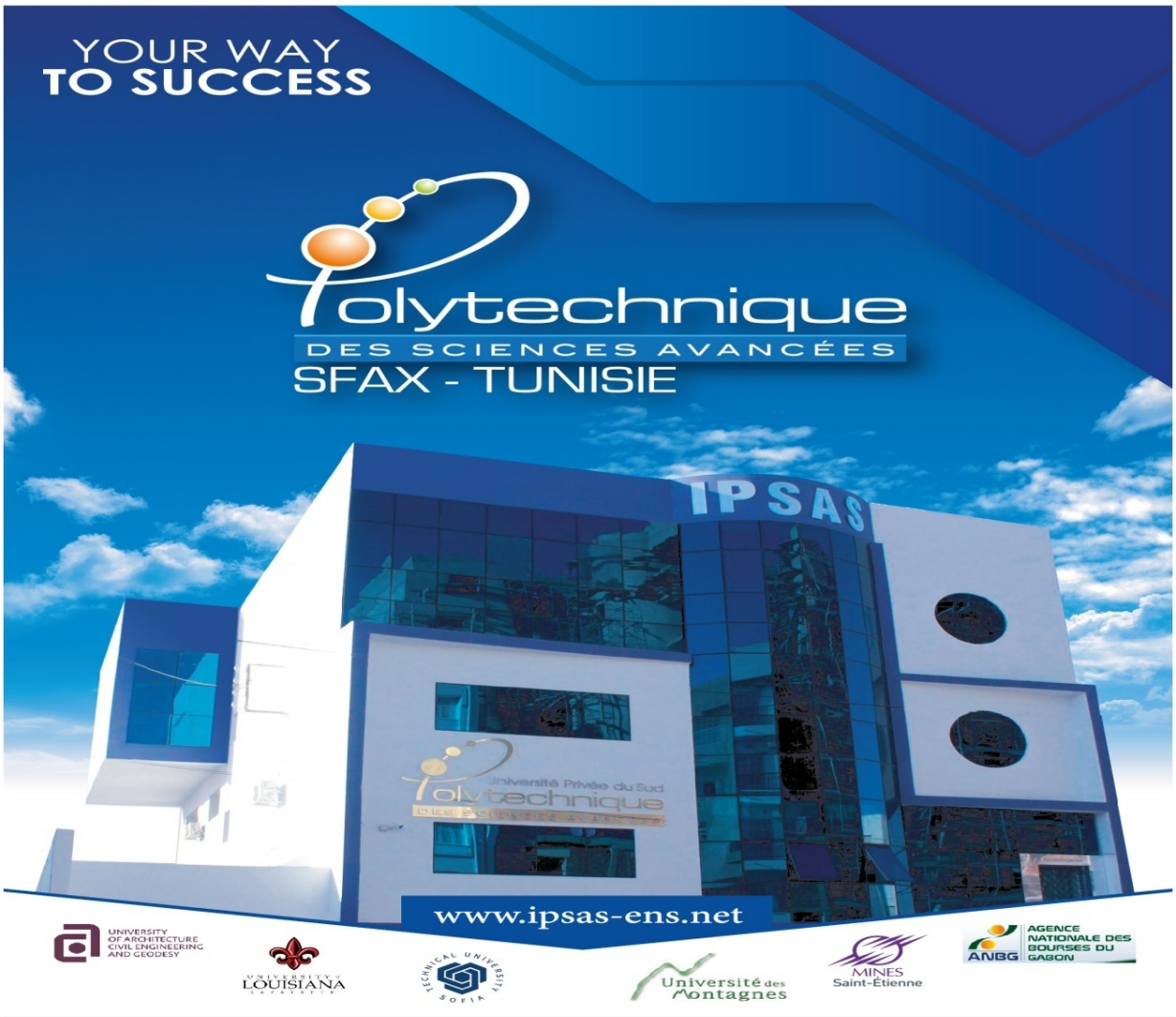
INDUSTRIAL ENGINEERING STUDENT GUIDE



INDUSTRIAL ENGINEERING STUDENT GUIDE

1. *Welcome from the General Management*

Twenty-seven (27) years or a little more is not a long time in the life of an institution, but it is enough to be able to stand out from the crowd. In its vision of the training of executives of a continent (Africa) in the making, IPSAS has always proposed to achieve a double objective:

To train engineers in the latest technologies;

To give them the capacity to react and adapt to situations where often the minimum of technology is assured.

By choosing IPSAS, you make the choice to learn how to think, react and manage situations.

Thanks to a teaching staff totally involved in this process of acquiring a method in addition to knowledge, IPSAS can already be proud of its graduates who are making careers in Tunisia and throughout Africa and the world.

By becoming an IPSAS student, you make a choice, the best one, and you guarantee yourself the possibility to choose your future profession. As you progress through our site, you will hopefully feel part of the IPSAS world, the world of a future that can be achieved.

2. *General presentation of the hierarchy*

Chairman and Managing Director: Mr Najib KAMOUN

Director: Mr Mohamed Achraf KAMOUN

Secretary General: Mr Mohamed ZGHAL

Director of Studies: Mr George KANTCHEV

Financial Director: Mr Farid KAMOUN

Communication Managers: Mrs Wabo Ulrich Kengne/ Ayman KAMOUN

Quality Manager: Mr Karim JELLALI

Head of Laboratories: Anis KAMOUN

3. IPSAS vision

The vision of the programme is an essential component of the IPSAS strategy and must necessarily reflect the main vocation of our organisation. A strategy clearly described in the IPSAS quality policy based on a fundamental principle that makes the satisfaction of stakeholders (such as students, teachers...) a priority of the organisation. Learner satisfaction should not only be understood as satisfaction during the student's academic career. The vision is broader than this concept because it is closely linked to the creation of programmes that respect the global evolution in the industrial and technological context and especially the demand imposed by the labour market. This will provide the learner with the opportunity to be an active component in the labour market upon graduation. This makes IPSAS a dynamic

player in its societal contribution through the creation of value in the university training sector. A training that is not only based on theoretical training but also on a dynamic vision allowing the training of engineers with a combination of theoretical knowledge and practical know-how allowing the engineer to exercise and impose himself by his achievements as being competent in the labour market. This vision can only be successful if a set of practical elements is implemented with a clear mission.

4. Missions

The missions that reflect the implementation of the IPSAS strategic vision for all its programmes can be summarised in five key points:

1) Organise innovative education based on innovative research results to produce graduates who are competent, respectful, entrepreneurial and competitive on a national and international scale;

2) To provide the necessary resources for the implementation of this curriculum;

3) Develop a quality assurance system for education based on good governance.

4) Organise a monitoring and evaluation service for the civil engineering programme to continuously improve its content.

5) Develop a network of cooperation with stakeholders related to the application of innovation in learning through the creation of a network of experts to participate in the updating of the programme.

The programme offers students the opportunity to acquire the required competences in the taught field of expertise are expected and needed. The learning outcomes are also determined according to the objectives.

5. The aims

IPSAS aims to :

1) Train and certify graduates who are competent in their specific engineering field, entrepreneurial and globally competitive. Engineers who :

a. have widely recognised "business" skills in their specific technological field;

b.-open-minded, adaptable and highly responsive due to a strong mix of cultures (broad scope of recruitment both in terms of profile and social background);

c. apt to disseminate in the industrial fabric a culture of complex problem solving acquired through the diversity of practical cases studied throughout their course.

2) To deliver training :

Able to respond to the national and international needs and problems that concern their sector of activity.

Based on the results of research into recent technologies and labour market demand.

Where consultation with basic and applied industry stakeholders forms a basis for the design and evaluation of the programme.

3)Able to respond to specific problems.

4) Strengthen the system of governance, quality assurance and awareness of the programmes.

5) Expand collaborative networks with stakeholders related to their discipline of study.

6. Programme design

Learning is no longer focused solely on outcomes, but also on the educational objectives of the civil engineering curriculum. Objectives that focus on producing graduates who are capable of becoming reliable professionals, leaders and change agents in the organization where they regularly practice and contribute to development.

The updating of the programme is an essential element of continuous improvement that allows us to offer training that evolves together with the demands of the labour market, the evolution of technology and the societal expectations of IPSAS. To this end, it is essential to review the competency profile by experts and teachers in the field, periodically to improve the quality of the graduates' profile. This also includes the evaluation and updating of the programme with the participation of the Scientific Council, teaching staff, students and related institutional stakeholders. The procedure for the development of the competency profile related to the redesign of the curriculum is explained below:

1) Assess and redesign the curriculum

2) Implement the follow-up study of graduates in their start-up and career development with the participation of relevant institutional stakeholders.

3) Construct the competence profile based on the outcome of the study and the improvement of the curriculum.

The participants in this process are the IPSAS Scientific Board, the students, the programme managers, the organisations with expertise in the field of civil engineering (building and construction companies, consultancies etc.) and the teaching staff. This vision of continuous improvement, based on the intervention of the stakeholders, is the approach that will be taken into account by the IPSAS management

7. General presentation of the course

The engineering cycle "Industrial Engineering" is a curriculum conceived and designed by the Polytechnic Institute of Advanced Sciences (IPSAS) based in Sfax- Tunisia. This program has been accredited by the Tunisian Ministry of Higher Education since 2013.

Industrial engineering

Job reference: what are the targeted activities for graduates at the end of the training?

Industrial Engineering is a discipline in constant search of means and processes that allow to do things better. This training aims to: design and manage processes and systems that improve the quality and productivity of the supply chain of companies.

Quality and productivity improvement is about eliminating all waste: the loss of time, money, materials, energy and other raw materials from organisations. Industrial Engineering provides a systematic approach to streamlining and improving the productivity and efficiency of organisations, whether public or private.

Industrial Engineering is not confined to the manufacturing or production floor level. It is clear that industrial engineers have the technical training to optimise the operation of a manufacturing system. However, it should be noted that the knowledge and skills of an industrial engineer are becoming increasingly sought after to assess and improve the productivity and quality of service companies. As a result, the term 'industrial' also includes service companies.

The most distinctive aspect of industrial engineering is the flexibility and versatility it offers in terms of career paths. Examples of industrial engineering practice include

- Improving and streamlining the operation of an automotive production unit

- Planning product distribution activities and the organization of all services

- Analysing the operations of an airline and thus designing an ERP or lean management system.

Whether they produce goods or services, such as sanitary equipment or health care, organisations need to set up integrated systems of people, materials, equipment, information and energy. It is the industrial engineer who designs, implements, manages and improves these integrated systems. They play a fundamental role since their decisions have a direct impact on the performance of the company or organisation.

As a discipline, the most important contributions of industrial engineering to organisations and industrial companies are

- Implementing a "systems" approach that ensures the effective and optimal consideration of all parts of an organisation's system, including human, economic and technological aspects;

- Establish a system for continuous productivity improvement.

- Modelling and simulation of production systems, processes and services

Tools to look at a problem in a structured way and determine ways to solve it;

- A constant concern for the interaction and integration of human, economic and technological aspects and the various disciplines involved in a situation;

- A concern for the management of change;

- A constant concern for the environment and health and safety;

- A constant application of scientific methods to make the right decisions through data analysis, choice of decision support tools.

ROLE OF THE INDUSTRIAL ENGINEER

What is an industrial engineer? The industrial engineer is a versatile executive with a global vision. He is a decision-maker who masters the organisational and technological aspects. They are as much interested in production systems, processes and services as in the people who work in them.

While other engineering disciplines apply their skills in specific fields, the industrial engineer will be able to work in a wide range of fields because his or her knowledge and skills are

multidisciplinary: manufacturing production companies, service companies, hospital services, transport or distribution companies, telecommunications companies, airlines, etc.

Demand

The need for industrial engineers is growing rapidly. Why is this? Industrial engineers are the only trained technical professionals who can integrate technological (productivity, systems, services), economic (analyses, profitability) and human (team management, training, etc.) issues into their work.

In a production company, they may design production lines, the architecture of the factory and all the systems orchestrating the flow of products and information.

In service companies, such as in the telecommunications, transport, banking, hospital or other sectors, he or she may design business processes, organise functions and services, plan roles, establish work shifts and allocate tasks. They will thus contribute directly to the management of companies by ensuring that all required resources are put to optimal use.

Summary of activities targeted by graduates at the end of the training

Competence framework: what are the competences attested at the end of the training

The IPSAS Industrial Engineering Department trains multidisciplinary engineers. Theoretical and practical knowledge is diverse and diversified and at the same time coherent.

The training is spread over five face-to-face semesters during which the student engineer receives the necessary theoretical foundations. Being aware of the necessity of the practical side and the importance of the gradual knowledge of the business world, the student reinforces and improves his knowledge through practical work, mini-projects, study visits, and compulsory internships.

Synthesis of the competences attested at the end of the training.

- Analyse and synthesise complex electromechanical systems,

- Mobilise scientific and technical resources,

- To have mastery of computer methods and tools and modelling,

- Have the capacity for research or R&D activities and be open to collaborative work.

Specific skills

Other skills are more specific to the electromechanical field. Engineers must be able to :

- Design, implement, test and validate innovative solutions, methods, products, systems and services,

- Have the ability to find relevant information, evaluate and exploit it,

- Have the ability to take into account the economic dimension, respect for quality, competitiveness and productivity, commercial requirements, economic intelligence.

Common skills

Certain skills are common to the engineering professions and are particularly applicable to "electromechanical" engineers who must be able to have

- The ability to work in an international context: mastery of one or more foreign languages (French and English) and associated cultural openness,

- The ability to take into account environmental issues, particularly by applying the principles of sustainable development,

- The ability to fit into professional life, to integrate into an organisation, to lead it and to make it evolve: exercise of responsibility, team spirit, commitment and leadership, project management, communication with specialists as well as with non-specialists.

Behavioural skills are also necessary for these very complex jobs:

- Ability to take into account the issues of workplace relations, ethics, responsibility, safety and health at work,

- Ability to take into account the challenges and needs of society,

- Autonomy, decision-making ability, organisational skills.

8. Conditions of access

Admission to IPSAS is in accordance with the provisions of Law No. 2000-73 of 25 July 2000 regulating private higher education.

25 July 2000 regulating private higher education. Two types of admission are possible:

- Direct admission: This concerns students who have a Tunisian or foreign baccalaureate.
- Access after decision of admission: It concerns the candidates of Tunisian or foreign nationality, who wish to register in an engineering cycle.
- Tunisian students who have completed a public or private preparatory cycle may apply for enrolment in the engineering cycle.
- The Tunisian student holder of a technological licence having links with the chosen engineering course of study, can apply for a registration in the engineering cycle.
- Foreign students who hold a preparatory cycle, a DUT, Licence, BTS or equivalent obtained in their country of origin can apply for registration in the engineering cycle.

When to fill in an application form?

You must fill in an application form:

When you wish to enrol in a study programme;

- If you have already applied for admission but have not yet registered;
- If you have suspended your enrolment at IPSAS for more than one year and wish to be re-admitted to the same programme;

Admission procedure:

- To be admitted to one of the IPSAS study programmes, you must: Complete an application form to be collected from our premises or online.

- Send the completed application and the required supporting documents to the admissions office in our offices or by email to :

Each form allows you to apply for admission to two programmes according to your first and second choice.

Admission file and required documents:

- A completed application form

- A birth certificate in French

- A complete school file including :

● For applicants still in high school or in a secondary school at the time of application: transcripts of marks obtained at that date for the current year and the previous year.

● For applicants who are still in secondary school at the time of application: transcripts of marks obtained at that time for the current and previous years, admission being subject to obtaining the baccalaureate.

● For all other persons: transcripts of marks obtained during the three previous years as well as those of the current year, if applicable.

●The diplomas obtained, certified as true copies of the original.

●Where applicable, the certificate of registration issued by the last university attended.

●Any additional information deemed useful or necessary.

●All documents submitted, except the original diplomas, remain the property of IPSAS.

Final admission:

Registration is considered final only after acceptance of the student's file by the university and payment of the tuition fees and other required fees.

NB: Tuition fees are due for the whole year and are payable at the time of registration, unless otherwise agreed by the General Management. Any amount paid remains the property of IPSAS. No refunds or reductions will be made for

cancellation of registration, late entry, absence, illness, voluntary departure or exclusion, etc.

As soon as IPSAS confirms the final admission, the student must complete his/her admission file with the following documents

- 2 identity photos

- A photocopy of the national identity card for Tunisians

- Proof of payment of tuition fees as fixed by the payment procedure for foreign students (additional documents to be produced)

9. Skills profile

9.1. Competence matrix - objectives - learning outcomes

IPSAS: Objectives-Modules-Matrix:Industrial Engineering

IPSAS – Learnings Outcomes-Matrix

Skills family	Learnings outcomes	Level	Modules
Engineering Sciences	• Sizingand Design ofmechanicalparts • Modeling ofmechanicalsystems; • Modeling ofautomaticsystems; • Mastering Computer Aided Design and Drawing software	**1**	Automatic I Automatic II Mechanical concept CAD I CAD II Manufacturin g technologies
Industrial science	• Modeling andnumericalsimulationofindustrialsystems; • Masteryandintegrationofindustrialsoftware; • Identificationofthe different partsof an industrialsystem; • Masteryofdataprocessingtechniquesandestimation ofreliabilityindicatorsforthedependabilityof an industrialsystem; • Knowledge of different approachestomonitoringanddiagnosingindustrialpr ocesses • Knowledge ofthefunctionalitiesofindustrialsupervisionsystems - Implementation andmanagementofindustrialsystems.	**3**	Design of industrial systems, Simulation of production systems, Management of information systems
Computer science	• Masteryofcomputersystems • Masteryof ERP Integrated Management Software, Enterprise ResourcePlanning	**2**	C and C ++ language Java language
Production	• Organizationanddevelopmentofproductionstations andlines; • Planningandmanagementofproductionoperations; • Measurement andimprovementofproductionperformance; • Design productionmethods • Masteryof different productionprocesses • Design theproductmanufacturingranges • Developmanufacturingfiles • Establishprovisionalproductionprograms • Masteryof Computer AssistedProduction	**2**	Production management CAPM ERP Vibratory mechanics CNC machine tools

	Management software		Mini-Projects Forecasting techniques
Quality	• Management ofresourcesandqualitycontroloperations; • Implementandanticipatethenecessaryactionstooptimizetheuseofmeansofproduction • Implement a qualitysystemParticipate in thedevelopmentofproducts • Knowledge ofthevariouscontinuousimprovementapproaches • Design andproducemonitoringandanalysistools • Implementation of an ISO 9001: 2015 qualitymanagementsystem	**2**	Quality engineering, R&D and innovation management Lean Manufacturing Electrical circuit ; Electrical engineering; Thermal; Thermal machines Electrical diagrams Lean Management
Energetic	• Choice andsizingofenergyinstallations; • Analysis of thermal machines; • Environmental study; • Design of an energybalance.	**1**	Heat transfer Heat exchanger Fluid mechanics Electric machine Thermodynamics Renewable energies
Materials	• Characterizationofmaterials; • Surface treatments	**2**	CND Implementation without removing material Materials choice Continuum mechanics
Logistics	• Identificationofthe different partsof a logisticssystem; • Organizetheproductioncircuitandassociatedlogistics; • Optimizetheresourcestobeimplemented,	**3**	Numerical analysis Operational research Supplychain management

	theorganizationofworkandmanufacturingdeadlines • Design andproducemonitoringandanalysistools (dashboards, charts, etc.) • Masteryofproblemsolvingmethodsandtools		Stock managment Transport management Business Management Financial management Management cost accounting: cost control and calculation
Mathematics	• Interpret statistics • Analyzethedata	**1**	Mathematics Statistics RO Numerical analysis
Transversal skills	• Communication in different languages, • Human Resource Management, • Knowledge oftheirrightsas an employee,	**2**	Communication techniques English HRM Labor law Internships
Research	• Successfullycomplete an appliedresearchproject. • Synthesis capacity	**3**	final project end of studies' project

Université Privée Du Sud
POLYTECHNIQUE
DES SCIENCES AVANCÉES
SFAX - TUNISIE

Industrial Engineering

Program Plan

Modules repartition

Modules Sheets

Revised version October 2021

Industrial Engineering First Year Semester 1

Idnt	CTSE	Intitulé	CI	TP	CI + TP	Tper	T		Coef	E		GM
Course Id	Code		L	PW	L+PW	Self pr.	T	ECTS		E	Subject	
MathI	MGIND11.01	Mathématique I	30	0	30	42	72	3	2	CC+E	Mathematics I	GM1-1
CompAG	MGIND11.02	Gestion des Entreprises	30	0	30	30	60	2,5	2	CC+E	Business Administration	GM1-2
ConcpMec	MGIND11.03	Conception mécanique	30	15	45	50	95	3,5	3	CC+E	Mechanical Design	GM1-3
ElecqI	MGIND11.04	Electronique	30	15	45	40	85	3	2,5	CC+E	Electronics I	GM1-4
SystCL	MGIND11.05	Systèmes et circuits logiques	30	15	45	40	85	3	2,5	CC+E	Logicsystems and circuits	GM1-4
TherdApp	MGIND11.06	Thermodynamique appliquée	24	0	24	40	64	2,5	2	CC+E	Appliedthermodynamics	GM1-5
ChoixMat	MGIND11.07	Choix des matériaux	24	0	24	20	44	1,5	2	CC+E	Selection of Materials	GM1-6
RDM	MGIND11.08	Résistance des matériaux (RDM)	30	15	45	50	95	3,5	3	CC+E	Materialresistance (RDM)	GM1-6
MecFlud	MGIND11.09	Mécanique des fluides	30	15	45	40	85	3	2,5	CC+E	Fluidmechanics	GM1-5
AgInd I	MGIND11.10-1	Anglais industriel I	24	0	24	20	44	1,5	1	CC+E	Industrial English I	GM1-7
TechCom	MGIND11.11	Techniques de communication I	24	0	24	20	44	1,5	1	CC+E	Communication techniques	GM1-7
DrtTra	MGIND11.12	Droit du travail	24	0	24	20	44	1,5	1	CC+E	Labor law	GM1-7
Total (Semestre/Semester)1 :			330	75	405	412	817	30	24,5			

Industrial Engineering First Year Semester 2

Idnt	CTSE	Intitulé	CI	TP	CI+ TP	Tper	T		Coef	E		GM
Course Id	Code		L	PW	L+PW	Self pr.	T	ECTS		E	Subject	
RechOp	MGIND12.13	Recherche opérationnelle	24	0	24	25	49	2	2	CC+E	Operationalresearch	GM1-1
StatProb	MGIND12.14	Statistique et probabilités	24	0	24	25	49	2	2	CC+E	Statistics and probabilities	GM1-1
GestEnt	MGIND12.15	Comptabilité Analytique de Gestion	24	0	24	15	39	1,5	2,5	CC+E	Management AnalyticalAccounting	GM1-2
FinEnt	MGIND12.16	Finance des entreprises	30	0	30	20	50	2	2	CC+E	Corporate finance	GM1-2
TechFab	MGIND12.17	Technologie de fabrication	24	15	39	20	59	2	2,5	CC+E	Manufacturingtechnology	GM1-3
CAO	MGIND12.18	Conception assisté par ordinateur	0	48	48	25	73	3	2,5	CC+E	Computer aided design	GM1-3
TranPMI	MGIND12.19	Transmission de puissance et de mouvement I	30	15	45	20	65	2	2,5	CC+E	Power and motion transmission I	GM1-3
Aut I	MGIND12.20	Automatique I	30	15	45	15	60	2	2	CC+E	Automatic I	GM1-4
Electq	MGIND12.21	Électrotechnique	30	15	45	30	75	3	2,5	CC+E	Electrical engineering	GM1-4
TranTher	MGIND12.22	Transfert et Échange de chaleur	30	21	51	24	75	3	2,5	CC+E	Heattransfer and exchange	GM1-5
MP	MGIND12.23	Mini-projet	0	30	30	25	55	2	1	R	Mini-project	GM1-6
MecMC	MGIND12.24	Mécanique des milieux continus (MMC)	30	0	30	30	60	2	2	CC+E	Continuous media mechanics (CMM)	GM1-6
AgInd II	MGIND12.10-2	Anglais industriel II	24	0	24	20	44	1,5	1	CC+E	Industrial English II	GM1-7
Total (Semestre/Semester)2 :			300	159	459	294	753	28	27			

Industrial Engineering Second Year Semester 1

Idnt	CTSE	Intitulé	CI	TP	CI+ TP	T.per	T		Coef	E		GM
Course Id	Code		L	Pw	L+Pw	Self pr.	T	ECTS		E	Subject	
MathII	MGIND21.26	Mathématique II	24	0	24	24	48	2	2	CC+E	Mathematics II	GM2-1
AnlyNum	MGIND21.27	Analyse numérique	24	0	24	24	48	1,5	2	CC+E	Digital analyze	GM2-1
SchEle	MGIND21.28	Schémas électriques	21	15	36	10	46	1,5	2	CC+E	Electricaldiagram	GM2-3
MachEle	MGIND21.29	Machines électriques	36	15	51	40	91	3	2,5	CC+E	Electrical machines II	GM2-3
ElecInd	MGIND21.30	Électronique industrielle	30	15	45	40	85	3	2,5	CC+E	Industrialelectronics	GM2-3
MMV	MGIND21.31	Automatique II	30	15	45	30	75	3	2,5	CC+E		GM2-3
MSI	MGIND21.32	Énergies renouvelables	30	15	45	30	75	3	2,5	CC+E	Information System Management	GM2-7
ContND	MGIND21.33	Contrôle Destructif et Non destructif	24	15	39	20	59	2	2,5	CC+E	Non-destructive testing	GM2-5
FrdClim	MGIND21.34	Mesure et instrumentation industrielle	24	15	39	20	59	2	2,5	CC+E	Industrialmeasurement and instrumentation	GM2-7
EchgChal	MGIND21.35	Optimisation	30	0	30	20	50	2	2,5	CC+E	Optimisation	GM2-1
POO	MGIND21.36	La programmation orientée objet (POO)	21	0	21	30	51	2	1,5	CC+E	Object Oriented Programming (OOP)	GM2-2
LangPC	MGIND21.37	Langage de programmation C	21	0	21	30	51	2	1,5	CC+E	C programminglanguage	GM2-2
AngIndIII	MGIND21.38	Anglais industriel I II	24	0	24	15	39	1,5	1	CC+E	Industrial English I	GM2-8
TechCom	MGIND21.39	Technique de communication II	24	0	24	20	44	1,5	1	CC+E	Communication technique	GM2-8
Total (Semestre/Semester)1 :			363	105	468	353	821	30	28,5			

Industrial Engineering Second Year Semester 2

Idnt	CTSE	Intitulé	CI	TP	CI+ TP	T.per	T		Coef	E		GM
Course Id	Code		L	Pw	L+Pw	Self pr.	T	ECTS		E	Subject	
Ecot	MGIND22.40	Économétrie	21	15	36	15	51	1,5	2	CC+E	Econometrics	GM2-1
OutAD	MGIND22.41	Outils d'aide à la décision	24	0	24	30	54	2	2	CC+E	Decision-makingtools	GM2-6
InfInd	MGIND22.42	Informatique industrielle	12	15	27	15	42	1,5	2	CC+E	Industrial data	GM2-2
MII	MGIND22.43	Régulation et Controle	24	15	39	20	59	2	2	CC+E		GM2-7
AutoqII	MGIND22.44	Méthodologie de Recherche	30	0	30	20	50	2	2,5	CC+E	ResearchMethodologie	GM2-6
CAOII	MGIND22.45	Fiabilité et Maintenance des Systèmes	21	0	21	25	46	1,5	2	CC+E	Computer aided design II	GM2-4
GestM	MGIND22.46	Gestion de la maintenance	21	15	36	40	76	2,5	2	CC+E	Maintenance management	GM2-4
GOP	MGIND22.47	Gestion et ordonnancement de la production	51	0	51	40	91	3	2,5	CC+E	Production management and scheduling	GM2-4
GQ	MGIND22.48	Gestion de la qualité	24	0	24	24	48	1,5	2	CC+E	Quality management	GM2-4
PFab	MGIND22.49	Processus de fabrication	30	0	30	20	50	2	2,5	CC+E	Manufacturingprocess	GM2-5
MOCN	MGIND22.50	Machines-Outils à commande numérique	30	24	54	30	84	3	2	CC+E	Numericallycontrolled machine tools	GM2-5
MOSEM	MGIND22.51	Mise en œuvre sans enlèvement de matière	27	15	42	30	72	2,5	2	CC+E	Implementationwithoutremovingmaterial	GM2-5
AgInd	MGIND22.52	Anglais industriel IV	24	0	24	15	39	1,5	1	CC+E	Industrial English IV	GM2-8
MP	MGIND22.53	Mini-projet	0	15	15	30	45	1,5	1	R	Mini-project	GM2-6
Total (Semestre/Semester)2 :			339	114	453	354	807	28	27,5			

Industrial Engineering Third Year Semester 1

Idnt	CTSE	Intitulé	CI	TP	CI+ TP	T.per	T		Coef	E		
Course Id	Code		L	PW	L+PW	Self pr.	T	ECTS		E	Subject	GM
LogisDis	MGIND31.55	Logistique de distribution	24	0	24	25	49	2	2	CC+E	Distribution logistics	GM3-2
CPSP	MGIND31.56	Conception et performance des systèmes de production	24	15	24	15	54	2	2	CC+E	Design and performance of production systems	GM3-1
GestProjt	MGIND31.57	Gestion de projet	24	0	24	30	54	2	2	CC+E	Project management	GM3-3
GestTranp	MGIND31.58	Gestion de transport	21	0	21	25	46	2	2	CC+E	Transport management	GM3-2
SCM	MGIND31.59	Supplychain management	21	0	21	30	51	2	2	CC+E	Supplychain management	GM3-2
GestStcs	MGIND31.60	Gestion des stocks	24	0	24	30	54	2	2	CC+E	Inventory management	GM3-2
TechPrev	MGIND31.61	Techniques de prévision	30	0	30	20	50	2	2	CC+E	Forecasting techniques	GM3-3
EntRP	MGIND31.62	Entreprise ressource planning	0	30	30	20	50	2	1,5	CC+E	Enterprise resource planning	GM3-3
Opt	MGIND31.63	Industrie 4.0 Advanced Operator	30	0	30	20	50	2	2	CC+E	Industry 4.0 Advanced Operator	GM3-1
LeanMan	MGIND31.64	Lean manufacturing	24	0	24	30	54	2	2	CC+E	Lean manufacturing	GM3-4
MSSP	MGIND31.65	Modélisation et simulation des systèmes de production	21	15	36	30	66	2,5	2,5	CC+E	Modeling and simulation of production systems	GM3-1
FMS	MGIND31.66	Management de la R&D et l'innovation	30	0	30	30	60	2	2	CC+E	Management of R&D and innovation	GM3-4
TGRH	MGIND31.67	Techniques de gestion des ressources humaines	21	0	21	30	51	2	2	CC+E	Humanresources management techniques	GM3-4
DevlpPer	MGIND31.68	Développement personnel	21	0	21	20	41	1,5	2	CC+E	Development staff	GM3-4
EnergRnw	MGIND31.69	Management des systèmes d'information	45		45	15	60	2	2	CC+E	Information System Management	GM3-3
Total (Semestre/Semester)1 :			360	60	405	370	790	30	30			

Industrial Engineering First Year

Idnt	CTSE	Intitulé	CI	TP	CI+TP	Tper	T		Coef	E		GM
Course Id	Code		L	PW	L+PW	Self pr.	T	ECTS		E	Subject	
MathI	MGIND11.01	Mathématique I	30	0	30	42	72	3	2	CC+E	Mathematics I	GM1-1
RechOp	MGIND12.13	Recherche opérationnelle	24	0	24	25	49	2	2	CC+E	Operationalresearch	GM1-1
StatProb	MGIND12.14	Statistique et probabilités	24	0	24	25	49	2	2	CC+E	Statistics and probabilities	GM1-1
Total GM1-1			78	0	78	92	170	7	6			
CompAG	MGIND11.02	Gestion des Entreprises	30	0	30	30	60	2,5	2	CC+E	Business Management	GM1-2
GestEnt	MGIND12.15	Comptabilité Analytique de Gestion	24	0	24	15	39	1,5	2,5	CC+E	Management AnalyticalAccounting	GM1-2
FinEnt	MGIND12.16	Finance des entreprises	30	0	30	20	50	2	2	CC+E	Corporate finance	GM1-2
Total GM1-2			84	0	84	65	149	6	6,5			
ConcpMec	MGIND11.03	Conception mécanique	30	15	45	50	95	3,5	3	CC+E	Mechanical concept	GM1-3
TechFab	MGIND12.17	Technologie de fabrication	24	15	39	20	59	2	2,5	CC+E	Manufacturingtechnology	GM1-3
CAO	MGIND12.18	Conception assisté par ordinateur	0	48	48	25	73	3	2,5	CC+E	Computer aided design	GM1-3
TranPMI	MGIND12.19	Transmission de puissance et de mouvement I	30	15	45	20	65	2	2,5	CC+E	Power and motion transmission I	GM1-3
Total GM1-3			84	93	177	115	292	10,5	10,5			
ElecqI	MGIND11.04	Electronique	30	15	45	40	85	3	2,5	CC+E	Electronics I	GM1-4
SystCL	MGIND11.05	Systèmes et circuits logiques	30	15	45	40	85	3	2,5	CC+E	Logicsystems and circuits	GM1-4
Aut I	MGIND12.20	Automatique I	30	15	45	15	60	2	2	CC+E	Automatic I	GM1-4
Electq	MGIND12.21	Électrotechnique	30	15	45	30	75	3	2,5	CC+E	Electrical engineering	GM1-4
Total GM1-4			120	60	180	125	305	11	9,5			
TherdApp	MGIND11.06	Thermodynamique appliquée	24	0	24	40	64	2,5	2	CC+E	Appliedthermodynamics	GM1-5
MecFlud	MGIND11.09	Mécanique des fluides	30	15	45	40	85	3	2,5	CC+E	Fluidmechanics	GM1-5
TranTher	MGIND12.22	Transfert et Échange de chaleur	30	21	51	24	75	3	2,5	CC+E	Heattransfer and exchange	GM1-5
Total GM1-5			84	36	120	104	224	8,5	7			
ChoixMat	MGIND11.07	Choix des matériaux	24	0	24	20	44	1,5	2	CC+E	Materialschoice	GM1-6
RDM	MGIND11.08	Résistance des matériaux (RDM)	30	15	45	50	95	3,5	3	CC+E	Materialresistance (RDM)	GM1-6
MP	MGIND12.23	Mini-projet	0	30	30	25	55	2	1	R	Mini-project	GM1-6
MecMC	MGIND12.24	Mécanique des milieux continus (MMC)	30	0	30	30	60	2	2	CC+E	Continuous media mechanics (CMM)	GM1-6
Total GM1-6			84	45	129	125	254	9	8			
AgInd I	MGIND11.10-1	Anglais industriel I	24	0	24	20	44	1,5	1	CC+E	Industrial English I	GM1-7
TechCom	MGIND11.11	Techniques de communication I	24	0	24	20	44	1,5	1	CC+E	Communication techniques	GM1-7
DrtTra	MGIND11.12	Droit du travail	24	0	24	20	44	1,5	1	CC+E	Labor law	GM1-7
AgInd II	MGIND12.10-2	Anglais industriel II	24	0	24	20	44	1,5	1	CC+E	Industrial English II	GM1-7
Total GM1-7			96	0	96	80	176	6	4			
Total			630	234	864	706	1570	58	51,5			

Industrial Engineering Second Yearr

Idnt	CTSE	Intitulé	CI	TP	CI+ TP	T.per	T		Coef	E		GM
Course Id	Code		L	Pw	L+P w	Self pr.	T	ECT S		E	Subject	
MathII	MGIND21.26	Mathématique II	24	0	24	24	48	2	2	CC+E	Mathematics II	GM2-1
EchgChal	MGIND21.35	Optimisation	30	0	30	20	50	2	2,5	CC+E	Optimisation	GM2-1
AnlyNum	MGIND21.27	Analyse numérique	24	0	24	24	48	1,5	2	CC+E	Digital analyze	GM2-1
Ecot	MGIND22.40	Économétrie	21	15	36	15	51	1,5	2	CC+E	Econometrics	GM2-1
Total GM2-1			99	15	114	83	197	7	8,5			
AlgoST	MGIND21.36	Algorithme et structure de données	21	0	21	30	51	2	1,5	CC+E	Algorithm and data structure	GM2-2
LangPC	MGIND21.37	Langage de programmation C	21	0	21	30	51	2	1,5	CC+E	C programminglanguage	GM2-2
InfInd	MGIND22.42	Informatique industrielle	12	15	27	15	42	1,5	2	CC+E	Industrial data	GM2-2
Total GM2-2			54	15	69	75	144	5,5	5			
MMV	MGIND21.31	Automatique II	30	15	45	30	75	3	2,5	CC+E		GM2-3
SchEle	MGIND21.28	Schémas électriques	21	15	36	10	46	1,5	2	CC+E	Electricaldiagram	GM2-3
MachEle	MGIND21.29	Machines électriques	36	15	51	40	91	3	2,5	CC+E	Electrical machines II	GM2-3
ElecInd	MGIND21.30	Électronique industrielle	30	15	45	40	85	3	2,5	CC+E	Industrialelectronics	GM2-3
Total GM2-3			117	60	177	120	297	10,5	9,5			
GOP	MGIND22.47	Gestion et ordonnancement de la production	51	0	51	40	91	3	2,5	CC+E	Production management and scheduling	GM2-4
GQ	MGIND22.48	Gestion de la qualité	24	0	24	24	48	1,5	2	CC+E	Quality management	GM2-4
CAOII	MGIND22.45	Fiabilité et Maintenance des Systèmes	21	0	21	25	46	1,5	2	CC+E	Computer aided design II	GM2-4
GestM	MGIND22.46	Gestion de la maintenance	21	15	36	40	76	2,5	2	CC+E	Maintenance management	GM2-4
Total GM2-4			117	15	132	129	261	8,5	8,5			
ContND	MGIND21.33	Contrôle Destructif et Non destructif	24	15	39	20	59	2	2,5	CC+E	Non-destructive testing	GM2-5
PFab	MGIND22.49	Processus de fabrication	30	0	30	20	50	2	2,5	CC+E	Manufacturingprocess	GM2-5
MOCN	MGIND22.50	Machines-Outils à commande numérique	30	24	54	30	84	3	2	CC+E	Numericallycontrolled machine tools	GM2-5
MOSEM	MGIND22.51	Mise en œuvre sans enlèvement de matière	27	15	42	40	82	2,5	2	CC+E	Implementationwithou tremovingmaterial	GM2-5
Total GM2-5			111	54	165	110	275	9,5	9			
OutAD	MGIND22.41	Outils d'aide à la décision	24	0	24	30	54	2	2	CC+E	Decision-makingtools	GM2-6
AutoqII	MGIND22.44	Méthodologie de Recherche	30	0	30	20	50	2	2,5	CC+E	ResearchMethodologie	GM2-6
MP	MGIND22.53	Mini-projet	0	15	15	30	45	1,5	1	R	Mini-project	GM2-6
Total GM2-6			54	15	69	80	149	5,5	5,5			
MSI	MGIND21.32	Énergies renouvelables	30	15	45	30	75	3	2,5	CC+E	Information System Management	GM2-7
MII	MGIND22.43	Régulation et Controle	24	15	39	20	59	2	2	CC+E		GM2-7
FrdClim	MGIND21.34	Mesure et instrumentation industrielle	24	15	39	20	59	2	2,5	CC+E	Industrialmeasuremen t and instrumentation	GM2-7
Total GM2-7			78	45	123	70	193	7	7			
AngIndIII	MGIND21.38	Anglais industriel I II	24	0	24	15	39	1,5	1	CC+E	Industrial English I	GM2-8
TechCom	MGIND21.39	Technique de communication II	24	0	24	20	44	1,5	1	CC+E	Communication technique	GM2-8
AgInd	MGIND22.52	Anglais industriel IV	24	0	24	15	39	1,5	1	CC+E	Industrial English IV	GM2-8
Total GM2-8			72	0	72	50	122	4,5	3			
Total (Semestre/Semester)2 :			702	219	921	717	1638	58	56			

Industrial Engineering Third Year

Idnt	CTSE	Intitulé	CI	TP	CI+ TP	T.per	T		Coef	E		
Course Id	Code		L	PW	L+PW	Self pr.	T	ECTS		E	Subject	GM
Opt	MGIND31.63	Industrie 4.0 Advanced Operator	30	0	30	20	50	2	2	CC+E	Industry 4.0 Advanced Operator	GM3-1
MSSP	MGIND31.65	Modélisation et simulation des systèmes de production	21	15	36	30	66	2,5	2,5	CC+E	Modeling and simulation of production systems	GM3-1
CPSP	MGIND31.56	Conception et performance des systèmes de production	24	15	24	15	54	2	2	CC+E	Design and performance of production systems	GM3-1
Total GM3-1			75	30	90	65	170	6,5	6,5			
LogisDis	MGIND31.55	Logistique de distribution	24	0	24	25	49	2	2	CC+E	Distribution logistics	GM3-2
GestStcs	MGIND31.60	Gestion des stocks	24	0	24	30	54	2	2	CC+E	Inventory management	GM3-2
GestTranp	MGIND31.58	Gestion de transport	21	0	21	25	46	2	2	CC+E	Transport management	GM3-2
SCM	MGIND31.59	Supplychain management	21	0	21	30	51	2	2	CC+E	Supplychain management	GM3-2
Total GM3-2			90	0	90	110	200	8	8			
GestProjt	MGIND31.57	Gestion de projet	24	0	24	30	54	2	2	CC+E	Project management	GM3-3
EnergRnw	MGIND31.69	Management des systèmes d'information	45		45	15	60	2	2	CC+E	Information System Management	GM3-3
TechPrev	MGIND31.61	Techniques de prévision	30	0	30	20	50	2	2	CC+E	Forecasting techniques	GM3-3
EntRP	MGIND31.62	Entreprise ressource planning	0	30	30	20	50	2	1,5	CC+E	Enterprise resource planning	GM3-3
Total GM3-3			99	30	129	85	214	8	7,5			
LeanMan	MGIND31.64	Lean manufacturing	24	0	24	30	54	2	2	CC+E	Lean manufacturing	GM3-4
FMS	MGIND31.66	Management de la R&D et l'innovation	30	0	30	30	60	2	2	CC+E	Management of R&D and innovation	GM3-4
TGRH	MGIND31.67	Techniques de gestion des ressources humaines	21	0	21	30	51	2	2	CC+E	Humanresources management techniques	GM3-4
DevlpPer	MGIND31.68	Développement personnel	21	0	21	20	41	1,5	2	CC+E	Development staff	GM3-4
Total GM3-4			96	0	96	110	206	7,5	8			
Total (Semestre/Semester)1 :			360	60	405	370	790	30	30			

GIND 1

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

Module: Mathematics for Engineers

Code: MGIND11.01

Module group: GM1-1

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the practice of profession
	X		

Teacher: Emna Gargouri

Status : Assistant Professor

E-Mail: emnagargouri@yahoo.fr

Courses	Laboratory and Practical works	Individual work	Total volume
30 h		**42 h**	**72h**

Coefficient :	ECTS credits :
2	3

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

The Mathematics for Engineers course is organized around the fundamental concepts of univariate and multivariate functions. The mastery of integral calculus and its implementations in differential geometry is main objective.

1.2 Objectives

The objective is to initiate students with functions with several variables, double, triple and curvilinear integrals and to apply them to the calculations of physical quantities such as areas, centres of inertia, volume, moments of inertia, length of a trajectory and material point subjected to a force field.

1.3 Prerequisites

Upstream modules	Module taught	Downstream modules
	MGIND 11.01	

1.4 Learning outcomes

Chapter	Title	Duration	Learning outcomes
Chapter 1	Concepts of multivariate functions	8h	Topology of R ^ n. Continuity. First and higher order partial derivatives. Class functions C ^ k. Schwarz's theorem. Extrema of two-variable functions.
Chapter 2	Double integrals	8h	Double integrals over a rectangle. Linearity. Growth. Invariance by translation. Additivity to a domain. Fubini's theorem. Switch to polar coordinates. Integration on a disc, ring or angular sector.

Chapter 3	Triple integrals	8h	Growth. Invariance by translation. Additivity to a region. Iterated integrals. Conversion in cylindrical and spherical coordinates. Integration on a parallelepiped, cylinder, cone, paraboloid or sphere.
Chapter 3	Curvilinear integrals	6h	Definition. Length of an arc. Areas. Green-Riemann theorem. Circulation of a vector field.

2. METHODOLOGY

The educational approach of this course is based on a deep understanding of the methods, while focusing on the computational aspect.

Integrated courses (h)	30
Labs and Practical work (h)	
Project (h)	25
Visits (h)	

3. Evaluation

Activity	Chapter(s)	Weighting
Mini-project		
Practical works		
Continuous assessment	Chapters 1 and 2	0.25
Presentation		
Final Exam	Chapters 2, 3 and 4	0.75

4. Bibliographic References

[1] D. Fredon, M. Bridier, Mathematics for Engineering Sciences. Edition Dunod.

[2] M. Gaultier, Analysis - curvilinear, multiple and surface integrals - Passage formulas. Edition Ellipses

[3] J. Bass, E. Masson, Calcul différentiel, intégrales multiples, fonctions de variable complexe. Edition Dunod.

	MODULEDESCRIPTION	**Department : Industrial Engineering**
		Date : 11/10/2021
		N° version : 02
		Semester : 01

Business Administration

Code : MGIND11.02

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession
	×		

Teacher :Dr. Med Achraf KAMMOUN

Status : Permanent

Mail : kammounmedachraf@gmail.com

Courses	Practicalworks	Individualwork	Total volume
--	30	60	

Coefficient:	ECTS credits :
2	2.5

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULEDESCRIPTION**	**Department : Industrial Engineering**
		Date : 11/10/2021
		N° version : 02
		Semester : 01

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

1.1: Description

The course of Management of the company is a semester course intended for the students of the first year, common core, Business Administration, of the Higher Institutes of Technological Studies in Tunisia. It lasts 3 hours per week. This course is a set of knowledge, essential in a context of opening markets and globalization.

In fact, in our society, the distance between consumers and producers is sometimes very high, the needs of the clientele are constantly diversifying, the desires appear more and more precise. The company is thus inserted in a network of increasingly close relationships with its customers and suppliers. This growing interdependence means that it is necessary to go beyond a simple logic of power relations to set up cooperative systems within the customer-supplier chain. By optimising the relationships between its main partners and key functions, the company gives itself the means to offer the end customer a product in line with his expectations.

Objectives

At the end of this course, the student will be able to :

- Understand the legal rules relating to the management of a company
- Make accounting entries and construct a balance sheet
- Draw up a cost price according to several methods
- Determine profitability thresholds and calculate a solvency ratio

1.2: Pre-requisites :

None

Upstream Modules	Taught Module	Downstream Modules
	Business Administration	

1.3 :LearningOutcomes :

Chapter	Title	Duration	Learning Outcomes
Chapter 1: The Entreprise	Introduction: I- The definition and role of the company II- The different actors within the company III- The different classifications of companies	**4 hrs**	The student is able to: - Identify the strategic business areas of the company. - Identify and evaluate the company's strengths and weaknesses.
Chapter 2: The business	Introduction:	**6hrs**	The student is able to:

community	I- The macro-Community II- The meso-Community II- The micro-Community III- How to master the relationships in the Community ? IV- Characteristics of the current business Community and structural trends		Identify and characterise the threats and opportunities of the Community (competitors, customers, suppliers, associations, public authorities...). - Identify the nature of a company's competitive advantage (technologies, products, markets...). Identify the actions taken to acquire, preserve or develop a competitive advantage (innovation, quality improvement, cost control, etc.).
Chapter 3: Administration and the Manager	Introduction: I- Definition of management II- Nature of management: science or art? III-The management process IV- The roles of the manager V- The skills of a manager	**4hrs**	- Describe the nature of management. - Explain the management process. - Describe the roles of the manager. - Define the necessary skills of a manager.
Chapter 4: The main management approaches	I- The classical school II- The human relations school III- The neoclassical school of management IV- The "contingent" approaches to organisations V- The modern school	**6 hrs**	At the end of this chapter the student should be able to - Explain the basic principles of the classical school, the school of human relations. - Define the concept of contingency. - Demonstrate the contributions of authors who have participated in the development of management thinking. - Explain the criticisms addressed to each author.
Chapter 5: The functions of the company	I- The supply function II- The production function II- The marketing function IV- The human resources management function V- The financialfunction	**4 hrs**	At the end of this chapter the student should be able to: - Describe the different stages of the procurement process. - Explain the methods of stock management - Identify the tools for optimising production - Explain consumer buying behaviour and describe the buying process Identify and explain the four elements of the marketing mix.
Chapter 5: Financial analysis of the company	Introduction: Section 1: Balance sheets and annual accounts; Section 2: Ratio Analysis; Section 3: Cash FlowAnalysis.	**6hrs**	Identify, assess and use the break-even point. Measure and analyse profitability. Select indicators, present and disseminate them. Identify useful indicators for steering the company

2.METHODOLOGY

Writtenassignments and/or
Presentations (written and oral)

Integrated courses (h)	24hrs
Practicalwork (h)	
Project (h)	
Visits (h)	

3.Assessment:

Designation	**Chapter(s)**	**Rating**
Mini-project		
Practical works		
Continuous assessment		30 %
Presentation		
Final Exam		70 %

4. Bibliographicreferences :

Janine Bruchet, " Objectif Entreprise", l'Editeur Hachette 1994

D.Larue et A. Caillat, " Economie d'Entreprise", l'Editeur Hachette 1990

Đỗ Thị Thanh Vinh, "Gestion des ressources humaines", Référence, 2005.

Đỗ Thị Thanh Vinh, "Le Marketing", Référence, 2006.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

Module: Mechanical Design

Code: MGIND11.03

Module group: GM1-3

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
		x	x

Teacher: Georges Kantchev

Status: Professor

Mail: georges.kantechev@gmail.com

Courses	Laboratory and Practical works	Individual work	Total volume
30 h	15 h	50 h	95 h

Coefficient :	ECTS credits :
3	3.5

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Objectives

- With this module, students should be familiar with the principles and methods of mechanical design.

- Students should know how to analyse the structure of mechanisms and machines.

- Students are able to study the kinematics of lever mechanisms, cam mechanisms, indexers, etc.

1.2 Prerequisites

Upstream modules	Module taught	Downstream modules
	MGIND11.03	

1.3 Learning outcomes

Chapter	Title	Duration	Learning outcomes
Chapter 1	Introduction to Mechanical	3	Examples of machine design.
Chapter 2	Structure and classification of machine mechanisms.	3	Basics of machine structure. Classification of mechanisms and machines.
Chapter 3	Lever mechanisms	6	Design, classification and kinematic analysis of lever mechanisms Determination of reactions in the kinematic links of mechanisms.
Chapter 4	Cam mechanisms	7	Design and classification of cam mechanisms. Transmission of forces. Kinematic analysis of cam mechanisms. Determination of cam profiles.
Chapter 5	Screw mechanisms.	4	Design, classification and analysis of screw mechanisms.
Chapter 6	Indexing mechanisms and variable structure mechanisms	6	Design, analysis and application of indexing mechanisms. Design, analysis and applications of variable structure mechanisms.

Practical work	Lab activity 1: Study of a crank mechanism	5h	The students have to make a geometrical and kinematic study of a crank mechanism using a didactic model Calculation of speed, accelerations using graphic methods (equiprojectivity and instantaneous centre of rotation)
	Lab activity 2: Study of a mechanism with 4 revolute joints	5h	Using the didactic model and the data of the mechanism with 4 revolute joints links, the students are asked to study its geometric and kinematic characteristics. Calculation of speed, accelerations using graphical methods (equiprojectivity and instantaneous centre of rotation)
	Manipulation 3: Study of a sliding mechanism	5h	With the didactic model and the data of the slide mechanism, the students have to make its geometrical and kinematic characterisation. Calculation of speed, accelerations using graphical methods (equiprojectivity and instantaneous centre of rotation)

2. METHODOLOGY

Integrated courses (h)	30 h
Labs and Practical work (h)	15 h
Project (h)	20h
Visits (h)	20h

3. Evaluation

Activity	Chapter(s)	Rating
Mini-project		
Practical works	From 1 to 7	0.25
Continuous assessment	From 1 to 4	0.25
Presentation		
Final Exam	From 1 to 9	0.5

4. Bibliographic References

[1] Neil Sclater & Nicholas P. CHIRONIS, MECHANISMS & MECHANICAL DEVICES SOURCEBOOK, Third Edition

[2] Jean MARTIN, Mechanisms for transforming motion with local contact, Techniques de l'Ingénieur, B5910. - René BOUDET, Presentation of mechanisms, Techniques de l'Ingénieur, B599.

[3] Hamilton H. Mabie and Charles F. Reinholtz, Mechanisms and dynamics of machinery . Fourth edition. 1987

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

Module: Electronique I (Analogue electronics)

Code: MGIND 11.04

Module group: GM1-4

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the practice of profession
X		X	

Teacher : Mallek Jihen

Status : Assistant Professor

Mail: mallek.jihen@gmail.com

Course	Laboratory and Practical works	Individual work	Total volume
30 h	**15 h**	**40 h**	**85 h**

Coefficient :	ECTS credits :
2,5	**3**

	Module Description	Department :Industrial Engineering
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

Apply the general theorems of electrical circuit analysis.

Study the characteristics of basic electronic components.

Study dipoles, quadrupoles and passive filters,

Study diodes and diode circuits,

Apply the general theorems of electrical circuit analysis. Know the characteristics of basic electronic components.

1.2 Objectives

- Be able to design electronic acquisition, control and display devices. In addition, they will be able to set up experimental devices in a context of collaborative work in the field of industrial electronics.
- Master methods and tools of analogue electronics engineering: identification, modelling and resolution of even unfamiliar and incompletely defined problems, use of computer tools, analysis and design of analogue circuits

1.3 Prerequisites

Upstream modules	Module taught	Downstream modules
	MGIND11.04	

1.4 Learning outcomes

Chapter	Title	Duration	Learning outcomes
Chapter 1	Linear Electric Circuits	6h	Apply the general theorems of electrical circuit analysis
Chapter 2	Variable Speed Electric Circuits	6h	Characteristics of basic electronic components.
Chapter 3	Study of Passive Filters	9h	Study dipoles, quadrupoles and passive filters,
Chapter 4	Study of Junction Diodes	9h	Characteristics of basic electronic components.

Practical work	- Lab activity 1 : Passive Circuits - Lab activity 2: Application of the general laws of electricity - Lab activity 3: RC Filter - Lab activity 4: Diode rectification - Lab activity 5. Practical exercises: Transistor amplifier assemblies (Common Transmitter)	15h	To set up experimental devices, to be open to the practice of collaborative work in the field of industrial electronics.

2. METHODOLOGY

Integrated courses (h)	30
Labs and Practical work (h)	15
Project (h)	
Visits (h)	

3. Assessment

Activity	Chapter(s)	Rating
Mini-project		
Practical works	CHP1, ChP2and ChP3	
Continuous assessment	CHP1 and ChP2	
Presentation		
Final Exam	All Chapters	

4. Bibliographic References

[1] ANALOGIC ELECTRONICSComponents and complex systems (Engineering Sciences),Bernard Latorre Corinne Berland, François de Dieuleveult, Christophe Delabie,Olivier Français, Patrick Poulichet, Dunod, 2018ISBN 978-2-10- 077566-8.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

Module: System and logic circuit

Code: MGIND11.05

Module group: GM1-4

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
	X		

Teacher : Omaya Bellaaj

Status : Assistant Professor

E-Mail: bellaj_omaya@hotmail.fr

Course	Practical work	Personal work	Total volume
30 h	15 h	40 h	85 h

Coefficient :	ECTS credits :
2,5	3

	Module Description	Department :Industrial Engineering
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

Logic circuit course presents the methods of analysis and low-level synthesis of combinatorial logic systems starting from a specification and leading to a physical achievement of the system through logic gates.

1.2 Objectives

- Representation of numbers in number bases
- Writing and simplifying logic functions
- Analysis and synthesis of logic systems
- Implementation of arithmetic combinatorial circuits
- Implementation of combinatorial coding, transcoding and multiplexing circuits
- Implementation of sequential circuits based on flip-flops.

1.3 Prerequisites

Knowledge of computer components
Synthesis of the different numbering systems and the different types of codes.

Upstream modules	Module taught	Downstream modules
	MGIND11.05	

1.4 learning outcomes

Chapter	Title	Duration	Learning outcomes
Chapter 1	*Combinatorial Logic*	4h	- Basic logic functions - Properties of Boolean algebra - Karnaugh's method - Representation of negative numbers, binary arithmetic - Arithmetic combinatorial circuits (comparator, adder, substractor) - Binary codes and error detection codes

Chapter 2	Special combinatorial circuits	4h	- Coders - Decoders - Transcoders - Multiplexer - De-multiplexer
Chapter 3	Sequential Logic	4h	RS scale Rocker D JK rocker Synchronous counters Asynchronous meters
Practical work	Combinatorial and sequential logic	15h	- RS, D and JK rocker - Synchronous and asynchronous meters

2. METHODOLOGY

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the individual activities, students have to do homework assignments.

Integrated courses (h)	30h
Labs and Practical work (h)	15h
Project (h)	25h
Visits (h)	15h

3. Assessment

Activity	Chapter(s)	Weighting
Mini-project		
Practical works	Chapter 1-2-3	0.25
Continuous assessment	Chapter 1-2-3	0.25
Presentation		
Final Exam	Chapter 1-2-3	0.5

4. Bibliographic References

[1] Th. l. Floyd, DIGITAL FUNDAMENTALS, Prentice Hall, 2006.

[2] M. Rafiquzzaman, Fundamentals of Digital Logic and Microcomputer Design, WILEY- INTERSCIENCE, 2005.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

Module: Thermodynamics

Code: MGIND11.06

Module group: GM-5

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the practice of profession
	X		

Teacher : Jemal Hassen

Status : Assistant Professor

Mail: hassenedjemel@yahoo.fr

Course	Laboratory and Practical works	Individual work	Total volume
24 h		**40 h**	**64 h**

Coefficient :	ECTS credits :
2	**2.5**

	Module Description	Department :Industrial Engineering
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

This course explains the principles of thermodynamics and highlight the usefulness of fundamental quantities such as internal energy, enthalpy, entropy, etc.
In addition, this course provides the student with the knowledge to understand systems and to evaluate the efficiency of energy systems in terms of energy and exergy.

1.2 Objectives

- Understanding the principles of thermodynamics
- Mastering energy balances
- Studying irreversible processes
- Apply thermodynamic principles to energy processes

1.3 Prerequisites:

Thermodynamics level BAC+2 - Mathematical tools: differential calculus, integral calculus and mutivariate functions.

Upstream modules	Module taught	Downstream modules
	MGIND11.06	

1.4 Learning outcomes

Chapter	Title	Duration	Learning outcomes
Chapter 1	Basic principles.	8 H	Master the fundamental principles of thermodynamics: 1- First principle 2- Second principle 3- Formalism in thermodynamics - Variations of state functions - Balance sheet concepts - Characteristic functions
Chapter 2	Thermodynamic diagrams and cycles	4 H	Become familiar with thermodynamic diagrams and cycles

Chapter 3	Energy systems analysis	12 H	Learn how to establish the various balances for energy analysis 1- Enthalpy balances 2- Entropic balances 3- Energy balances 4- Applications to the study of real energy systems
Practical work	Lab activity 1: Calorimetry. Lab activity 2: Determination of the adiabatic index of air Lab activity 3: Determination of the overall efficiency of the	5 H 5 H 5 H	Use a calorimeter to measure the heat capacity of liquids. Study air compression and determine the efficiency of a compressor.

2. METHODOLOGY

Integrated courses (h)	24
Labs and Practical work (h)	15
Project (h)	40
Visits (h)	

3. Assessment

Designation	Chapter(s)	Rating
Mini-project		
Practical works	Ch1 Ch2 Ch3	25%
Continuous assessment	CH1 Ch2	25%
Presentation		
Final Exam	CH1 Ch2 Ch3	50%

4. Bibliographic References

[1] YunusCengel, Michael Boles , Mehmet Kanoglu, Thermodynamics: An Engineering Approach, McGraw- Hill Higher Education, 2008.
[2] L. Borel, D. Favrat, Thermodynamics and Energy, Volume 1. PPUR presses polytechniques, 2005
[3] J. M. Smith, Hendrick C Van Ness, M. Abbott. Introduction to Chemical Engineering Thermodynamics. The Mcgraw-Hill Chemical Engineering Series
[4] Richard E. Sonntag , Gordon J. Van Wylen , Pierre Desrochers. Applied thermodynamics. Edition: Erpi.

Selection of Materials

Code : MGIND11.07

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession
x			

Teacher :Fatma WALHA

Status : Permanent

Mail :walha.fatma@gmail.com

Courses	Practicalworks	Individualwork	Total volume
24hrs	0h	20rs	44rs

Coefficient:	ECTS credits :
2	1.5

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

1.1: Description

Objectives

-To know the definition of the term Material, the different families of materials and to study the relations between the structure of the material and its properties.

-To study the binary alloys.

-To know the phases of a chemical composition of two elements at different temperatures.

- To master the reading of a binary equilibrium diagram and to know their types

-Identify the structures of the compositions and calculate the proportions

-Study the Iron-Carbon diagram and differentiate between steel and cast iron.

-Know the different heat treatments on steel and their consequences on the microstructure and subsequently on their properties

-To know how to choose materials by the Ashby method and the calculation of the performance index

1.2: Prerequisites :

-Basic knowledge of chemistry

Upstream Modules	Taught Module	Downstream Modules
--	MGIND11.07	--

1.3 :Learning Outcomes :

Chapter	Title	Duration	Learning Outcomes
Chapter 1	Généralités sur les Matériaux et Architecture Atomique	5Hrs	-Know the meaning of the term material and the classification of the different families of materials -To know the properties (mechanical, thermal, electrical, chemical...) of materials -Know the microscopic structure of a material
Chapter 2	Phase diagrams and binary equilibrium diagrams	7Hrs	Binary equilibrium diagram for fully miscible solid state systems and partially miscible solid state

			systems
Chapter 3	Steels and castiron	3rs	-Study the iron-carbondiagram -Know the compositions, characteristics and designations of steels and cast irons
Chapter 4	Heattreatments of steels	3Hrs	-Modifying the performance of steels through heat treatment by acting on the microstructure
Chapter 5	Selection of Materials	6Hrs	-Calculate the performance index -Selecting the material using the ESC abacuses (Ashby's method)

2.METHODOLOGY

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the self-study activities, students have to do the exercises given as homework.

Integrated courses (h)	24hrs
Practicalwork (h)	
Project (h)	
Visits (h)	

3.Assessment:

Designation	**Chapter(s)**	**Rating**
Mini-project		
Practical works		
Continuous assessment	Chapitres de 1 à 3	0.25
Presentation		
Final Exam	Tous les chapitres	0.75

4. Bibliographicreferences :

- J. Benard, A. Michel, J. Philibert, J. Talbot : Metallurgiegenerale, Masson ed., Paris, 1984, 2eme ed., 651p.
- J.-P. Bailon, J.-M. Dorlot : Des Materiaux, Presse Internationales Polytechniques,Montreal, 2000, 3eme ed., 736p.
- M.F. Ashby, D.R.H. Jones :Materiaux, 2. Microstructure et mise en .uvre, Dunoded., 1991, 385p.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

Module: Strength of materials

Code: MGIND11.08

Module group: GM1-6

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the practice of profession
x			

Teacher : Fatma Walha

Status : assistant Professor

E-Mail: walha.fatma@gmail.com

Course	Laboratory and Practical works	Personal work	Total volume
30 h	15 h	50 h	95 h

Coefficient :	ECTS credits :
2,5	3.5

	Module Description	Department :Industrial Engineering
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

Strength of materials studies the behaviour of deformable solids. It is particularly interested in calculating the dimensions of mechanical systems so that they are able to resist the forces applied to them during their service under the required safety conditions.

1.2 Objectives

- Understand the general objectives of SoM and its assumptions.
- Determine the cohesive torsor along a beam.
- Determine loading types in a beam.
- Drawing of stress diagrams.
- Determine the stress distribution in a beam section subjected to tensile, shear, torsion and bending stresses.
- Check the strength condition for beams under tension, shear, torsion and bending.
- Apply the principle of superposition to break down complex loads into simple loads.
- Stress distribution in the cross-section of a beam subjected to compound loading.
- Check the resistance condition of a beam subjected to a composite load.
- Size a beam subjected to compound loading.

1.3 Prerequisites

Modelling of mechanical actions.
Basic principle of statics.

Cohesion Torsor

Normal and Tangential Stress
Polar quadratic moment

Upstream modules	Module taught	Downstream modules
--	**MGIND11.08**	

1.4 Learning outcomes

Chapter	Title	Duration	Learning outcomes
Chapter 1	Introduction to Strength of materials	2H	Objectives of SoM General assumptions

Chapter 2	Cohesion Torsor		4H	Internal loads Components of cohesion Torsor Introduction to stress analysis
Chapter 3	Traction and Compression		3H	Tensile test, strain, Stresses. Tensile strength condition. Tensile stiffness Condition. Stress concentration
Chapter 4	Shear		3H	Shear test, strain, Stresses. Shear strength condition.
Chapter 5	Torsion		5H	Torsion test. Relations: Stress - strain / Stress – torsion moment. Torsional strength / stiffness conditions. Stress concentration
Chapter 6	bending		5H	Study of stress / strain in bending. Relation stress - bending moment. Bending strength / stiffness conditions. Stress concentration.
Chapter 7	Superposition theorem		4H	Apply the principle of superposition to transform complex stresses into simple stresses.
Chapter 8	Buckling		4H	Distribution of stresses in a beam cross section subjected to compound stress.
Practical works	Lab activity 1 :	Bending test	4H	- Implement theoretical knowledge -Be familiar with the beam bending test rig (component parts, instructions for use, etc.) - be able to develop and conduct various bending tests. -Apply acquired theoretical knowledge
	Lab activity 2 :	Torsion test	4H	-Characteristics of a test specimen subjected to torsional loading. -Plot the torsion test curves for different materials (steel, brass) and determine the experimental value of elasticity modulus and the shear limit.
	Lab activity 3 :	Bending computation using RDM6 software	4H	- Analysis of a structure by the finite element method (straight beams subjected to bending)
	Lab activity 4 :	Tensile test	3H	-Determine the mechanical characteristics (elasticity modulus, elastic resistance, tensile strength, etc.) of different materials (steel, brass, aluminium)

2. METHODOLOGY

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the individual activities, students have to do homework assignments.

Integrated courses (h)	30h
Labs and Practical work (h)	15h
Project (h)	
Visits (h)	

3. Assessment

Activity	Chapter(s)	Rating
Mini-project		
Practical works	Chapters 3, 5, 6	0.25
Continuous assessment	Chapters 1 to 4	0.25
Presentation		
Final Exam	All chapters	0.5

4. bibliographical references

[1]. J. L. Fanchon, Guide des sciences et technologies industrielles. Afnor Nathan, Paris 2001. [2]. Chevalier, Guide de calcul en mécanique. Hachette Livre 1993.
[3]. N.BOURAHLA , Resistance of basic materials. Edition GECOTEC

[4]. A. Delaplace, F. Gatuingt, F. Ragueneau , Mécanique des structures : Résistance des matériaux

, Dunod, Paris, 2008.

[4].J.FANCHON, Guide de mécanique : sciences et technologies industrielles, NATHAN 1998.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 2

Module: Fluid Mechanics

Code: MGIND11.09

Module group: GM1-5

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the practice of profession
	x	x	

Teacher : Jemii Hiba Status

: Assistant Professor E-Mail :

h.jemai@hotmail.fr

Course	Laboratory and Practical works	Individual work	Total volume
30 h	**15 h**	**40 h**	**85 h**

Coefficient :	ECTS credits :
2.5	**3**

	Module Description	Department :Industrial Engineering
		Date : 15/10/2021
		Version N°: 2
		Semester : 2

1- COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

- Provide basic knowledge on statics and fluid dynamics
- Calculate the pressure drop experienced by a flowing fluid in a pipe.

1.2 Provide the basic knowledge to calculate pumps (Hmt, NPSH,...)**Prerequisites**

Knowledge of basic mathematical concepts

Thermodynamics

Upstream modules	Module taught	Downstream modules
	MGIND11.09	

1.3 Learning outcomes

Chapter	Title	Duration	Learning outcomes
Chapter 1	Physical characteristics of fluids	3h	Mechanical behaviour and physical properties of fluids (compressible and incompressible)
Chapter 2	Fluid statics	6h	The students will acquire the following knowledge: a)The pressure difference between two points b) Fundamental laws of hydrostatics c) Pascal's theorem. d) Torsor associated with the pressure forces of a fluid on a plane wall e)Thrust centre position f) Archimedes' thrust
Chapter 3	FLUID KINEMATICS	6h	a) Types of flow b) Continuity equations
Chapter 4	PERFECT FLUID DYNAMICS	6h	- Flow rate and average speed - Flow regimes - Euler equation - Bernoulli equation

Chapter 5	VISCOUS FLUID DYNAMICS	6h	- Classification of pressure losses - Calculation of pressure losses - Reduction of pressure losses
Chapter 6	Pump calculation	3h	- Pump characteristic curve and network curve - Pump cavitation - Coupling of pumps and laws of similarity

Practical work	Title	Duration	Learning outcomes
Lab activity 1:	Properties of fluids	4h	Density measurement of fluids Measurement of fluid viscosity (ball drop)
Lab activity 2:	Pressure losses	4h	Pressure losses (Linear, 45° elbow, and 90° elbow)
Lab activity 3:	Venturi, valves and filter	4h	Venturi tube Pressure losses (Filter, Valves)
Lab exam	Assessment	3h	

2- METHODOLOGY

Integrated courses (h)	30
Labs and Practical work (h)	15
Project (h)	-
Visits (h)	-

3- Assessment

Activity	**Chapter(s)**	**Rating**
Mini-project	-	
Practical works	Chapters 1, 3, 4, 5 and 6	0.25
Continuous assessment	Chapter 2	0.25
Presentation	-	
Final Exam	All Chapters	0.5

4- Bibliographic References

[1] A. Fortier, Mécanique des fluides et transferts de chaleur et de masse par convection, Masson, 1975

[2] R.B. Bird, W.E., Steawart, E.N. Lightfoot, Transport phenomena, John Wiley and Sons, New York, 1960

[3] E. Baltaretu, Les pompes centrifuges: conditions fonctionnelles-constructives, chaînes de cotes, Eyrolles, 1975

[4] H. Fauduet, Fundamentals of Process Engineering and Chemical Technology, Lavoisier 1997.

[5] G. Towler, R. Sinnott, Chemical Engineering Design, Principles, Practice and Economics of Plant and Process Design, 2008, Elsevier

[6] R. Gibert, Génie chimique Tome 1 mécanique des fluides, Eyrolles, 1963

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**DESCRIPTION OF THE MODULE**	**Engineering Training Cycle: Electromechanical Engineering** **1ère year Semester: 2** **Version number: 02** **Date: 15/10/2021**

Module: English for SpecificPurposes

Code: MGIND11.10

Module group: GM1-7

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
	x		

Teacher : Mariem Feki

Status : Assistant Professor

Mail: fekimariem@gmail.com

Course	Practical work	Personal work	Total volume
24 h	- h	20 h	54 h

Coefficient :	ECTS credits :
1	1.5

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**DESCRIPTION OF THE MODULE**	**Engineering Training Cycle: Electromechanical Engineering**
		1ère year Semester: 2
		Version number: 02 **Date: 15/10/2021**

1. DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

1.1 Description

knowledge: students should embrace a pack of vocabulary concerning the tool, the equipments and the processes. 2-Competences: students should be able to make accurate sentences, with simple structures, conjugate verbs in simple forms of the tenses. 3- Skills: students would be able to answer correctly, using the appropriate structure and vocabulary in specific contexts.

1.2 Objectives

After completing this course , students are expected to master three language skills: Reading, writing and speaking.

Students are able to find out the main idea of the text and to find explicit and, then, implicit information from the text. Students are able to find out word definitions related to the text and to relate information to their life. Students are able to write and tell on site activities and challenges.

1.3 Pre-requisites

There is a minimum level according to international tests, that is, between A2 and B1, to reach by the end of the year having a B2 in the two skills (reading, speaking) and B1 in listening and writing.

Upstream modules	Taught module	Downstream modules
	MGIND11.10	

1.4 Learning outcomes

Chapters	Title	Duration	Learning outcomes
Chapter 1	Placement Test	4 hrs	Learning from mistakes of the placement test Student is able to identify from which point he should start
Chapter 2	Tools and devices. - naming tools and their uses. - Simple present and present continuous	6 hrs	The main outcome is to have students familiar with the equipments on plants or sites, and able to understand

	- describing tools in different work areas and their uses (adjectives and adverbs) Technical drawings		and talk about work areas
Chapter3	Automation and robotics. Safety at work: - PPE / IPE / CPE - instructions / hazards and accidents / remedies. - making orders and giving advice (modal verbs)	4 hrs	The objective is mainly to have students able to talk about challenges and hazards in mechanical engineering contexts. Students should be able to participate in group conversations in an emergency context. Prepare and introduce presentations on safety measures and equipments.
Chapter4	Reading articles about energy and mechanical advances Summarizing articles Presenting main ideas of articles	6 hrs	Students should be able to understand an article on mechanical advances. To write summaries with guidance .
Practicalworks	Continuous presentations	4hrs	Presentations in every unit are compulsory.

2.METHODOLOGY :

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the self-study activities, students have to do the exercises given as homework.

Integrated courses (h)	24hrs
Practicalwork (h)	
Project (h)	
Visits (h)	

3. Assessment:

Designation	**Chapter(s)**	**Rating**
Mini-project		
Practical works		
Continuous assessment	Units 1&2	10%
Presentation	All units	10%
Final Review	All units	80%

4. Bibliography:

[1] Sporanzi, Sabrina. Flash on English for Mechanics , Electronics and technical assistance.ESP series.
Eric.H. Glendinning, Norman Glendinning, Oxford English for Electrical and Mechanical Engineering, Ed Oxford University Press.
https://eprints.umm.ac.id/36610/3/Prastiyowati%20Lestiono%20Khoiriyah%20Khoyyimah%20Herdianto%20Fitriati%20-%20English%20for%20Mechanical%20Engineering.pdf

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 15/10/2021

Module: Communication Techniques

Code: MGIND11.11

Module group: GM1-7

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the practice of profession
	x		

Teacher : Jouda Ghorbel

Status : Assistant Professor E-

Mail: joudaghorbel@yahoo.fr

Course	Laboratory and Practical	Individual work	Total volume
24 h	- h	20 h	44 h

Coefficient :	ECTS credits :
1	1.5

	Module Description	Department :Industrial Engineering
		Date : 15/10/2021
		Version N°: 2
		Semester : 15/10/2021

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

This course is a preparation for entry into the workplace; it begins with a general chapter on French communication, which covers the different elements of the communication situations as well as the different language registers.

The second chapter is devoted to the study of the cover letter and the difference between the spontaneous cover letter and the one following an advertisement.

The third chapter of this module is focused on how to prepare a good CV.

The course ends with the final stage of recruitment preparation, the job interview, where the majority of the questions asked in an interview are covered and how to find the right answers and get the job.

1.2 Pre-requisite:

Upstream modules	Module taught	Downstream modules
	MGIND11.11	

1.3 Learning outcomes

Chapter	Title	Duration	Learning outcomes
Chapter 1	Communication	6h	The student masters the elements of the communication situation and the language registers.
Chapter 2	The cover letter	6h	The student is able to write an effective cover letter and to distinguish between a spontaneous cover letter and a cover letter following an advertisement.
Chapter 3	The CV	6	The student is able to write a standard CV.

Chapter 4	The job interview	6	The student is able to have a successful job interview; he/she is able to present him/herself correctly and answer the questions often asked during an interview.

2. METHODOLOGY

The Contact Hours consist of an introduction to the course. Practical applications are dealt with separately in the tutorials.

Active methods, brainstorming, simulations and group exercises are used in the applications. For

self-study activities, students should complete the exercises given as homework.

3. Assessment:

Activity	Chapter(s)	Rating
Mini-project		
Practical works		
Continuous assessment	1-2	0.5
Presentation		
Final Exam	1-2-3	1

4. Bibliographic References

[1] Christelle Capo-Chichi; Le CV. Studyrama. Collection Emploi

[2] Uriel Megnassan; *Le CV et la lettre de motivation, Mettez du punch dans vos candidatures*. Collection Eyrolles.

[3] Uriel Megnassan; *Get your dream job in 5 rounds*. Eyrolles Collection.

[4] Patrick De Sainte Lorette; La lettre de motivation spécial étudiants et jeune diplômé. Edition d'organisations.

	Module Description	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

Module: Labour law

Code: MGIND11.12

Module group: GM1-7

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the practice of profession
			X

Teacher : Ben Mahfoudh

Status : Assistant Professor

Mail: maitrerafaabenmahfoudh@gmail.com

Course	Laboratory and Practical works	Individual work	Total volume
24 h		20 h	44 h

Coefficient :	ECTS credits :
1	1.5

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description:

This module initiates students about the legal rules governing the employment contract, the commitments of the parties to the employment contract and the causes of the end of the employment contract and their consequences.

1.2 Objectives:

- To prepare the student for professional life

- Knowledge of legal rules organising the relationship between the different parties in the professional environment.

1.3 Prerequisites

The French language

Upstream modules	Module taught	Downstream modules
No	**MGIND11.12**	No

1.4 Learning outcomes

Chapter	Title	Duration	Learning outcomes
Chapter 1	Introduction	4h	- Knowing what labour law is - Be familiarwith the componenets of employment contract and how to distinguish it from other contracts of exchange of services for remuneration.

Chapter 2	The sources of labour law	6h	- Know the sources of labour law and the relationship between them. - The aim of labour law is to protect the weaker party to the contract who is the employee. A lower rule may derogate from a higher rule in a way that is favourable to the employee.

Chapter 3	The life of the employment contract : - Formation of the employment contract - Performance of the employment contract - End of the employment contract	14 h	- Determining the conditions of building the employment contract based mainly on consensualism - distinguish between the types of employment contract: fixed-term and open-ended - Know the commitments of the parties to the employment contract (salary, leave, OHS, loyalty, vigilance, etc.) - Determining the causes of the termination of the employment contract and their consequences.

2. METHODOLOGY

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the individual activities, students have to do homework assignments.

Integrated courses (h)	24 h
Labs and Practical work (h)	
Project (h)	20 h
Visits (h)	

3. Assessment

Activity	Chapter(s)	Weighting
Mini-project		
Practical works		
Continuous assessment	The whole course	30%
Presentation		
Final Exam	The whole course	60%

4. Bibliographic References

[1] Nouri Mzid, course on labour law, Faculty of Law of Sfax, academic year 2019-2020.

[2] Mohamed Hadi Ben Abdallah, Code de travail avec jurisprudence tunisienne et comparée, Tunis, 2005.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**DESCRIPTION OF THE MODULE**	**Engineering Training Cycle: Electromechanical Engineering** **1ère year Semester: 2** **Version number: 02** **Date: 15/10/2021**

Module: Operational Research

Code: MGIND12.13

Module group: GM1-1

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
	x	x	

Teacher : Amina Arousse

Status : Assistant Professor

Mail: Arousse.amina@gmail.com

Course	Practical work	Personal work	Total volume
24 h	- h	25 h	49 h

Coefficient :	ECTS credits :
2	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**DESCRIPTION OF THE MODULE**	**Engineering Training Cycle: Electromechanical Engineering**
		1ère year Semester: 2
		Version number: 02 **Date: 15/10/2021**

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 : Description

Operations research is a discipline that draws on the operational aspects of mathematics, economics and engineering sciences. The objective is to propose quantitative approaches to produce better decisions. These approaches provide tools to rationalise simulate and optimise industrial and economic systems.

1.2 Objectives

The objective is to have a first contact with the formulation and solution of linear programs with different geometrical, algebraic and algorithmic methods in several case studies.

1.3 Prerequisites

Upstream modules	Module taught	Downstream modules
	MGIND12.13	

1.4 Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Chapter 1	Introduction to linear programming	4h	Formulation of a linear program. Examples of applications. Graphical solution.
Chapter 2	Solving a continuous linear program	8h	Standard form of a linear program. Simplex method: Algebraic and algorithmic descriptions. Presence of equality constraints. Big M method. Two phase method. Special cases
Chapter 3	Duality and post-optimal analysis	6h	Construction of a dual problem. Optimal solutions of the dual and the primal. Sensitivity analysis. Adding a variable or a constraint.
Chapter 4	Integer linear programming	6h	Introduction. Method of Gomory cuts. Branch-and-Bound method

2. METHODOLOGY

The pedagogical approach of this course is based on a deep understanding of the methods, while focusing on the computational aspects.

Integrated courses (h)	24
Practical work (h)	
Project (h)	25
Visits (h)	

3. Evaluation

Designation	Chapter(s)	Weighting
Mini-project		
Practical work		
Continuous monitoring	Chapters 1 and 2	0.25
Presentation		
Final Review	Chapters 2, 3 and 4	0.75

4. Bibliographic References

[1] S.I. Gass, Linear programming: Mathods and Applications. Dover Books on Computer Science.

[2] F. Faure, B. Lemaire, C. Picouleau, Précis de recherche opérationnelle. Edition Dunod.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**DESCRIPTION OF THE MODULE**	**Engineering Training Cycle: Electromechanical Engineering**
		1ère year Semester: 2
		Version number: 02 **Date: 15/10/2021**

Module: Statistics and Probability

Code: MGIND12.14

Module group: GM1-1

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
	X		

Teacher : Bouri Mohmed

Status: Professor

Mail :

Course	Practical work	Personal work	Total volume
24 h	h	24 h	48 h

Coefficient :	ECTS credits :
2	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**DESCRIPTION OF THE MODULE**	**Engineering Training Cycle: Electromechanical Engineering** **1ère year Semester: 2** **Version number: 02** **Date: 15/10/2021**

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

This course intends to present some iterative numerical methods to be implemented for mechanical problems in other courses of the Industrial Engineeringprogram.

1.2 Objectives

- use the concepts and vocabulary of probability theory and statistics
- assess the probability of events using combinatorial analysis or the main laws of probability
- construct the probability distribution of a discrete random variable and calculate its expectation and Variance
- normalise data
- correctly use the binomial, Poisson, normal, Student's law and chi-square tables

1.3 Prerequisites

The subject matter concepts

Upstream modules	Module taught	Downstream modules
	MGIND12.13	

1.4 Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Chapter 1	Combinatorial analysis and probability	4	Know the basic definitions of combinatorial analysis, probability calculus and statistics.
Chapter 2	Binomial law and Poisson law	5	Understand intuitively and mathematically the main elements in probability and statistics.
Chapter 3	Normal law	5	Apply fundamental concepts in probability and statistics to various

Chapter 4	Statistical inference: parameter estimation	5	situations
Chapter 5	Statistical inference: hypothesis testing	5	Demonstrate rigour and critical thinking in statistics.

2. METHODOLOGY

- The lecture periods consist of theoretical presentations and examples.

- There is no compulsory textbook for this course.

Exercises and notes will be provided to students in class. Some useful books are included in the bibliography.

Integrated courses (h)	24 h
Practical work (h)	
Project (h)	24 h
Visits (h)	

3. Evaluation

Designation	**Chapter(s)**	**Weighting**
Mini-project		
Practical work		
Continuous monitoring	Chp1 -chp2 chp 3	0.25
Presentation		
Final Review	Chp 1+2+3+4+5	0.75

4. Bibliographic References

[1] Amyotte, Luc. (2012). Complément de méthodes quantitatives : Applications a la recherche en sciences humaines. Editions du renouveau pédagogique. ISBN 978-2-7613-4164-6

	DESCRIPTION MODULE	**Department: Industrial Engineering**
		Date: 11/10/2021
		Version number: 02
		Semester: 1

Management Analytical Accounting

Code: MGIND11.15

GM1-2

Specialty modules	**Basic module**	**Engineering Sciences and Techniques**	**Preparation for the profession**
			*

Teacher : Amina El Abed

Status: Research teacher

Mail: mina_abed@hotmail.fr

Course	**Practical work**	**Personal work**	**Total volume**
24h		15h	**39h**

Coefficient :	**ECTS credits :**
2.5	1.5

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**DESCRIPTION OF THE MODULE**	Department: Industrial Engineering
		Date: 11/10/2021
		Version number: 02
		Semester: 1

1. COURSE DESCRIPTION AND COMPETENCIES :

:Description

Cost accounting is a special discipline that has its roots in (general) financial accounting. It allows the calculation of various costs (full costs, partial costs) and is, as such, a real management and steering tool for the company.

Cost accounting is a method of processing financial data with the aim of analysing the overall result as calculated from the financial accounts. It also makes it possible to supplement financial accounting by giving it a basis for evaluating certain assets (stock of raw materials, stock of finished products, stock of goods, production of fixed assets). It provides a basis for forecasting expenses and income and ensures their control. It also provides information on which to base studies and reasoning for decisions affecting the company's future.

Objectives

This module aims to:

Analyse the company's overall result.

- Define management accounting expenses and revenues.

Analyse indirect costs by drawing up an indirect cost analysis table and allocating them for costing purposes.

- Calculate the various costs related to the company's manufacturing process (purchase cost, inventory valuation, production cost, cost of goods sold) and the cost result.

- Calculate the break-even point, the breakeven point and the safety index. Study

the different partial cost methods (variable, direct and specific).

- Study the method of rational allocation of fixed costs.

Prerequisites:

Upstream modules	Module taught	Downstream modules
No	MGIND11.02 Cost management accounting	MGIND12.15 Business management

1.3: Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Chapter 1	The objectives and means of management accounting (course + TD)	3 h	At the end of this chapter, the student will be able to: Analyse costs (by product, by order, by function, by activity centre) analysing the company's overall results
Chapter 2	Expenses and income in management accounting (course+discussion)	5 h	By the end of this chapter, the student should be familiar with the costs and revenues of management accounting.
Chapter 3	The analysis centre method: The treatment of expenses Indirect (course+DT)	4 h	At the end of this chapter, the student will be able to analyse indirect costs and allocate them for costing purposes.
Chapter 4	The analysis centre method: The different stages of calculation of costs and analytical result (course + TD)	6 h	At the end of this chapter, the student will be able to calculate the different costs related to the company's manufacturing process and the cost result.
Chapter 5	The Cost-Volume-Profit model (lecture+DT)	4 h	At the end of this chapter, the student will be able to calculate the break-even point, the breakeven point and the safety index.
Chapter 6	Partial costing methods: variable, direct and Specific (course+DT)	4 h	At the end of this chapter, the student will be able to calculate the result according to the variable cost method, the direct cost method and the specific cost method.
Chapter 7	Rational allocation of fixed costs (course+DT)	4 h	At the end of this chapter, the

			student should know in particular the influence of the level of activity on the cost recorded - the principle and usefulness of rational imputation - definitions of the reference activity - the scope of the method.

2. METHODOLOGY

The contact hours consist of introducing new concepts, rules and formulas. It is very important to ask good questions to check the students' understanding. Thereafter, the student is required to work on the tutorial exercises during the session independently. By moving on to the correction of the exercises, the student will be able to check his understanding and get more explanations.

Integrated courses (h)	34h
Practical work (h)	00
Project (h)	00
Visits (h)	00

3. Evaluation

Designation	**Chapter(s)**	**Weighting**
Mini-project		
Practical work		
Continuous monitoring	Chapter 1 - Chapter 2	0.25
Presentation		
Final Review	Chapter 1- Chapter 2- Chapter 3 - Chapter 4- Chapter 5- Chapter 6- Chapter 7	0.75

4. Bibliographic References

Alazard, C., Sépari, S., 2010. DCG 11- Contrôle de gestion Manuel et Applications. Collection: Expert Sup, Dunod, 2 ème edition- 752 pages.

Burlaud, A. Chatelain-Ponroy, S., Mignon, S., Teller, R., Walliser, E., 2004. Contrôle de gestion. Collection: Vuibert gestion, Vuibert, 2ème édition- 368 pages.

Burlaud, A., Chatelain-Ponroy, S., Simon, C., 2003. Comptabilité de gestion : QCM et applications QCM et applications. Collection: Vuibert gestion, Vuibert, 2ème édition- 176 pages.

Coucoureux, M., Cuyaubère, T., 2011. Cost calculation and analysis. Nathan, 1 ère edition - 230 pages.

Coucoureux, M., Cuyaubère, T., Muller, J., 2010. Management control DCG- Epreuve 11- Manuel et applications. Collection: DCG, Groupe Revue Fiduciaire et Nathan, 2 ème edition- 592 pages.

Dubrulle, L., Jourdain, D., 2007. Comptabilité analytique de gestion. Collection: Gestion Sup, Dunod, 5 ème edition- 536 pages.

Goujet, C., Raulet, C., 2007. Comptabilité de gestion Manuel. Collection: Tertiaire Sup, Dunod, 7ème edition- 496 pages.

Saada, T., Burlaud, A., Simon, C., 2005. Comptabilité analytique et contrôle de gestion. Collection: Educapole. Vuibert, 3ème edition - 224 pages.

	MODULE DESCRIPTION	**Department : Industrial Engineering**
		Date : 15/10/2021
		N° version : 02
		Semester : 02

Business Finance

Code : MGIND 12.16

GM1-2

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession
×			

Teacher :Dr. Med Achraf KAMMOUN

Status : Permanent

Mail :kammounmedachraf@gmail.com

Courses	Practicalworks	Individualwork	Total volume
30	**--**	**20**	**50 h**

Coefficient:	ECTS credits :
2	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department : Industrial Engineering**
		Date : 15/10/2021
		N° version : 02
		Semester : 02

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

1.1: Description

Fundamentals of valuation (financial mathematics): the importance of the interest factor in decision making and its application in the valuation of personal loans and mortgages, common and preferred shares and bonds by learning to effectively manipulate certain functions of the calculator and software such as Excel. Financial analysis related to the establishment of a financial diagnosis using the ratio method and its decomposition according to the Dupont model by introducing the concept of risk. Concrete cases to illustrate both these techniques and the limits of these tools.Short and medium term financial planning with an introduction to working capital management: define, explain and apply the principles of forecasting financial statements, cash flow management, accounts receivable and payable and inventory management with emphasis on the risk-return-liquidity balance.Use of information technology (electronic funds transfer, electronic document exchange, etc.) in working capital management.

Objectives

The finance course is a course that provides knowledge of the company's situation in order to provide tools to help make decisions at the company level, whether in the short or long term.

The main financial decisions to be made by a company fall into two categories:

The financing choice: this is the decision concerning the sources of financing for the firm's activity, given the costs and risks.

Investment choice: this is the decision about how to allocate the resources raised in an optimal way in order to maximise the value of the firm.

1.2: Prerequisites :

General accounting.

Upstream Modules	Taught Module	Downstream Modules
	Business Finance	

1.3 :LearningOutcomes :

Chapter	Title	Duration	Learning Outcomes
Chapter 1: Financial Reporting	Introduction: Section I: the accounting balance sheet; Section II: the limitations of accounting information; Section III: The Financial Balance Sheet;	**6hrs**	The student is able to: - Master the essential concepts of finance; - Differentiate between the accounting and financial balance sheet;
Chapter 2: Financial Balance Analysis	Section I: Working Capital;	**7 hrs**	The student is able to: - Analyse the financial situation of

	Section II: Working Capital Requirements; Section III: Net Cash Flow		a company; - Interpret the results of the financial balance and propose optimal solutions;
Chapter 3: **Financial Mathematics**	Section I: Simple interest; Section II: Compound interest; Section III: Constant Annuities; Section IV: Proportional Rate and Equivalent Rate;	**7hrs**	The student is able to: - Differentiate between different types of interest; - Differentiate between the situations of discounting and capitalisation; - choose the method of calculating the future value and the present value of a sum or a sequence of years.
Chapter 4: **Choosing to invest in Avenir Certain**	Introduction Section I: Classification of investments; Section II: Investment decision-making process; Section III: Investment appraisal; Section IV: Project Selection; Section V: Investment Selection Criteria; Section VI: Comparison of NPV and IRR criteria;	**10hrs**	The student is able to: - Define the concept of investment, - Evaluate an investment project based on the investment criteria; - Differentiate between liquidity and profitability criteria;

2.METHODOLOGY

*Written assignments and/or

*Presentations (written and oral)

Integrated courses (h)	30hrs
Practicalwork (h)	
Project (h)	
Visits (h)	

3.Assessment:

Designation	Chapter(s)	Rating
Mini-project		
Practical works		
Continuous assessment		30 %
Presentation		
Final Exam		70 %

4. Bibliographicreferences :

Berk J., P. DeMarzo: Finance d'entreprise, Ed. Pearson

- **Harb E., Veryzhenko I., Masset A., Murat P.:** Finance (Dunod, 2014)
- **Bodie Z., R. Merton:** Finance, Ed. Pearson

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

Module: Manufacturing Technology

Code: MIND12.17

Module group: GM1-3

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the practice of profession
X			X

Teacher: Khlif Mohamed

Status : Assistant Professor

E - Mail: Mohamed.khlif@enis.tn

Course	Laboratory and Practical works	Personal work	Total volume
24 h	**15 h**	**20 h**	**59 h**

Coefficient :	ECTS credits :
2,5	**2**

	Module Description	Department :Industrial Engineering
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

The aim of the course and the practical work is to provide students the methodology of materials manufacturing techniques (turning, milling, grinding, and drilling). The main goals of the course are to enable the acquisition of basic knowledge in the field of machining parts (operations, tools, cutting conditions, measuring instruments).

1.2 Objectives

- Seelect the cutting tool per operation in the machining range
- Select the cutting conditions (speeds, feeds, depth of cut)
- Calculate the machining time
- Setting up turning, milling and grinding machines
- Part machining (face milling, surfacing, grooving, centring, drilling, counter boring, tapping),
- Dimensional control of functional specifications (dimensions, geometric tolerances and roughness).

1.3 Prerequisites:

Upstream modules	Module taught	Downstream modules
	MGIND12.117	

1.4 Learning outcomes

Chapter	Title	Duration	Learning outcomes
Chapter 1	General introduction on material shaping	2 h	Overview on manufacturing methods
Chapter 2	Turning	5 h	At the end of these chapters students will be able to identify machine tools and machining operations
Chapter 3	Milling	5 h	
Chapter 4	Drilling, reaming and tapping	4 h	
Chapter 5	The rectification	4 h	
Chapter 6	Choice of cutting conditions	5 h	At the end of these chapters students will be able to select cutting tools and cutting methods
Chapter 7	General information on non-conventional machining methods (HSM)	5 h	
Practical work	Lab activity: 1 turning Lab activity 2 : milling Lab activity 3: Grinding	15 h	At the end of these activities, students will be able to machine parts in turning and milling and select the necessary cutting tools

2. METHODOLOGY

The course is based on a methodology combining lectures, tutorials, practical work and individual work.

The face-to-face integrated courses combines lectures and tutorials. Students are asked to complete personal work in the classroom and present it as a lecture. The practical work allows the application of the concepts studied during the course

Integrated courses (h)	30 h
Labs and Practical work (h)	15 h
Project (h)	28 h
Visits (h)	12 h

3. Assessment

Activity	Chapter(s)	Weighting
Mini-project		
Practical works	1 à 7	0.25
Continuous assessment	1 à 4	0.25
Presentation		
Final Exam	1 à 7	0.5

4. Bibliographic References

[1] Engineering Technique

[2] Machining: Processes and Methods, W. Bouzid - CPU 2004

[3] Mechanical Manufacturing, Course Notes and Corrected Exercises J. Ben Younes - CPU 2008

	Module Description	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

Module: Computer graphics (computer-aided design)

Code: MGIND12.18

Module group: GM1-3

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the practice of
		x	x

Teacher : Dorra Trabelsi

Status : Assistant Professor

E-Mail: dorraso@gmail.com

Course	Practical work	Personal work	Total volume
	48 h	25 h	73 h

Coefficient :	ECTS credits :
2.5	3

	Module Description	Department :Industrial Engineering
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

- This course provides students with an overview of the techniques for representing a curve using CAD and the associated geometrical transformations. During the practical sessions, the student will be able to use the CAD software SOLIDWORKS and the CAD software CATIA and apply what he/she has seen in class.

1.2 Objectives

- Ability to define the path of a complex curve using a parametric equation
- Ability to apply geometric transformations to any point in space
- Ability to use SOLIDWORKS design software
- Design mechanical parts by extrusion, revolution and multi-extrusion
- Carrying out analyses and numerical simulations (example: calculation of VON MISES stress using CATIA V5)

Production of surface parts and Assembly of mechanical parts (example: a four-cylinder ICE engine) Animation of a mechanical assembly

1.3 Prerequisites:

- Technical drawing, Mechanical design -

Upstream modules	Module taught	Downstream modules
--	**MGIND12.18**	

1.4 Learning outcomes

Activity	Title	Duration	Learning outcomes
Lab activities 1 and 2	3D part design	12H	At the end of this course, students will be able to draw 3D parts by extrusion, revolution and scanning
Lab activity 3	Creation of assemblies	12H	At the end of this course, students will be able to assemble parts with constraints
Lab activity 4	Digital simulation	6H	At the end of this course, students will be able to simulate parts under imposed load

Lab activity 5	Introduction of CATIA V5 software - Creation of parts by extrusion - Creating parts by revolution -Creation of parts by	21 h	The student will be able to design and assemble parts using Catia V5 Calculation of VON MISES stress using CATIA V5
Lab activity 6	-Assembly of parts - Design and animation of a single stage gear system		

2. METHODOLOGY

Integrated courses (h)	
Labs and Practical work (h)	48 h
Project (h)	25 h
Visits (h)	

3. Assessment

Acivity	**Chapter(s)**	**Rating**
Mini-project		0.5
Practical work		0.5
Continuous monitoring		
Presentation		
Final Review		

4. Bibliographic References

[1] SolidWorks® Software Student Guide *solidworks tutorial pdf*,

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 2

Module: Power and Motion Transmission I

Code: MGIND12.19

Module group: GM1-3

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the practice of profession
		x	x

Teacher: Georges Kantchev

Status: Professor

Mail: georges.kantechev@gmail.com

Course	Laboratory and Practical works	Individual work	Total volume
30 h	15 h	20 h	65 h

Coefficient :	ECTS credits :
2,5	2

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

Engineering education requires much more than knowledge of the characteristics of power transmission components. For mechanical engineering designer, it is necessary to address the dynamic behaviour of mechanical assemblies to succeed in the adequate selection of power transmission components between the driving machine and the receiving machine. On the other hand, the selection of power transmission components such as coupling, clutch and brake, based on technical documentation, is essential for a mechanical engineer.

1.2 Objectives

- This course provides students with knowledge about the mechanical characteristics of machines and the dynamic modelling of mechanical systems.
- Students should know the technology and construction of the main components of power transmission couplings, clutches, brakes.
- Students are able to select and calculate the main power transmission and braking components.

1.3 Prerequisites

Knowledge of General Mechanics
Mechanical design course

Upstream modules	Module taught	Downstream modules
	MGIND12.19	

1.4 Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Chapter 1	Power transmission devices.	3 h00	Application and classification of power transmission devices.
Chapter 2	Driving and receiving machines.	4 h00	Mechanical characteristics definition
Chapter 3	mechanical assemblies	4 h00	Dynamic modelling of mechanical assemblies. Operating regimes.
Chapter 4	Rigid and elastic couplings.	4 h00	Classification, technology and selecion. Resonance phenomena avoidance

Chapter 5	Clutches and couplers.	3 h00	Classification, control systems, technology.

Chapter 6	Brakes and braking theory	12h00	- Brakes and braking theory in the case of industrial mechanical systems - Mechanically operated brakes - Hydraulic, pneumatic and electrically operated brakes. - ABS braking system.
Practical work	Lab activity 1: Moment of inertia of a crank-crank system	5h	Experimentally determine the moment of inertia of a mechanical assembly (crank mechanism of an internal combustion engine) and demonstrate that it is variable as a function of a positional parameter.
	Lab activity 2 : Simple universal joints and constant velocity joints	5h	Study of a simple universal non-homokinetic joint (Hook joint). Study a constant velocity joint and compare its behaviour to that of the simple universal joint
	Lab activity 3: Oldham Joint	5h	Study the characteristics of an Oldham joint and understand how it works

2. METHODOLOGY

Integrated courses (h)	30
Labs and Practical work (h)	15
Project (h)	40
Visits (h)	10

3. Assesement

Activity	Chapter(s)	Rating
Mini-project		
Practical works		0.25
Continuous assessment		0.25
Presentation		0.5
Final Exam		

4. Bibliographic References

[1] Robert LE BORZEC, Gearboxes, Techniques de l'Ingénieur, B5640.

[2] Bernard KOHLER & Edgard SZTRYGLER, Mechanical Chains, Techniques de l'Ingénieur, B5650.

[3] René HULIN, Gearboxes, Techniques de l'Ingénieur, B5660.

[4] Roland FARGES, Pulleys and transmission belts, Adhesion drive, Techniques de l'Ingénieur,

B5680

[5] Hamilton H. Mabie and Charles F. Reinholtz, Mechanisms and dynamics of machinery . Fourth edition. 1987

[6] Michel Aublin, René Boncompain, Michel Boulaton,Daniel Caron Emile Jeay, Bernard Lacage , Jacky Réa , Systèmes Mécanique théorie et dimensionnement, Dunod

	Module Description	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 2

Module: Automation I (Analysis of dynamic and continuous systems)

Code: MGIND12.20

Module group: GM1-4

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the practice of profession
		x	

Teacher : Omaya Bellaaj

Status : Assistant Professor

E-Mail: bellaj_omaya@hotmail.fr

Course	Laboratory and Practical works	Individual work	Total volume
30 h	15 h	15h	60h

Coefficient :	ECTS credits :
2	2

	Module Description	Department :Industrial Engineering
		Date : 15/10/2021
		Version N°: 2
		Semester : 2

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

This course is an introduction to Automatic Control commonly qualified as the science of automatisms. The study, analysis, synthesis and the implementation of control systems is provided to students

1.2 Objectives

This first year course aims to introduce the main concepts of Automatic Control: system modelling, the feedback control structure, the study and representation of first and second order system transfer functions. In order to implement and use these concepts, mathematical tools (Laplace Transform) are presented and studied in detail and is considerd as the the technical core of this course.

1.3 Prerequisites

- Solving differential equations,
- Basic mathematics.

Upstream modules	Module taught	Downstream modules
	MGIND12.20	

1.4 Learning outcomes

Chapter	Title	Duration	Learning outcomes
Chapter 1	Control systems	9h	- Examples of Physical System Modelling - Example of control systems - Systems and signals - Electrical and dynamic systems Electromechanical analogy Applications
Chapter 2	Mathematical concepts: Laplace transformation	9h	Definition of the Laplace transformation Properties Application to the response of a linear system: transfer function

2. METHODOLOGY

- The Contact Hours consist of the presentation of the training objectives and the programme.
- Directed and structured activation of students' prior knowledge using structuring methods.
- Concrete use of the resources provided to students: treatment, deepening, exercise, application, consolidation of new knowledge

Integrated courses (h)	30h
Labs and Practical work (h)	15h
Project (h)	10h
Visits (h)	10h

3. Assessment

Activity	**Chapter(s)**	**Rating**
Mini-projet		
Travaux Pratiques	Chapter 1-2-3	0.25
Contrôle continu	Chapter 1-2-3	0.25
Exposé		
Examen Final	Chapter 1-2-3	0.5

4. Bibliographic References

[1] J. Nagrath, M. Gopal, Contro Systems Engineering, Willy Eastern Limited, New Delhi, 1982. [2]

P. de Larminat, Y. Thomas, Automatique des Systèmes Linéaires - Tomes 1:

[3] Signals and Systems and 2: Identification, Ed. Flammarion Sciences, Paris, 1977. [4]

Thomas Kailath, T. KAILATH - Linear systems, Information and System Sciences

[5] Series - Prentice Hall, Englewood, 1988;

[6] Francis Milsant, Asservissements Linéaires, T1- Analyse, T2- Synthese, Eyrolles, Paris, 1971

[7] Yves Granjon , Linear, non linear, state time systems...Collection : Sciences Sup, Dunod, September 2015

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 2

Module: Electrical engineering

Code: MGIND12.21

Module group: GM1-4

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the practice of profession
		x	x

Teacher : Rafik Neji

Status: Professor

E-Mail: rafik.neji@gmail.com

Course	Laboratory and Practical works	Individual work	Total volume
30 h	**15 h**	**30h**	**75 h**

Coefficient :	ECTS credits :
2,5	**3**

	Module Description	Department :Industrial Engineering
		Date : 15/10/2021
		Version N°: 2
		Semester : 2

1. COURSE DESCRIPTION AND TARGET COMPETENCIES

1.1 Description

Study of the single-phase circuit: Definition of the sinusoidal quantity, Presentation and properties of sinusoidal quantities, Impedance and Admittance of a circuit, Study of circuits in steady state, Active power, reactive power, apparent power, Laws relating to powers, Power factor, Improvement of the power factor, other concepts.

Study of balanced three-phase systems: Definition, Usual set-ups - Star set-up - Delta set-up, Active power, reactive power, Laws relating to power, Different set-ups for measuring active and reactive power, Improvement of the power factor, Practical notions.

1.2 Objectives

The aim of this module is to familiarise engineering students with the specific concepts of this discipline, which will enable them to practice their future profession in an extremely vast field of application. The application covers many industrial companies, in the fields of production and transport of electrical energy, in electrical equipment, in transport using electric motors, in power electronics and microelectronics

1.3 :Prerequisites

Upstream modules	Module taught	Downstream modules
Preparatory studies in : - Mathematics (Complex numbers and Trigonometry) - Basic electricity	**MGIND12.21**	

1.4 Learning outcomes

Chapter	Title	Duration	Learning outcomes
Chapter 1	Single-phase AC circuit	15h	- Mastery of single-phase electrical circuits for the calculation of various electrical quantities

Chapter 2	Balanced three-phase systems	15h	- Mastery of balanced three-phase systems for the correct selection of the load assembly, for the calculation of the various electrical and energy quantities, and for the measurement of power
Practical work	- Presentation of test rig, safety procedures and equipment to be used - Lab activity 1: Single-phase AC circuit - Lab activity 2: Power measurement for a balanced three-phase system	15h	Mastery of the reading of nameplates, selection of measuring equipment and the analysis of the characteristics recorded

2. METHODOLOGY

- Presentation of the objectives of the subject and the goals to be achieved.
- Directed and organised activation of students' knowledge using structuring methods.
- Use of the resources prescribed to the students: processing, deepening, consolidation of the required knowledge, exercises and industrial applications.
- The contact hours consist of presenting different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For individual activities, students have to do homework assignments.

Integrated courses (h)	30h
Labs and Practical work (h)	15h
Project (h)	10h
Visits (h)	30h

3. Assessment

Activity	**Chapter(s)**	**Rating**
Mini-project		
Practical works	1 and 2	25%
Continuous assessment	1	25%
Presentation		
Final Exam	1-2	50%

4. BIBLIOGRAPHICAL REFERENCES

[1] J. Lessenne, F. Notelet, G. Seguier, Introduction à l'Electrotechnique approfondie, Lavoisier, 1994,

[2] G. Seguier, F. Notelet, Electrotechnique Industrielle, 3 ème Edition, Lavoisier, 2006,

[3] F. Warne, P. Maye, Génie Electrotechnique, Dunod, 2013,

[4] Th. Wildi, Electrical Engineering, 3 ème Edition, 2000,

[5] R. Bourgeois, D. Cogniel, MémotechElectrotechnique, Collection A. Capliez, 2002.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 2

Module : ***Heat transfer***

Code : ***MGIND12.22***

Module group : ***GM1-5***

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the practice of profession

Teacher: ***Yasser Rahmani***

Status: ***Maître assistant***

E-Mail: ***rahmaniyasser@gmail.com***

Courses	Laboratory and Practical works	Individual work	Total volume
30h	***21h***	***24h***	***75 h***

Coefficient :	ECTS credits:
2.5	***3***

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department : Industrial Engineering**
		Semester: *2*
		Version N°: 2
		Date : 15/10/2021

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

This course provides the necessary knowledge to study the different modes of heat transfer: Conduction, Convection, Radiation. The course also provides the student with the methodology to establish an energy balance for a system that exchanges energy with its environment and to determine how to limit or improve heat transfer within different systems (thermal insulation, fins, etc.)

1.2 Objectives

- Understand the principles of heat and heat transfer
- Master the main modes of heat transfer

1.3 Prerequisites:

Thermodynamics, Fluid mechanics, Mathematical tools

Upstream modules	Module taught	Downstream modules
	MGIND12.22	

1.4 Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Chapter 1	General introduction	4 H	Understand the principle of the different modes of heat transfer: - Definition of fundamental quantities - Formulation of a heat transfer problem - Heat transfer modes
Chapter 2	Conduction	8 H	Master Fourier's law and learn about transient conductive transfer: - Fourrier's Law - Unidirectional heat transfer - Transient conduction

Chapter 3	Convection	6 H	Study of the convection coefficient h : - Forced convection - Natural convection
Chapter 4	Radiation	4 H	Acquire the basic concepts of radiation transfer: - definitions
			- Blackbody radiation - Heat exchange between any bodies
Chapter 5	Heat exchangers	8 H	Learn the methodology for calculating heat exchangers: - Heat exchanger technology - DTLM method - NUT method.
Practical work	Lab activity 1: Study of conduction in plane and cylindrical geometries Lab activity 2: Heat exchange by convection Lab activity 3: Study of a water-air radiator	5 H 5 H 5 H	Experimental determination of the thermal conductivity of different materials Study of heat transfer by forced convection in a cylindrical pipe (counter-currents and co-currents) Study of heat transfer in the case of a radiator)

2 METHODOLOGY

Integrated courses (h)	30
Practical work (h)	15
Project (h)	40
Visits (h)	

3 Evaluation

Designation	**Chapter(s)**	**Weighting**
Mini-project		
Practical work	Ch2 Ch3 Ch5	25%
Continuous monitoring	CH1 Ch2 Ch3	25%
Presentation		
Final Review	Ch1 Ch2 Ch3 Ch4 Ch5	50%

4 Bibliographic References

- J-L. Battaglia, A. Kusiak , J-R. Puiggali, Introduction aux transferts thermiques, Dunod, Paris, 2010
- J.P. Couderc, C. Gourdon, A. Liné, Phénomènes de transfert en génie des procédés, Lavoisier, Paris, 2008.
- J.M., Coulson, J.F., Richardson, Chemical Engineering: volume 1, Fluid Flow, Heat transfer and mass transfer, Elsevier, 1980
- R. Leleu, Heat Transfers, Techniques de l'Ingénieur, J1080
- J. H., Lienhard, A Heat Transfer Textbook, Phlogiston Press, Cambridge, 2003
- A. Fortier, Mécanique des fluides et transferts de chaleur et de masse par convection, Masson, 1975

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**DESCRIPTION OF THE MODULE**	**Engineering Training Cycle: Electromechanical Engineering** **1ère year Semester: 2** **Version number: 02** **Date: 15/10/2021**

Module: Mini project

Code: MGIND12.23

Module group: GM1-6

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
		x	x

Teacher : Frikha Moez

Status : Assistant Professor

Mail: frmoez@gmail.com

Course	Practical work	Personal work	Total volume
- h	30 h	25 h	55 h

Coefficient :	ECTS credits :
1	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**DESCRIPTION OF THE MODULE**	**Engineering Training Cycle: Electromechanical Engineering** **1ère year Semester: 2** **Version number: 02** **Date: 15/10/2021**

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

The mini-projects are an opportunity for the student to deepen and apply the knowledge acquired during the courses. The student learns how to divide the provided time of the project between analysis and understanding of the problem. They also learn to check and propose optimal solutions

1.2 Objectives:

- Drawing up the specifications for a project according to requirements.

- Propose technological solutions for design, transmission and control and select the best among the proposed solutions.

- Designing a mechanical system

1.3 Prerequisites:

- Mechanical design

- Strength of materials

Upstream modules	Module taught	Downstream modules
	MGIND12.23	

1.4 Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Practical work	- Study of the existing situation and problematic - Formulation of the specifications Bibliographic study - Functional analysis and selection of solutions - Design with Solidworks		- Understand the relationships between the system under study and the environment around it. - Define all the parameters to be taken into account for the proper running of the system. - Propose technological solutions to ensure system operation

2. METHODOLOGY

Integrated courses (h)	—
Practical work (h)	30 H
Project (h)	25 H
Visits (h)	—

3. Evaluation

Designation	Chapter(s)	Weighting
Mini-project	————	
Practical work	————	0.5
Supervised Homework	————	
Presentation	————	0.5
Final Review	————	

4. bibliographical references

[1] Guide de calcul en mécanique, *D. SPENLE & R. GOURHANT*, Hachette, edition n°3, 2001.

[2] Guide du dessinateur industriel, *A. CHEVALIER*, Hachette, 2004.

[3] Mémotech Productique: conception et dessin, *C. Barlier& R. Bourgeois*, Casteilla, edition n°3, 1995.

[4] Mémotech Génie Mécanique, C. Barlier& B. Poulet, Casteilla, edition n°3, 1995.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 2

Module: Continuous Media Mechanics

Code: MGIND12.24

Module group: GM1-6

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the practice of profession
x	x		

Teacher : Chokri Ben Selem

Status : Assistant Professor

Mail: bensalem.chokri@yahoo.fr

Course	Laboratory and Practical works	Individual work	Total volume
30 h	- h	30 h	60 h

Coefficient :	ECTS credits :
2	2

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

This course provide the student with the basic knowledge (techniques and issues) of Continuum Mechanics.

1.2 Objectives

The aim of this module is to enable the student to:

- Understand and become familiar with the concepts of stresses and strains for a continuous medium. For stresses, be able to relate make a formulation using Cauchy tensor.
- Discover the problems of behavioural laws and apply them to real examples,
- Know how to propose a mechanical problem and interpret the results.
- Know how to use the right techniques to solve a problem in continuum mechanics

1.3 Prerequisites

Basic knowledge of material properties and classical mechanics

Upstream modules	Module taught	Downstream modules
	MGIND12.24	

1.4 Learning outcomes

Chapter	Title	Duration	Learning outcomes
Chapter 1	Tensor analysis : - Concept of partial derivatives Enstein's convention - Tensor,: definition, properties of tensors, frame change - Vector analysis formulas, (Cartesian, cylindrical and spherical coordinate systems) - Introduction to continuum mechanics	7h	At the end of this chapter the student will be able to: - to understand tensors and their properties, - Understand index notation and vector functions in the Cartesian, cylindrical and spherical coordinate systems.
Chapter 2	Study of a continuous medium strain. Extensiometry	7h	At the end of this chapter the student will be able to: - to understand the strain tensor, - calculate, analytically and graphically by Mohr's circle representations, the relative strain, elongation and slip, - to understand the practical techniques of strain measurement (extensiometry).
Chapter 3	Stresses in a continuous medium	5h	At the end of this chapter the student will be able to: - understand the Cauchy tensor, - determine, analytically and graphically by Mohr's circle representations, the normal and tangential stresses exerted on a surface, - Formulate the equations of dynamics.
Chapter 4	Behavioiur Laws	2h	At the end of this chapter the student is able to relate the strain tensor to the stress tensor.
Chapter 5	strain energy	2h	At the end of this chapter the student is able to calculate the strain energy.
Chapter 6	Methods for solving linear elasticity problems	5h	At the end of this chapter the student is able to use the Lame-Navier and Beltrami methods for solving linear elasticity problems.
Chapter 7	Elastic limit criteria	2h	At the end of this chapter the student is able to understand the elastic limit criteria: Rankine, Tresca and Von-Mises criteria

2. METHODOLOGY

Integrated courses (h)	30h00
Labs and Practical work (h)	
Project (h)	30h00
Visits (h)	

3. Assesement

Activity	Chapter(s)	Rating
Mini-project		
Practical works		
Continuous assessment	1 à 4	0.25
Presentation		
Final Exam	1à 7	0.75

4. References :

[1] L. CHEVAIER, Mechanics of systems and deformable media, ellipse, 2004,

[2] D. DESJARDIN and Marie TOUZET, Introduction à la mécanique des milieux continus, Ed Dunod, 1999.

[3] G. Duvaut, Mécanique des milieux continue, ed, Masson, 1990

[4] P. Germain and P. Muller, Introduction à la mécanique des milieux continus, ed, Masson, 1995. [5] D. Calecki, Phydique des milieux continus T2, ed. Hermann, 2007

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**DESCRIPTION OF THE MODULE**	Engineering Training Cycle: Electromechanical Engineering 2nd year Semester: 1 Version number: 02 Date: 15/10/2021

Module: English II

Code: MGIND12.10-2

Module group: GM1-7

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
	X		X

Teacher : Mariem Feki

Status : Master assistant

Mail: fekimariem@gmail.com

Course	Practical work	Personal work	Total volume
24 h	- h	24h	44 h

Coefficient :	ECTS credits :
1	1.5

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

1.1 Description

Students should have a knowledge about Electro- mechanical field. Vocabulary of mechanical and electrical plants and sites, as well as structures and expressions frequently used in the field.

Students should gain the skills of explaining a problem in the field of electromechanical engineering. They should also describe faults and their solutions. Finally, students should acquire the ability to communicate in English for specific purposes.

Students would be able to pronounce accurately. In addition, students would learn preliminary grammar rules and phonetics in order to be able to produce essays and talks.

1.2 Objectives:

Students should be able to understand talk and write properly in English in their electro-mechanical domain

Have students who are able to present new projects and systems in academic and professional contexts.

Have students who are able to transfer their communication skills in international contexts.

1.3 Prerequisites:

Students of Electro-mechanical engineering should have a level of A2 to B1 in written composition and reading. A level of B1 to B2 in speaking and reading. Levels are identified according to a placement test by the Common European Framework of Languages.

Upstream modules	Taught module	Downstream modules
MGIND12.10-1	**MGIND12.10-2**	

1.4 Learning outcomes:

Chapters	Title	Duration	Learning outcomes
Chapter 1	I- Placement Test	4 h	In this session, students should identify their level in written and spoken English, in order to build on the missing areas. Grammatical revision is done through the test.

Chapter 2	Electromechanical faults and repairs Language: describing a series of actions, giving a series of instructions Present simple and imperatives. talking about works in progress Vocabulary: maintenance and equipments 1- at a pit stop lane (fuel, wheel,) 2- robots (describing parts, functions, processes)	6h	d In this unit, students learn how to express any fault, leak or misuse of equipments and mechanical devices. Students should be able to express eliberately what happens on site. Presenting a project and using specific techniques of communication to describe the functioning of a mechanical tool or device.
Chapter3	Manufacturing plates 1- car assembly line 2- Tunnel drill Language: past simple and future forms Vocabulary: car assembly line, tools and devices, comparing items, dimensions and specifications. road signs.	6h	Students should be able to know the mechanics and systems of assembling and manufacturing, At the end of the unit, students are asked to present big projects or famous advances in the world of electro-mechanical engineering. Presentations should be conforming to the international standards of presentations in academic contexts.
Chapter4	How to read, summarize and paraphrase scientific articles. How to prepare a presentation. How to present.	4 h	At the end of this unit, students should be aware of the steps and parts of a research paper. They should be able to prepare a short presentation according to the basic formal and content requirements.
Practical works	Continuous presentations (at least one every session)	4 h	Assessing the skills of expressing ideas in English.

2.METHODOLOGY :

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the individual activities, students have to do homework assignments.

Integrated courses (h)	24hrs
Practicalwork (h)	
Project (h)	
Visits (h)	

3. Assessment:

Designation	Chapter(s)	Rating
Mini-project		
Practical works		
Continuous assessment		10%
Presentation		10%
Final Review		80%

GIND 2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department :Industrial Engineering** **2nd year Semester: 1** **Version number: 02** **Date: 15/10/2021**

MathematicsII

Code : MGIND21.26

Groupe de module :GM2-1

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession
	x		

Teacher :Bassem Ben Hamed

Status : Temporary

Mail :bassem.benhamed@gmail.com

Courses	Practicalworks	Individualwork	Total volume
24 h		**24h**	**48h**

Coefficient:	ECTS credits :
2	2

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

1.1: Description

The engineering sciences require the use of mathematical tools when writing calculation software or solving equations. These methods must be perfectly mastered to be applied efficiently.

Objectives

This course lays the foundations of mathematical analysis and provides all the necessary knowledge, from the methods of solving differential equations to the use of the Fourier transform and functional analysis.

1.2: Prerequisites :

Upstream Modules	Taught Module	Downstream Modules
MGIND11.01	MGIND21.26	

1.3 :LearningOutcomes :

Chapter	Title	Duration	Learning Outcomes
Chapter 1	Fourier sequences	6hrs	Dirichlet's theorem. Jordan's theorem. Non-periodic case. Parseval'sequality.
Chapter2	Fourier transform	6hrs	Fourier transform for functions. Inversion. Derivation. Convolution. Parseval-Plancherel theorem. Fourier transform of distributions.
Chapter 3	Laplace transform	6hrs	Link between laplace and Fourier. Abscissa of summability. Inversion. Convolution. Application to the solution of differential equations. Calculation of transfer functions in electronics.
Chapter4	Z-transformation	6hrs	Decomposition into simple fractions. Linearity. Shift and transform. Derivation. Convolution. Product of sequences. Initial value.
PWs			

2.METHODOLOGY

The pedagogical approach of this course is based on a deep understanding of the methods rather than on the computational aspect. This means that the examples chosen are primarily intended to illustrate different aspects of the methods and to highlight their advantages and disadvantages. This approach is partly justified by the fact that more and more engineers use software tools.

Integrated courses (h)	24hrs
Practicalwork (h)	
Project (h)	
Visits (h)	

3.Assessment:

Designation	**Chapter(s)**	**Rating**
Mini-project		
Practical works		
Continuous assessment	Chapters 1& 2	0.25
Presentation		
Final Exam	Chapters 2 & 3	0.75

4.Références Bibliographiques

[1] J.M. Poitevin, Outils mathématiques pour physiciens et ingénieurs, Edition DUNOD.

[2] L. Leroyer, P. Tesson, Mathématiques pour l'ingénieur, exercices et problèmes, Edition DUNOD

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department :Industrial Engineering** **2nd year Semester: 1** **Version number: 02** **Date: 15/10/2021**

Module: Numerical Analysis

Code: MGIND21.27

Module group: GM2-1

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
X	X		

Teacher : Bassem ben Hamad

Status: Professor

Mail: bassem.benhamed@gmail.com

Course	Practical work	Personal work	Total volume
24 h		40h	64 h

Coefficient :	ECTS credits :
1,5	2.5

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

This course aims to :

- Develop basic skills in numerical analysis (convergence of algorithms, error analysis, and correct formulation of problems in mathematical form).
- Practice the implementation of these skills by making optimal use of all available resources (efficient programming, visualisation of results, etc.)

1.2 Objectives

The aim of this course is to provide an overview of the main elementary numerical methods and to cover the following topics in particular:

- Roots of an algebraic equation
- Systems of linear and non-linear equations
- Interpolation
- Equations and systems of differential equations

1.3 Prerequisites:

Upstream modules	Module taught	Downstream modules
	MGIND21.27	

1.4 Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Chapter 1	Interpolation	8h	Vandermonde matrix. Lagrange interpolation. Newton's polynomial. Interpolation error. Cubic splines.
Chapter 2	Differential equations and systems	8h	Euler's method. Taylor's method. Runge Kutta methods of order 2 and 4. Systems of differential equations. Higher order equation.
Chapter 3	Systems of algebraic equations	8h	Bisection method. Fixed point method: Convergence and Aitken extrapolation. Newton's method: Convergence and the case of multiple roots. Secant method.

2. METHODOLOGY

Integrated courses (h)	24h00
Practical work (h)	
Project (h)	40h00
Visits (h)	

3. Evaluation

Designation	**Chapter(s)**	**Weighting**
Mini-project		
Practical work		
Continuous monitoring	Chapters 1 and 2	0.25
Presentation		
Final Review	Chapters 2 and 3	0.75

4. Bibliographic References

[1] A. Fortin, Numerical analysis for engineers. 4th ème edition, Presses Internationales Polytechnique. [2] J. Stoer, R. Bulirsch, Introduction to Numerical Analysis. Text in Applied Mathematics, Springer.

Module: Electrical diagrams (Electrical diagrams and protection)

Code: MGIND21.28

Module group: GM2-3

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
	X	X	

Teacher : Randa Kallel

Status : Master assistant

Mail: kallelranda1986@gmail.com

Course	Practical work	Personal work	Total volume
21 h	15 h	10h	46h

Coefficient :	ECTS credits :
1.5	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department :Industrial Engineering** **2nd year Semester: 1** **Version number: 02** **Date: 15/10/2021**

1. COURSE DESCRIPTION AND TARGET COMPETENCIES

1.1 Description

- Know the standards and symbols of the basic elements of electrical installations (domestic and industrial).
- Distinguish between electrical equipment according to its control, protection and safety functions.
- Be able to establish the lighting, control and power circuits of an electrical installation
- Study the starting and braking modes of asynchronous machines

1.2 Objectives

-Be able to design of electrical installations in the domestic and industrial fields

-Learn the different types of protection and control equipment as well as the dimensioning of electrical equipment for all types of applications.

- Put into practice the acquired knowledge during courses by building electrical circuits and apply them to control electric motor.

1.3 Prerequisites

Upstream modules	Module taught	Downstream modules
	MGIND21.28	

1.4 Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Chapter 1	Standardisation and electrical diagrams	6h	- Mastery of the concept of electrical diagrams, their classification, their representation and the identification of device terminals. - Knowledge of the symbols of the various protective, control and load devices
Chapter 2	Domestic Installations - Lighting Circuits Lighting	9h	Master and know the different domestic lighting installations and their implementation
Chapter 3	Starting of asynchronous motors	9h	Learn how to build electrical circuits for the different starting and braking modes of induction motors

Practical work	Presentation of test rigs, safety procedures and equipment to be used - Lab activity 1: Two-way and remote switch ignition assembly - Lab activity 2: reversing the direction of rotation of an asynchronous motor - Lab activity 3: Star-delta starting of an asynchronous motor	15h	Master the selection of control and protection devices for practical implementations of various domestic lighting and asynchronous motor starting set- ups

2. METHODOLOGY

- Presentation of the objectives of the subject and the goals to be achieved.
- Directed and organised activation of students' knowledge using structuring methods.
- Use of the resources prescribed to the students: processing, deepening, consolidation of the required knowledge, application exercises.
- The contact hours consist of presenting different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For individual activities, students have to do the exercises given as homework.

Integrated courses (h)	24h
Practical work (h)	15h
Project (h)	20h
Visits (h)	20h

3. EVALUATION

Designation	**Chapter(s)**	**Weighting**
Mini-project		
Practical work	2-3	25%
Continuous monitoring	1-2	25%
Presentation		
Final Review	1-2-3	50%

4. BIBLIOGRAPHIC REFERENCES

1. H. Largeaud, Le Schéma Electrique, 3 ème edition, Eyrolles, 2006,
2. Guide NFC 15-100,
3. P. Brynert, J. Schmucki, Safety in Electrical Installations, Electro Suisse, 2013,
4. T. Gllauziaux, D. Fedullo, Mémento de Schémas électriques, Tome2, Eyrolles,
5. El. Azzaag, Electrical Safety, Dodax, 2018.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department :Industrial Engineering** **2nd year Semester: 1** **Version number: 02** **Date: 15/10/2021**

Module: Electrical Machines II (AC Electrical Machines)

Code: MGIND21.29

Module group: GM2-3

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
	X	X	

Teacher : Rafik Neji

Status: Professor

Mail: rafik.neji@gmail.com

Course	Practical work	Personal work	Total volume
36 h	15 h	40h	91 h

Coefficient :	ECTS credits :
2,5	3

1. COURSE DESCRIPTION AND TARGET COMPETENCIES

1.1 Description

- Study and Analysis of the Iron Core Coil: Usefulness of iron, effects of saturation, effects of hysteresis, equivalent diagram, vector diagram, power balance.
- Study and analysis of the Single Phase Transformer: Operating principle, Main use of the transformer, No load operation of the transformer, Transformer ratio, Load operation of the transformer, Short circuit operation of the transformer, Equivalent diagrams, No load, load and short circuit power balances
- Study and control of the Synchronous Machine: components of the machine, Electromotive force, No-load operation, Load operation, Armature magnetic reaction, Equivalent diagram, Bhen-Eschumburg diagram, powers, losses, torques and efficiency, Operation of an alternator on an independent network, Operation of an alternator on a network of infinite power
- Study of the Asynchronous Machine: components and operation, Equation and equivalent diagram, Energy balance and electromagnetic torque, Testing of asynchronous motors, Starting of asynchronous motors.

1.2 Objectives

The student will be able to establish the general equations of electromechanical energy conversion applied to transformers, synchronous and asynchronous machines, and to determine and analyse their characteristics in static or variable regimes. It allows him to determine and analyse their characteristics in static or variable regimes taking into account their associations with static converters especially for applications related to electric and hybrid vehicles, renewable energies, wind turbines and photovoltaic panels.

1.3 Prerequisites

Upstream modules	Module taught	Downstream modules
	MGIND21.29	

1.4 Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Chapter 1	Iron core coil	12h	- Mastery of the study of the iron core coil, the importance and disadvantages of iron, the equation and the energy balance. - Analyse the phenomenon of saturation and hysteresis
Chapter 2	Single-phase transformer	12h	- To know the main use of the transformer in the field of long-distance energy distribution and transmission - Know how to equate and analyse its behaviour during no-load, short-load and full-load operation
Chapter 3	Synchronous machine	12h	- To know how to use this type of machine in alternator and motor operation and its application in the field of electric traction and wind turbines - Mastering its various functions in power plants
Chapter 4	Asynchronous machine	9h	- Study and analysis of the behaviour of the asynchronous machine when used as a motor - Equation and identification of its parameters for use in electric traction system
Practical work	- Presentation of test rig, safety procedures and equipment to be used - Lab activity 1: Single-phase transformer: different operating modes - Lab activity 2: Asynchronous machine: mechanical characteristics - Lab activity 3: Synchronous machine, alternator and motor operation - a balanced three-phase system	15h	- Mastering the reading of nameplates, the selection of measuring devices - Analysis and interpretation of the recorded characteristics

2. METHODOLOGY

- Presentation of the objectives of the module and the goals to be achieved.
- Directed and organised activation of students' knowledge using structuring methods.
- Use of the resources prescribed to the students: processing, deepening, consolidation of the required knowledge, exercises, industrial applications in the field of production, transport and distribution of electrical energy, as well as in electric power trains and wind turbines.
- The contact hours consist of presenting different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For individual activities, students have to do the exercises given as homework.

Integrated courses (h)	45h
Practical work (h)	15h
Project (h)	20h
Visits (h)	20h

3. EVALUATION

Designation	Chapter(s)	Weighting
Mini-project		
Practical work	2-3-4	25%
Continuous monitoring	1-2	25%
Presentation		
Final Review	1-2-3-4	50%

4. BIBLIOGRAPHIC REFERENCES

2. G. Seguier, F. Notelet, Electrotechnique Industrielle, 3rd ème edition, Lavoisier, 2006,

3. J. Chatelain, Machines Electriques, Volume X, Georgi edition, 1983,

4. Th. Wildi, Electrical Engineering, 3rd ème edition, 2000,

5. R. Bourgeois, D. Cogniel, MémotechElectrotechnique, Collection A. Capliez, 2002,

6. P. Arques, Conception et Construction des Moteurs Alternatifs, de la Théorie à la Conception, Ellipses, 1999,

7. S. Loutzky, Calcul Pratique des Alternateurs et des Moteurs Asynchrones, Eyrolles, 1969.

Module: Industrial Electronics

Code: MGIND21.30

Module group: GM1

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
x		x	

Teacher : Moez Ghariani

Status: Professor

Mail: moez.ghariani@gmail.com

Course	Practical work	Personal work	Total volume
30 h	**15 h**	**40h**	**85 h**

Coefficient :	ECTS credits :
2.5	3

	MODULE DESCRIPTION	**Department :Industrial Engineering**
		2nd year Semester: 1
		Version number: 02 **Date: 15/10/2021**

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

Know the main Power Systems.

Identify the performance of power components and define their criteria.

Establish the characteristics and performance of power systems

Design, implement and test different static converter architectures.

Analyse and evaluate linear power supplies.

Analyse and evaluate variable speed drives for DC rotating machines.

1.2 Objectives

- Mastery of the methods and tools of power electronics engineering: identification, modelling and resolution of even unfamiliar and incompletely defined problems, use of computer tools, analysis and design of power systems
- The ability to design, implement, test and validate innovative solutions, methods, products, systems and services in power electronics, related to the supply of electrical systems and the speed variation of rotating electrical machines.
- The ability to carry out fundamental or applied research activities, to set up experimental devices, to be open to the practice of collaborative work in the field of industrial electronics.
- The ability to find, evaluate and use relevant information related to the power supply of electrical systems and the speed variation of rotating electrical machines.

Prerequisites:

Upstream modules	Module taught	Downstream modules
	MGIND21.30	

1.3 1.3 Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Chapter 1	Introduction to static converters	3	Identify static converters
Chapter 2	Examples of power electronics applications in the industrial and domestic fields	6	Know the main Power Systems, their application and performance
Chapter 3	Power components	3	Establish the characteristics and performance of Power components
Chapter 4	Study of uncontrolled rectifiers (linear power supply)	9	Analyse and evaluate linear power supplies
Chapter 5	Study of controlled rectifiers (Variable speed drive)	6	Analysing and evaluating variable speed drives
Chapter 6	Study of UPS (Uninterruptible Power Supply)	3	Analyse and evaluate uninterrupted power supplies
Practical work	Lab activity 1.Testing and validation of uncontrolled rectifiers Lab activity 2. Testing and validation of controlled rectifiers Lab activity 3. Testing and validation of rectifiers Mixed	15	To set up experimental devices, to be open to the practice of collaborative work in the field of power electronics.

2. METHODOLOGY

Integrated courses (h)	30
Practical work (h)	15
Project (h)	
Visits (h)	

3. Evaluation

Designation	**Chapter(s)**	**Weighting**
Mini-project		
Practical work	CHP4 and ChP5	
Continuous monitoring	CHP1, CHP2, CHP3, and ChP4	
Presentation		
Final Review	All Chapters	

4. Bibliographic References

[1] Power Electronics - 10th ed: Structures, controls, applications (Engineering Sciences),Guy Séguier, Philippe Delarue, Francis Labrique, Dunod, 19 August 2015.

[2] Les alimentations électroniques - 3e édition : Technique et ingénierie, Pierre Mayé, Dunod, June 2018.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Department :Industrial Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 2

Module: Automation I (Analysis of dynamic and continuous systems)

Code: MGIND21.31

Module group: GM2-3

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the practice of profession
		x	

Teacher : Omaya Bellaaj

Status : Assistant Professor

E-Mail: bellaj_omaya@hotmail.fr

Course	Laboratory and Practical works	Individual work	Total volume
30 h	15 h	30h	75 h

Coefficient :	ECTS credits :
2.5	3

	Module Description	Department :Industrial Engineering
		Date : 15/10/2021
		Version N°: 2
		Semester : 2

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

This course is an introduction to Automatic Control commonly qualified as the science of automatisms. The study, analysis, synthesis and the implementation of control systems is provided to students

1.2 Objectives

This first year course aims to introduce the main concepts of Automatic Control:

system modelling, the feedback control structure, the study and representation of first and second order system transfer functions. In order to implement and use these concepts, mathematical tools (Laplace Transform) are presented and studied in detail and is considerd as the the technical core of this course.

1.3 Prerequisites

- Solving differential equations,
- Basic mathematics.

Upstream modules	Module taught	Downstream modules
	MGIND12.20	

1.4 Learning outcomes

Chapter	Title	Duration	Learning outcomes
Chapter 1	Control systems	15h	- Examples of Physical System Modelling - Example of control systems - Systems and signals - Electrical and dynamic systems Electromechanical analogy Applications
Chapter 2	Mathematical concepts: Laplace transformation	15h	-Definition of the Laplace transformation Properties -Application to the response of a linear system: transfer function

2. METHODOLOGY

- The Contact Hours consist of the presentation of the training objectives and the programme.
- Directed and structured activation of students' prior knowledge using structuring methods.
- Concrete use of the resources provided to students: treatment, deepening, exercise, application, consolidation of new knowledge

Integrated courses (h)	30h
Labs and Practical work (h)	15h
Project (h)	10h
Visits (h)	10h

3. Assessment

Activity	**Chapter(s)**	**Rating**
Mini-projet		
Travaux Pratiques	Chapter 1-2-3	0.25
Contrôle continu	Chapter 1-2-3	0.25
Exposé		
Examen Final	Chapter 1-2-3	0.5

4. Bibliographic References

[1] J. Nagrath, M. Gopal, Contro Systems Engineering, Willy Eastern Limited, New Delhi, 1982.

[2] P. de Larminat, Y. Thomas, Automatique des Systèmes Linéaires - Tomes 1:

[3] Signals and Systems and 2: Identification, Ed. Flammarion Sciences, Paris, 1977.

[4] Thomas Kailath, T. KAILATH - Linear systems, Information and System Sciences

[5] Series - Prentice Hall, Englewood, 1988;

[6] Francis Milsant, Asservissements Linéaires, T1- Analyse, T2- Synthese, Eyrolles, Paris, 1971

[7] Yves Granjon , Linear, non linear, state time systems...Collection : Sciences Sup, Dunod, September

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department :Industrial Engineering** **-Semester: 1** **Version number: 02** **Date: 15/10/2021**

Module: Renewable energy

Code: MGIND21.32

Module group: GM2-7

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession

Teacher : Taher Hmida

Status : Assistant professor

Mail: tahar.hamida@gmail.com

Course	Practical work	Personal work	Total volume
30 h	- h	30 h	60 h

Coefficient :	ECTS credits :
2	2

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 : Description

This course intends to give students a better understanding of the major challenges of the 21st century in terms of energy transition as well as the means of exploiting the various sources of renewable energy (sun, wind, water, geothermal, biomass).
The course will provide also an overview on nuclear applications in general and nuclear power generation in particular.

1.2 Prerequisites:

Basic knowledge in scientific fields (Maths, Physics, Chemistry..), engineering fields (mechanical, electrical, civil, geology...), heat transfer

Upstream modules	Module taught	Downstream modules

1.3 Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Chapter 1	Classification of renewable energies	6 H	This chapter provides knowledge on the classification and characteristics of the different types of renewable energy (wind, solar, geothermal, hydraulic, biomass...)
Chapter 2	*Solar Energy*	12 H	To gain knowledge of the technical and economic characteristics and parameters of solar energy in both applications: - Solar thermal energy - Photovoltaic solar energy
Chapter 3	*Nuclear Energy*	12 H	- Understand the advantages and disadvantages of using nuclear power reactors. - Describe and explain the different components of a nuclear power plant and associated applications

2. METHODOLOGY

Integrated courses (h)	30
Practical work (h)	
Project (h)	30
Visits (h)	

3. Evaluation

Designation	Chapter(s)	Weighting
Mini-project		
Practical work		
Continuous monitoring	CH1 Ch2	25%
Presentation		
Final Review	Ch1 Ch2 Ch3	75%

4. Bibliographic References

D.LLeGourières, Wind energy: Theory, design and practical calculation of installations, Paris: Eyrolles; 1980
L. Freris, D. Infield, Les Energie Renouvelable Pour La Production De L'électricité, DUNOD, Paris 2009
C. Laughton, Solar Hot Water: Design And Installation Of Solar Water Heaters, DUNOD, Paris 2012. J.Percebois, Solar Energy: Economic Perspectives (Energy and Society), 1975
Z. Chen, F. Blaabjerg, Wind Energy - The World's Fastest Growing Energy Sourc, IEEE Power Electronics Society Newsletter, 3, 15-18, 2006.

Module: Destructive and non-destructive testing of metals

Code: MGIND21.33

Module group: GM2-5

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession

Teacher : Trabelsi Chokri

Status : Master assistant

Mail: trabelsichokri2020@gmail.com

Course	Practical work	Personal work	Total volume
24 h	15 h	20h	59 h

Coefficient :	ECTS credits :
2	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department :Industrial Engineering** **2nd year Semester: 1** **Version number: 02** **Date: 15/10/2021**

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

Non-destructive testing allows, while respecting the integrity of the objects :

- Direct examination of parts and detection of surface and/or internal defects,
- Monitoring the in-service evolution of detected defects.

1.2 Objectives

The implementation of non-destructive testing requires knowledge of :

- the possibilities and limits of the processes that can be used,
- the history of the piece (form and method of manufacture),
- the defects to be detected (type, position, dimensions, etc.),
- the physical properties of the controlled material.

1.3 Prerequisites

Upstream modules	Module taught	Downstream modules
	MGIND21.33	

1.4 Learning outcomes

Knowledge of the laws of physics :

- Capillarity
- Magnetism
- Eddy current
- Wave physics

Chapter	Heading	Duration	Learning outcomes
Chapter 1	Presentation of Non Destructive Testing (NDT)	3	Know the basics of Eddy current control
Chapter 2	Visual examination - Optical procedures	5	Understanding how to make a visual inspection.

Chapter 3	Penetrant inspection	5	Master the principle of Penetrant inspection.
Chapter 4	Magnetic particle inspection and ultrasound	5	To master the principle of magnetic particle inspection and the principle of propagation of ultrasonic waves.
Chapter 5	Eddy currents	5	Know the basic principle of eddy current testing.
Chapter 6	Industrial radiography and tomography	6	To know the basic principle of X-ray and tomography control
Practical work	Lab activity 1. Penetrant Testing Lab activity 2. Magnetic particle inspection and ultrasound Lab activity 3. Radiography and tomography	15 h	To apply the concepts seen in the course:

2. METHODOLOGY

The course is based on a methodology combining lectures, tutorials, practical work and personal work.

The face-to-face sessions are of the integrated course type combining lectures and tutorials. Students are required to complete personal work in a non-classroom setting and to present it in class as a lecture. The practical work allows the application of the concepts studied during the course

Integrated courses (h)	24 h
Practical work (h)	15 h
Project (h)	15 h
Visits (h)	15 h

3. Evaluation

Designation	**Chapter(s)**	**Weighting**
Mini-project		
Practical work		0.25
Continuous monitoring		0.25
Presentation		
Final Review		0.5

4. Bibliographic References

- MEC6405-Experimental Stress Analysis - Course 7 - 2009
- MEC-761 Mechanical Testing and Non-Destructive Testing - Martin Viens, prof.
- Non Destructive Testing (NDT), J. Dumont-Fillon, Edition Technique de l'Ingénieur, Mesures et Contrôle (R1400)
- Non-destructive testing, M. Lacroix, Edition Technique de l'Ingénieur, (M110)
- Ultrasound, J. Sapriel, Edition Technique de l'Ingénieur, Electronique (E1910)

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department :Industrial Engineering** **-Semester: 2** **Version number: 02** **Date: 15/10/2021**

Module: Measurement and instrumentation of electrical systems

Code: MGIND22.34

Module group: GM2-7

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
x		x	

Teacher : Mouna Krichen

Status : Assistant professor

Mail: mona.krichene@gmail.com

Course	Practical work	Personal work	Total volume
24 h	15h	20 h	59 h

Coefficient :	ECTS credits :
2,5	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department :Industrial Engineering** **-Semester: 2** **Version number: 02** **Date: 15/10/2021**

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Descriptions

Study the industrial metrology of basic physical quantities: temperature, level, pressure and flow. Learn to wire and calibrate analogue and digital transmitters

1.2 Objectives

- Understand ISA standard for industrial instrumentation for reading IT plan-sheets
- Transmitter sensor for measuring various basic physical quantities: temperature, pressure, level and flow
- Calibration of an analogue and digital transmitter
- Pressure current converter, pressure current converter for transmission of standard signals in instrumentation

<u>Research perspectives of the course :</u>

- Industrial network of instruments and signal conditioners
- Intranet network
- iot (internet of things) sensors for industry 4.0

1.3 Pre-requisite:

- Analogue electronics
- Fluid mechanics
- Basic electricity and preliminary knowledge of pneumatics
- Electrical and pneumatic cabling

Upstream modules	Module taught	Downstream modules
	MGIND22.43	

1.4 Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Chapter 1	Introduction to metrology and the ISA standard	6	Know the different elements of a control loop and read an IT diagram (Piping and Instrumentation)

Chapter 2	Temperature measurement: (RTD Pt100 resistance thermometers, optical pyrometer) measurement chain	4 h	Converting the different temperature units Knowing the RTD law Read the RTD and PT100 tables
Chapter 3	Pressure measurement: relative, absolute, differential...) Installation of a pressure transmitter and wiring of transmitters.	6 h	Know the different types of pressure, units and conversions Wiring of different types of transmitters, installation conditions
Chapter 4	Level measurement: measurement technique and installation of level transmitters)	4 h	Level measurement principle (pressure, electrical, ultrasonic and radar)
Chapter 5	Volume flow measurement: (measurement technique and installation of flow transmitters)	4 h	Knowledge of linear flow measurement techniques (turbine, DEM, Ultrasonic) Know the technique of non-linear flow measurement (Depressors: Diaphragm nozzle, Venturi tube)
Practical work	Lab activity 1: Programming a temperature converter and testing its alarms Lab activity 2: Programming a voltage to current converter and calibrating the current to pressure and pressure to current converter Lab activity 3: Calibration of a level transmitter Lab activity 4: Calibration of a flow transmitter Lab activity 5: Calibrating a pressure transmitter	12h	Programming a converter or transmitter with programming software or a programming console or by keyboard. Wire the various sensors. Drawing up calibration tables

2. METHODOLOGY

The contact hours consist of presenting different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For individual activities, students have to do the exercises given as homework assignments.

Integrated courses (h)	24h
Practical work (h)	12h
Project (h)	
Visits (h)	

3. EVALUATION

Designation	Chapter(s)	Weighting
Mini-project		
Practical work		0.25
Continuous monitoring	Chapter1-Chapter2-Chapter	0.25
Presentation		
Final Review	Chapter1-Chapter2-Chapter3 Chapter4-Chapter5	0.5

4. BIBLIOGRAPHIC REFERENCES :

- Industrial transmitter sensors: Afpa course (Angers-Pompey vocational training agency)
- Industrial Instrumentation - Dunod
- Angers Professional Instrumentation
- http://www.audin.fr/pdf/documentations/sick/instrumentation-industrielle/instrumentation-industrielle.pdf
- Measurement and instrumentation course - enit http://www.enit.rnu.tn/fr/Minds/mes_instru/COURS_DE_MESURE_ET_INSTRUMENTATION.pdf

	MODULEDESCRIPTION	**Department :Industrial Engineering**
		Date : 15/10/2021
		N° version : 02
		Semester :2

Optimization

Code : MGIND21.35

Module MG2-1

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession
		*	

Teacher :GhassenChahtour

Status : Temporary

Mail :Ghassene_chahtour@yahoo.fr

Courses	Practicalworks	Individualwork	Total volume
30		**20**	**50**

Coefficient:	ECTS credits :
2.5	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULEDESCRIPTION**	**Department :Industrial Engineering**
		Date : 15/10/2021
		N° version : 02
		Semester : 2

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

1.1: Description

Optimization and decision problems are frequent, often of different complexity and even NP- Hard. The use of the computer tool is essential for the resolution of the majority of these cases. It is in this context that we will study some decision problems of different complexity that can be solved by specific algorithms

Objectives

The main objective of this course is to explain the basic principle of solving integer linear programs and dynamic programming. On the other hand to present the Scheduling Problems, their formulations and some methods of solution.

1.2 Prerequisites :

1. OperationalResearch

2. Probability

Upstream Modules	Taught Module	Downstream Modules
OperationalResearch probabilities	Optimization	Logistics

1.3 :Learning Outcomes :

Chapter	Title	Duration	Learning Outcomes
Chapter1	Linearintegerprogramming.	10.5Hrs	Master the formulation of a PLNE integer linear program. Know how to solve PLNE by the Gomory cut method. Solving by the Branch and Bound method
Chapter 2	The DynamicProgramming	10.5 Hrs	Students are able to break down a problem into steps, determine the characteristics of the problem, and solve it using a backward chaining procedure.
Chapter 3	Scheduling	9 Hrs	Master the classification of scheduling problems. Students able to formulate the problem mathematically

2.METHODOLOGY

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the self-study activities, students have to do the exercises given as homework.

Integrated courses (h)	30 Hrs
Practicalwork (h)	-
Project (h)	20h
Visits (h)	-

3.Assessment :

Designation	Chapter(s)	Rating
Mini-project	*	
Practical works	*	
Continuous assessment	++	
Presentation	*	
Final Exam	++	

4. Bibliographic references :

- Stuart Dreyfus, « *Richard Bellman on the birth of Dynamic Programming* », *Operations Research*, vol. 50, n° 1, janvier-février 2002, p. 48-51
- Richard Bellman, *Dynamic Programming*, Princeton, Princeton University Press, 1957. — Réimpression 2003, Dover Publication, Mineola, New-York
- NEMHAUSER, G.L. et L.A. WOLSEY, *Integer and Combinatorial Optimization*, Wiley, New York, 1988.
- Y. NORBERT, R. OUELLET et R. PARENT, *La recherche op´erationnelle*, Ga¨etan Morin Editeur, Montr´eal-Paris, 1995.
- K.R. Baker Introduction to Sequencing and Scheduling, Jhon Wiley, 1974.
- GOTHA, Les problèmes d'ordonnancement. RAIRO, Recherche Opérationnelle, Tome 27, n 1, (1993) p 77-150

	Module Description	Department :Industrial Engineering
		Date : 30/10/2021
		Version N°: 02
		Semester :01

Object-Oriented programming (OOP)

Code : 21.36

GM2-2

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession
		x	

Teacher :Ms. Maha AZABOU

Status : Permanant

E-mail : azabou.maha@yahoo.Fr

Courses	Practicalworks	Individualwork	Total volume
21		30	51

Coefficient:	ECTS credits :
1.5	2

	MODULE DESCRIPTION	Department : Industrial Engineering
		Date : 30/10/2021
		versionN° : 02
		Semester : 1

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

1.1 Description

This module is intended to teach the concepts of object-oriented programming

1.2 Objectives :

After this course the engineering students will be able to :

a- Assimilate the basic principles of Object Oriented Programming (OOP)
b- Master the process of compiling and executing a Java program
c- Master the basic elements of the Java language
d- Implement classes and objects in Java
e- Handling strings and collections
f- Mastering the concepts of inheritance and polymorphism
g- Implementing abstract classes and interfaces
h- Handling exceptions in Java

1.3 Prerequisites :

Upstream modules	Taught module	Downstream modules
Programming language C	Object-Oriented programming	

1.3 Learning outcomes:

Chapters	Title	Duration	Learning outcomes
Chapter 1	General introduction to object-oriented programming	1hr 30	a,b
Chapter 2	Basic elements of the Java language	3hrs	C
Chapter3	Classes and Objects in Java	3hrs	d
Chapter4	Tables and Strings	1hr 30	e
Chapter 5	Inheritance and polymorphism	1hr 30	f
Chapter 6	Abstarct classes and interfaces	1h30	g
Chapter 7	Exception Management	3hrs	h
Practical works	Basic elements of Java language	6hrs	

	Classes and objects in Java Tables and strings Inheritance and polymorphism Abstract classes and interfaces. Exception management		

2.METHODOLOGY :

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the self-study activities, students have to do the exercises given as homework.

Integrated courses (h)	21hrs
Practicalwork (h)	
Project (h)	
Visits (h)	

3. Assessment:

Designation	Chapter(s)	Rating
Mini-project		
Practical works		
Continuous assessment	2,3,4	25%
Presentation		
Final Review	2,3,4,5,6,7	75%

4. Bibliographic references :

- H.M. DEITEL & P.J. DEITEL, « Comment programmer en JAVA », éditions Prentice Hall, 1999
- Benjamin AUMAILLE, « Java 2 », éditions ENI, 1999
- Claude DELANNOY, « Programmer en JAVA », Edition Eyrolles, 2008. ISBN : 978-2-212-12326-5

Websites

- www.javasun.com : Site officiel Sun
- www.javaworld.com
- www.developpez.com

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULEDESCRIPTION**	**Department : Industrial Engineering**
		Date : 11/10/2021
		N° version : 02
		Semester: 1

Programming languages

Code : MGIND21.37

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession
		X	

Teacher :Salma KSIBI

Status : Permanent

Mail :salmaksibi88@gmail.com

Courses	Practicalworks	Individualwork	Total volume
21h	-	30h	51h

Coefficient:	ECTS credits :
1.5	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULEDESCRIPTION**	**Department : Industrial Engineering**
		Date : 11/10/2021
		N° version : 02
		Semester: 1

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

Description

This module represents an introduction to the famous C programming language.
The C programming language is the basis of the operating systems we know today or at least the kernel of these systems such as Unix/Linux. The C language was initially designed to develop an operating system (Unix) but over time, thanks to its power, it has been adopted by a large community of developers which has allowed the language to evolve and above all to be standardised. This language is multi-platform, which means that a program that you create for example under Linux could be recompiled under Windows, ... without having to change anything in the source code.
In this module, the engineering student learns how to do data manipulations ("what") in pseudo-language and/or C language, transcribe algorithms ("how") in pseudo-language and/or C language, and code "console" programs with command line argument handling.

Objectives:

This course aims to provide a modern knowledge of programming so that a student can solve problems related to his or her discipline. The programming language used is C ANSI 89. More specifically, this course will enable the student to: acquire basic programming notions; acquire knowledge of the C language; use and implement abstract data types (stack, file and list).
Objectives
This course aims to :
-Discover the C programming environment,
-To know how to react to a programming problem.
At the end of this module, the student engineer will be able to
-Manage the inputs/outputs.
-Consider computer solutions written in C for problems to be solved by computer.
-Solve problems of a mathematical nature
-Study all possible cases that can be considered in order to solve a specific problem
-Mastering control structures
-Mastering iterative structures
-Browse, manipulate and sort arrays.

Prerequisites :

Upstream Modules	Taught Module	Downstream Modules
Algorithmic	**MGCV11.01** : Informatics I : Programming languages	**MGCV12.15 :** Informatics II

1.3 :Learning Outcomes :

Chapter	Title	Duration	Learning Outcomes
Chapter 1	Introduction to the C language	3hrs	At the end of this chapter, the engineering student will recognize the history and the basic notions of the C language.
Chapter 2	The variables in C	3hrs	At the end of this chapter, the engineering student knows how to manipulate variables in C.
Chapter3	Inputs/outputs	3hrs	At the end of this chapter, the engineering student knows how to manipulate C input/output, i.e. to provide displays and inputs.
Chapter 4	The conditional structures	4hrs30	At the end of this chapter, the engineering student knows how to impose conditions and how to deal with the different cases proposed.
Chapter 5	The repetitive structures	4hrs30	At the end of this chapter, the engineering student knows how to define repeating structures to make one or a block of instructions repeat a finite number of times.
Chapter6	Tables	3hrs	At the end of this chapter, the engineering student knows how to create, browse and manipulate one- and two-dimensional tables.

2.METHODOLOGY

The contact hours consist of presenting different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For self-study activities, students have to do the exercises given as homework.

Integrated courses (h)	21hrs
Practicalwork (h)	-
Project (h)	-
Visits (h)	-

3.Assessment:

Designation	**Chapter(s)**	**Rating**
Mini-project	-	-
Practical works	-	-
Continuous assessment	Chapitre1, 2, 3, 4	25%
Presentation	-	-
Final Exam	Tous les chapitres	75%

4. Bibliographicreferences

1. http://www.isetjb.rnu.tn/docs/supports-cours/progc-aasses-mblaghgi.pdf
2. https://www.labri.fr/perso/chaumett/enseignement/matieres/langage-c/slides/rappels-et-complements-langage-c.pdf
3. https://c.developpez.com/cours/?page=langage-c

	Module Description	Department :Industrial Engineering
		Date :22 /10/2021
		Version N°: 02
		Semester :03

English for Specific Purposes III

Code : MGIND21.38

GM2-8

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession
	x		x

Teacher : Ms Mariem FEKI

Status : Permanant

e-mail :fekimariem@gmail.com

Courses	Practicalworks	Individualwork	Total volume
21hrs		10 hrs	31 hrs

Coefficient:	ECTS credits :
1	1.5

	MODULE DESCRIPTION	Department : Industrial Engineering
		Date : 30/10/2021
		versionN° : 02
		Semester :03

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

1.4 Description :

English for specific purposes is a course that focuses on business topics and enhances the communicative skills of the students, as well as his writing and reading competences

The course enables the students to get accustomed to English expressions and structures in the field of business, use them properly and help him to produce in an oral and a written way.

The course sheds light on e-commerce, negotiating, and dealing with customers. .

1.5 Objectives :

- Develop basic skills to deal with people in business context.
- Acquiring the competence of communicating in business oriented contexts.
- Highlight knowledge on e-commerce, persuasive language, and problem solving. .
- have students who developed their communication skills and reach B2 level in the four skills

1.6 Prerequisites :

Intermediate level in general English ,

Knowledge of basic notions and key concepts and structures in business in English.

Upstream modules	Taught module	Downstream modules

1.4 Learning outcomes:

Chapters	Title	Duration	Learning outcomes
Chapter 1	E-commerce	6hrs	The main outcome is to have students familiar with the world of e-commerce and e-trade. To be familiar with internet terms,
Chapter 2	Raising finance	6hrs	The main outcome sought is to have students able to use the langiage and structures of negotiating. Have students familiar with idiomatic expressions related to finance. Have students who are able to write e-mails to respond to given situations.
Chapter3	Customer service	6hrs	The unit's outcomes are mainly based

			on having knowledge on what customers complain about. Be able to handle complaints. Acquire the skills of writing a report.
Chapter4	Revision and practice	3 hrs	-To wrap-up all vocabulary and grammatical points. To practice written exercises. Writing reports/ answering e-mails of complaints.
presentations			In every class a group of students should write about and introduce a chosen topic in a presentation.

2.METHODOLOGY :

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the self-study activities, students have to do the exercises given as homework.

Integrated courses (h)	21hrs
Practicalwork (h)	
Project (h)	
Visits (h)	

3. Assessment:

Designation	**Chapter(s)**	**Rating**
Mini-project		
Practical works		
Continuous assessment		
Presentation	All chapters	20%
Final Review	All chapters	80%

4. Bibliography :

-Cotton.D, Falvey.D,Knet .S,: *Market leader: Intermediate Practice File*, ed Longman.

-O'Brien, Josephine. *English for Business*. Ed, Thomson Heiln.

-Walker, J (Ed), *Practice tests for the Bec preliminary,Students' book*. Express Publishing.

-Cotton.D, Falvey.D,Knet .S,: *Market leader: Upper Intermediate Practice File*, ed Longman.

-Strutt,Peter. *Business Grammar and Usage.*Longman.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department :Electromechanical**
		-Semester: 1
		Version number: 02 **Date: 15/10/2021**

Module: Communication techniques

Code: MGIND21.39

Module group: GM2-8

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
X			

Teacher : Jouda Ghorbel

Status : Assistant Professor

Mail: joudaghorbel@yahoo.fr

Course	Practical work	Personal work	Total volume
24 h		20h	44 h

Coefficient :	ECTS credits :
1	1.5

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department :Electromechanical** **-Semester: 1** **Version number: 02** **Date: 15/10/2021**

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

This module is a continuation of the module taught in the first year of the engineering cycle and deals with communication within the company. The course begins with a general chapter that explains the characteristics of communication within the company as well as the forms, types, issues and networks of this communication.

Professional writing will then be addressed, with a close study of all the characteristics of the memo, the information note, the circular and the e-mail.

The course ends with a chapter on oral presentation and public speaking.

This course aims to develop students' skills in oral and written communication techniques within the company.

1.2 Pre-requisite

French communication which encompasses the different elements of the language situation and the different language registers

Upstream modules	Module taught	Downstream modules
	: MGIND21.39	

1.3 Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Chapter 1	Communication within the company	6	The student masters the characteristics, forms, types and networks of communication within the company.
Chapter 2	The memorandum	3	The student is able to write a memo.
Chapter 3	The information note	3	The student is able to write a briefing note.
Chapter 4	The circular	3	The student is able to write a circular

Chapter 5	The email	3	The student is able to write a professional email
Chapter 6	The oral presentation	6	The student masters the techniques of public speaking.

2. METHODOLOGY

The Contact Hours consist of an introduction to the course. Practical applications are dealt with separately in the tutorials.
Active methods, brainstorming, simulations and group exercises are used in the applications.
For individual activities, students should complete the exercises given as homework.

3. Evaluation

Designation	Chapter(s)	Weighting
Continuous monitoring	1-2-3	0.5
Final Review	1-23-4-5	1

4. Bibliographic References

Bouquet, Brigitte. "Diversité et enjeux des écrits professionnels", *Vie sociale*, vol. 2, no. 2, 2009, pp. 81-93.

Joly, Bruno. "La communication en entreprise", *La communication.* Under the direction of Joly Bruno. De Boeck Supérieur, 2009, pp. 69-129.

Leibovitz, Annie. *La boîte à outils pour prendre la parole en public*. Dunod, 2020

Riffault, Jacques. "La formation aux écrits professionnels : présentation d'un dispositif pédagogique ouvert à la question du sens", *Vie sociale*, vol. 2, no. 2, 2009, pp. 71-80.

	MODULEDESCRIPTION	**Department : Industrial Engineering**
		Date : 11/10/2021
		N° version : 02
		Semestre :

Econometrics

Code : MGIND22.40

GM2-1

Specialty modules	**Main module**	**Engineering Sciences and Techniques**	**Preparation for the profession**
		X	

Teacher :

Status :

Mail :

Courses	**Practicalworks**	**Individualwork**	**Total volume**
21hrs	**15hrs**	**15hrs**	**51hrs**

Coefficient:	**ECTS credits :**
2	1.5

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULEDESCRIPTION**	**Department : Industrial Engineering**
		Date : 11/10/2021
		N° version : 02
		Semestre :

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

1.1: Description

Objectives

At the end of this module, students will be able to:

- Analyse producer, consumer and market behaviour.

- Establish causal relationships between statistical variables (marketing, ecology, health, psychology, sociology, etc.) for data interpretation by choosing the most relevant models

- Mastering computer software (SPSS) for the estimation of econometric models

- Interpret the estimation results.

- Have the necessary knowledge to work directly in the field

1.2 : Prerequisites :

Notions of statistics and linear algebra

Upstream Modules	Taught Module	Downstream Modules
MGIND12.14	MGIND22.40	MGIND31.61

1.3 :Learning Outcomes :

Chapter	Title	Duration	Learning Outcomes
Chapter 1	Introduction		To know the econometric approach, the fields of application of regression
Chapter 2	Simple linearregression		Performing a simple linear regression. Hypothesis testing, confidence intervals, prediction ranges.
Chapter 3	Multiple linearregression		Performing a multiple linear regression. Hypothesis testing, confidence intervals, prediction ranges.
Chapter 4	SPSS software applications		Know how to manipulate the software to perform a regression and how to interpret the output of the software.
PWs			

2.METHODOLOGY

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the self-study activities, students have to do the exercises given as homework.

Integrated courses (h)	21h
Practicalwork (h)	15h
Project (h)	20h
Visits (h)	

3.Assessment:

Designation	**Chapter(s)**	**Rating**
Mini-project		
Practical works		0.25
Continuous assessment		0.25
Presentation		
Final Exam		0.5

	MODULEDESCRIPTION	**Department : Industrial Engineering**
		Date : 15/10/2021
		N° version : 02
		Semester :2

Decision-making tool

Code :MGIND22.41

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession
		×	

Teacher :GhassenChahtour

Status : Temporary

Mail :Ghassene_chahtour@yahoo.fr

Courses	Practicalworks	Individualwork	Total volume
24hrs	--	30hrs	54rs

Coefficient:	ECTS credits :
2	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department : Industrial Engineering**
		Date : 15/10/2021
		N° version : 02
		Semester : 2

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

1.1: Description

The need to make decisions arises daily at any time for any person and particularly for the management bodies. To help them, several theories have been developed such as the theory of decision. Within this framework, we will present the different criteria for choosing the optimal decision. Then we will present some techniques capable of solving in an optimal way the problems of transport, graph and queue.

Objectives

The main objective of this course is to explain the basic principle of decision theory and graphs on the one hand and on the other hand to learn how to solve queuing and transport problems.

1.2 Prerequisites :

1. OperationalResearch

2. Probability

Upstream Modules	Taught Module	Downstream Modules
OperationalResearch probabilities	Decision-makingtool	Optimization

1.3 :Learning Outcomes :

Chapter	Title	Duration	Learning Outcomes
Chapter 1	Decisiontheory	6 Hrs	- Students able to present a table and a decision tree. - Able to find the best decision in an uncertain world. - Mastery of the Bayesian approach as a tool for decision making under partial uncertainty. - Utility theory
Chapter 2	Transportation problem	4.5 Hrs	Students are able to formulate a transport problem, present it in the form of a transport table, and search for an initial solution by one of the three methods presented. Search for the Optimal solution.
Chapter 3	Graphs Theory	6Hrs	To master the basic elements of Graph Theory, and the application of some algorithm such as FORD and Fulkurson.

Chapter4	Queuing	4.5 Hrs	Mastering the formalism of a queuing problem. Presentations of some Waiting Models and their Solving Methods.

2.METHODOLOGY

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the self-study activities, students have to do the exercises given as homework.

Integrated courses (h)	24hrs
Practicalwork (h)	
Project (h)	30h
Visits (h)	

3.Assessment:

Designation	**Chapter(s)**	**Rating**
Mini-project	*	
Practical works	*	
Continuous assessment	++	0.25
Presentation	*	
Final Exam	++	0.75

4. Bibliographicreferences

- Anderson D. R., Sweeney D. J., Williams, T. A., (1995): Quantitative Methods for Business, West Publishing Compagny, Sixth Edition, USA.
- Markland, R. E., (1989): Topics in Management Science, Wiley, Third Edition, USA.
- Raiffa H. (1973) : Analyse de la décision : Introduction aux choix en avenir incertain, Dunod, 1973,Paris.
- Y. NORBERT, R. OUELLET et R. PARENT, *La recherche opérationnelle*, Gaétan Morin Editeur, Montréal-Paris, 1995.

	MODULEDESCRIPTION	**Department : Industrial Engineering**
		Date : 15/10/2021
		N° version : 02
		Semester :4

Industrial IT

Code : MGIND22.42

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession
	X		

Teacher :Sonia MAALEJ Ep ALLOUCHE

Status : Permanentat the Universitée Du Sud des Sciences Avancées, Sfax-Tunisia

Mail :sonia.maalej@gmail.com

Courses	Practicalworks	Individualwork	Total volume
12	**15**	**15**	**42**

Coefficient:	ECTS credits :
2	1.5

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULEDESCRIPTION**	**Department : Industrial Engineering**
		Date : 15/10/2021
		N° version : 02
		Semester :4

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

1.1: Description

Industrial computing is a branch of applied computer science that covers all the techniques of design, analysis and programming of computer systems with the aim of solving problems of an industrial nature, in particular those related to the processing of information in real time.

Automated systems, used in the industrial sector, have an identical basic structure. They are made up of several more or less complex parts that are connected to each other. The objective of system automation is to produce quality products with the least possible human intervention at the lowest possible cost.

Objectives

The course in industrial computer science has the following objectives:

- This course leads to the conceptual and practical mastery of technologies implemented in an automated industrial production environment

- Analysis of the needs arising from process engineering, definition and sizing of automated industrial systems (industrial robots, production lines, programmable industrial automatons, measuring devices and actuators)

- Study of local industrial networks.

- Be able to implement automation applications designed around programmable industrial controllers: programming, networking, instrumentation of programmable industrial controllers

- Design and implementation of the control architecture of an automated system: Be able to develop an automated application with the TIA Portal software

This course with its real manipulations and implementations prepares students for the sectors of Research and Development in the fields of Automation and Industrial Computing.

1.2: Prerequisites :

- Automation I and II: General aspect and control loop of an automated system;

- Electrical diagram: be able to read a control and power diagram of a system;

- Logic systems and circuits: basic knowledge of BOOLE algebra.

Upstream Modules	Taught Module	Downstream Modules
MGIND11.05 MGIND22.44 MGIND12.20 MGIND21.28	MGIND22.42	MGIND22.43

1.3 :Learning Outcomes :

Chapter	Title	Duration	Learning Outcomes
Chapitre 1	Définition d'Automatisme	0.5h	-To understand the structure of an automated production system and to define the different parts of this system: - Introduction to automated systems: history, definitions, field of use... ; Structural analysis of an automated installation.
Chapter 2	Architecture of an automated production system	2.5 hrs	- Functional analysis: The different parts of an automated system (control, operating, dialogue); - Characteristics of the components of each part (actuators, pre-actuators, sensors); Connection system
Chapter3	General construction of a PLC	3hrs	- The general structure of the PLC; - Hardware and technical architecture of a PLC; - Connection of the PLC ; - Selection criteria; The differentprogramminglanguages.
Chapter 4	Programming of PLCs	3hrs	- Basic notions, concepts and structures of GRAFCET ; Develop the three levels of a GRAFCET
Chapter5	Implementation of an automated system	3hrs	- Ladder programming from the control circuit of the wired logic; Ladder programming by grafcet-Ladder conversion.
PWs	Manip 1: Introduction to STEP7 TIA Portal	3hrs	- Discovering presence sensors; - Identify the detection principles using the test pieces; - Be able to navigate a program developed with STEP7 TIA Portal; - Be able to connect to a PLC and use the simulator as a programming console and diagnostic tool; - Be able to make simple modifications to programs; - Be able to develop an automated application with the TIA Portal software; - Techniques for powering and connecting to a PLC input module.
	Manip 2: Sorting System Bench	4hrs	Programming and implementation of the BST-02 Sorting Station Bench that allows the handling of parts of different colours.
	Manip 3: Pumping station bench	4hrs	Programmation et implémentation de la station de pompage comportant trois électropompes (P1, P2 et P3) de même puissance.
	Manip 4 :ManipulatorArms	4hrs	Programmation and implementation

			of the Pneumatic Manipulator arm for rotating parts

2.METHODOLOGY

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the self-study activities, students have to do the exercises given as homework

Integrated courses (h)	12
Practicalwork (h)	15
Project (h)	0
Visits (h)	0

3.Assessment:

Designation	**Chapter(s)**	**Rating**
Mini-project		
Practical works	Chapitres 4 et 5	0.25
Continuous assessment	Chapitres 1 et 2	0.25
Presentation		
Final Exam	Chapitres 3, 4 et 5	0.5

4. Bibliographicreferences :

Automates Programmables Industriels Mr L. BERGOUGNOUX (POLYTECH' Marseille 2004–2005)

1) Livre : Automatique industrielle en 20 fiches, Gérard Boujat, Patrick Anaya, 2013

2) Cours : Mr Hmaied Sarhene, Automate Programmable Et Réseaux Locaux Industriels, 2020 (https://www.technologuepro.com/)

3) Cours : Mr Ben Hammed Sofiene, les automatismes industriels, 2017 (https://www.technologuepro.com/)

	MODULE DESCRIPTION	**Department :Industrial Engineering**
		-Semester: 1
		Version number: 02 **Date: 15/10/2021**

Module: Regulations and controls

Code: MGIND21.43

Module group:
GM2-7

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
x		x	

Teacher : Awatef Maatoug

Status : Assistant professor

Mail: awatef.maatoug@yahoo.fr

Course	Practical work	Personal work	Total volume
24 h	**15h**	**20 h**	**59 h**

Coefficient :	ECTS credits :
2	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department :Industrial Engineering** **-Semester: 1** **Version number: 02** **Date: 15/10/2021**

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

The regulation of industrial processes includes all the material and technical means implemented to maintain a physical quantity to be regulated, equal to a desired value. The course will provide a wide overview on the main techniques for regulation and control.

1.2 Objectives

The student will master the techniques necessary for the selection and design of industrial controllers, primarily proportional, integral and derivative controllers.

The student knows the practical implementation techniques of industrial controllers.

1.3 Prerequisites

- Basic knowledge of automation.
- Methods of analysis and control of dynamic linear systems.

Upstream modules	Module taught	Downstream modules
	MGIND21.43	

1.4 Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Chapter 1	General information on regulation	6h	- Principle of regulation - General diagram of a control loop - Examples of regulated processes - Different types of regulation - Application
Chapter 2	PID controllers	9h	- Hardware aspects of PID controllers - Functional aspects - Proportional action - Integral and proportional integral action - Derivative and proportional derivative action. - system with delay

Chapter 3	Setting PID controllers	9h	Step response methods Ziegler-Nichols method Cohn-Coon method Adjustment according to adjustability
			- In-line adjustment - Direct synthesis, pole compensation - Placement of poles
Practical work	Lab activity 1. level control problem Lab activity 2. Regulation of a first and second order system	12h	use of the proportional controller - use of the integral controller - use of the bypass regulator

2. METHODOLOGY

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the individual activities, students have to do the exercises given as homework assignments.

Integrated courses (h)	24h
Practical work (h)	12h
Project (h)	20h
Visits (h)	15h

3. Evaluation

Designation	Chapter(s)	Weighting
Mini-project		
Practical work	Chapter 1-2-3	0.25
Continuous monitoring	Chapter 1-2-3	0.25
Presentation		
Final Review	Chapter 1-2-3	0.5

4. Bibliographic References

1- J, M. Flaus. (1994). La régulation industrielle, Editions Hermès, Paris
2- A, Kaya. and T.J, Scheib (1988). Tuning of PID controls of different structures, control engineering, 62-65, july, 1988.
3- K. Ogata (1992): Modern control engineering. Eastern EconomyEdition, second edition, India.
4- B. C. Kuo (1991): {``Automatic control systems"}. Prentice hall,englewood cliffs, sixth edition, new jersey 07632

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	MODULEDESCRIPTION	**Department: Industrial engineering**
		Date: 10/18/2021
		N° version: 02
		Semester: 2

RESEARCH METHODOLOGY

Code: MGIND22.44

GM2-6

Specialty modules	Main module	Engineering sciences and techniques	preparation for the profession

Teacher: Noomen GUIRAT

Status: Assistant-Professor

E-mail: noomenguirat@gmail.com

Course	Practical work	Individual work	Total volume
30h		20h	50h

Coefficient:	ECTS's credits:
2.5	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department: Industrial engineering**
		Date: 11/10/2021
		N° version: 02
		Semester:

2. DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED:

2.1 Description:

1. Explain the engineer's science approach characteristics.
2. Define a research problem
3. Choose a research technique and method in connection with the define problem
4. Build a data gathering tool/instrument according to the previously chosen technique and method
5. Carry out/Execute the data gathering with the tool built
6. Analyze the collected data
7. Interpret the obtained results

Objectives:

Overall course's goal: apply the scientific approach to empirical research

Specifics objectives:

- Master the constituting elements of the scientific approach
- Execute/Apply all the steps of scientific approach

2.1 : Prerequisites

Upstream modules	Modules taught	Downstream modules

1.3: Learning Outcomes

Chapters	Title	Duration	Learning outcomes
Chapiter 1	Characteristics of the engineer's scientific approaches	10	Master characteristics of the engineer's scientific approaches
Chapiter 2	Steps of a scientific work	10	Know how to plan scientific research
Chapiter 3	Engineering research techniques in science	10	Have an idea on the tools and methods invested in the research
Chapiter 4	Data gathering tools	10	Be able to collect data where it is located

Chapiter 5	Results analysis and interpretation	10	Promote the research

1. METHODOLOGY

Contact hours consist to present the scientific research in the engineer's world. Chapters are organized as seminar and organized with real practical case in the scientific research world.

Integrated courses (h)	30
Practical work (h)	
Project (h)	20
Visits (h)	

2. Assessment

Name	Chapiter (s)	Weighting
Mini-project		
Practical work		
Continuous Assessment		15%
Presentation		10%
Final Review		75%

4. Bibliographical references

* HUBERMAN A.Michael. / MILLES Matthew B. : ANALYSE DES DONNEES QUALITATIVES. Editeurs : DE BOECK UNIVERSITE Collation : 626p.

* LARDY Jean Pierre, RECHERCHE D'INFORMATION SUR L'INTERNET : outils et méthode ADBS EDITIONS Collation : 118p

* LARAMEE Alain / VALLEE Bernard : LA RECHERCHE EN COMMUNICATION : Eléments de méthodologie Notice générale. Editeurs : PRESSES UNIVERSITAIRE DE QUEBEC. 377p.

* LENOBLE-PINSON Michèle LA REDACTION SCIENTIFIQUE : Conception, rédaction, présentation, signalétique Titre. DE BOECK UNIVERSITE Collation: 152p.

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Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department: Industrial Engineering** **Semester: 1** **Version number: 02** **Date: 15/10/2021**

Module : (FMD) Reliability Maintainability Availability

Code: M.GInd22.45

Module group :GM2.4

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
X			

Teacohamedher: Khlif M

Status : Assistant Master

Mail: mohamed.khlifi@enis.rnu.tn

Course	Practical work	Personal work	Total volume
21	h	25	46 h

Coefficient :	ECTS credits :
2	1.5

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Engineering Training Cycle: Industrial Engineering** **3ème year Semester: 1** **Version number: 02** **Date: 15/10/2021**

1. COURSE DESCRIPTION AND COMPETENCIES :

: Description

The performance of maintenance in an industrial enterprise is of paramount importance to keep equipment in good working order. Maintenance, in its broadest definition, is the sum of all management, programming and execution operations. The calculation of the reliability, availability and maintainability of equipment is an essential tool for evaluating the efficiency of any system

Objectives:

Determine the FMD indicators of a good.

Determine availability indicators.

Propose solutions to improve the reliability and maintainability of an asset.

Prerequisites:

Industrial maintenance

Upstream modules	Module taught	Downstream modules
	MGInd22.45.	

1.3: Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Chapter 1	Reliability	5h	At the end of these chapters students will be able to identify the different laws of reliability
Chapter 2	Maintainability	5h	At the end of these chapters students will be able to determine Maintainability of a system
Chapter 3	Unavailability	5h	At the end of these chapters students will be able to determine Availability of a system

2. METHODOLOGY

The course is based on a methodology combining lectures, tutorials, practical work and personal work.

The face-to-face sessions are of the integrated course type combining lectures and tutorials. Students are required to complete personal work in a non-classroom setting and to present it in class in the form of a lecture. The practical work allows the application of the concepts studied during the course

Integrated courses (h)	21h
Practical work (h)	
Project (h)	25h00
Visits (h)	

3. Evaluation

Designation	**Chapter(s)**	**Weighting**
Mini-project		
Practical work		
Proctored homework		0.25
Presentation		
Final Review		0.75

4. Bibliographic References

[1] B.S. Dhillon, Ph.D. "Engineering Maintainability: How to Design for Reliability and Easy Maintenance" 257 pages Publisher: Elsevier Science & Technology Books I SBN: 088415257X Pub. Date: Young 1999

[2] Jan Claude Ligeron "Reliability in Mechanics" M20S/IMdR2009 779 page [3]

Pierre DAVID "Management of Industrial Risks Deployment of Safety of

Functioning: Concepts, Methods, Life Cycle" 209 pages, year 2010-2011

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department :Industrial Engineering** **-Semester: 2** **Version number: 02** **Date: 15/10/2021**

Module: Computer-aided maintenance management

Code: MGIND22.46

Module group: GM2-4

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession

Teacher: Wissem Zghal

Status : Assistant professor

Mail: zghal_wissem@yahoo.fr

Course	Practical work	Personal work	Total volume
21 h	15 h	40 h	76 h

Coefficient :	ECTS credits :
2	2.5

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 : Description

Maintenance is an essential function in every industrial process. It is becoming an increasingly sensitive component of company's performance. It is therefore important to master this activity and to be familiar with the various tools and methods of its management.

1.2 Objectives

- Mastery of the basic concepts of maintenance (mastery of the normative concepts related to maintenance);
- Determination of maintenance management tools ;
- Use of maintenance management methods ;
- Implementation of these methods through practical applications.

1.3 Prerequisites:

Knowledge of industry, production concepts, industrial systems, etc.

Upstream modules	Module taught	Downstream modules

1.3: Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Chapter 1	General presentation of Maintenance	4h	Presentation of the different basic concepts of maintenance: mastery of the normative notions related to maintenance
Chapter 2	FMD Concept of Maintenance	4h	Implement the concept of Reliability, Maintainability and Availability (control, calculation and synthesis)
Chapter 3	Dashboard in Maintenance	4h	Presentation, identification and exploitation of the different ratios and the concept of maintenance efficiency

Chapter 4	Economic Approach to Maintenance	4h	Presentation and implementation of methods for determining and analysing maintenance costs
Chapter 5	Quantitative Decision Support Tools for Maintenance Management	5h	Mastery of the various quantitative analysis methods for maintenance management.
Practical work	CMMS	12h	Use of a CMMS software to implement the various elements presented in the course through practical case studies based on the creation of the various CMMS modules: equipment management, stock management, work management and analysis.

2. METHODOLOGY

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the individual activities, students have to do the exercises given as homework assignments

Integrated courses (h)	21h
Practical work (h)	15h
Project (h)	
Visits (h)	

3. Evaluation

Designation	**Chapter(s)**	**Weighting**
Mini-project	-	
Practical work Continuous monitoring	All Chapters Chapters 1, 2 and 3	50%
Presentation	-	
Final Review	Chapters 3, 4 and 5	50%

4. bibliographical references

[1] BSI Standards Publication, Maintenance-Maintenance terminology, EN 13306:2017.

[2] François Monchy, Maintenance: methods and organisations, published by DUNOD, Paris, 2000.

[3] Marc Frédéric, Mettre en œuvre une GMAO (maintenance industrielle service après-vente maintenance immobilière), Dunod, Paris, 2003.

[4] *Maintenance*, methods and organisations, François Monchy, published by DUNOD,

[5] Jean Héng, Pratique de la maintenance préventive, published by DUNOD, 2002.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module Description**	**Département : Génie Industriel**
		Date : 11/10/2021
		N° version : 02
		Semestre : 2

Production Management and Scheduling

Code : MGIND22.47

GM2-4

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession
x			x

Teacher : Hager TRIKI

Statut : Assistant Professor

Mail : hager.triki@isgis.usf.tn

Courses	Practicalworks	Individualwork	Total volume
51h		**40h**	**91h**

Coefficient:	ECTS credits :
2.5	3

3. DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

3.1 Description

This course enables students to learn how to manage production within the industrialization process in the company.

Objectives

The course aims to allow the student:

- Develop the skills and competencies necessary to solve production management problems;

- Focus on the integration of functions such as production, planning, balancing and optimization of bottlenecks in the production flow

3.2 Prerequisites :

Upstreammodules	Taught module	Downstreammodules
Business management	Production management and scheduling	Design and performance of production systems

1.3 Learning outcomes:

Chapters	Title	Duration	Learning outcomes
Chapter 1	Introduction to production management	15h	to know the technical words and lexicons of production management
Chapter 2	Typology of production systems	15h	To Know the production methods
Chapter 3	Capacity management	15h	Distinguish between load and production capacity and methods to balance them
Chapter 4	Materials Resources Planning MRP	15h	how to calculate the net need
Chapter 5	Scheduling of workshops	15h	To know the workshops type and the scheduling method
Chapter 6	Optimized Production Technology method (OPT)	16h	method to optimize the productive flow
Practical works			

4. METHODOLOGY

Contact Hours consist of presenting different concepts, rules and diagrams. Practical applications are dealt with separately in directed exercises and practical work. For self study activities, students must do the exercises given as homework.

Les cours intégrés (h)	51
Travaux Pratiques (h)	
Projet (h)	20
Visites (h)	20

3. Assessment:

Designation	Chapter(s)	Rating
Mini-project		
Practical works		
Continuous assessment		
Presentation		
Final Review		

4. Bibliographic references :

- Alain Courtois, Chantal Martin-Bonnefous, Maurice Pillet, Pascal Bonnefous , « Gestion de production: les fondamentaux et les bonnes pratiques »cinquième édition N° d'éditeur : 4247 ORGANISATION; ORGANISATION édition (May 27, 2011) Nbre de page 476.

- Georges Javel « Organisation et gestion de la production » Dunod, Nbre de page 432, science sup (2eme édition) 01/04/2000

	MODULE DESCRIPTION	**Department : Industrial Engineering**
		Date : 15/10/2021
		N° version : 02
		Semester :02

Quality Management System

Code : MGIND 22.48

GM2-4

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession
	×		

Teacher :Dr. Med Achraf KAMMOUN

Status : Permanent

Mail :kammounmedachraf@gmail.com

Courses	Practicalworks	Individualwork	Total volume
24h	**--**	**24**	**48h**

Coefficient:	ECTS credits :
2	1.5

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

1.1: Description

At the end of this course, the student will have acquired the principles, techniques and modern tools of total quality management.
Introduction: definitions, product or service cycle, total quality issues. Strategies for quality improvement.Organisation of the quality function in the company. Human factors in quality management: motivation and its prerequisites, participative management. Quality circles and teamwork: goals, elements of success, operating process. Problem solving techniques: classic tools, the seven new quality management tools, Kaizen and Six Sigma methodologies.
Economics of quality: elements of quality-related costs, cost effectiveness measures and justification techniques. Deployment of the quality function.Implementation of the continuous quality improvement process and action plan.
Case studies and a team session project aimed at improving quality in a company identified by the team members.

Objectives

To understand the vocabulary related to quality,
To understand the organisation and deployment of a Quality Management System based on ISO 9001 and its main processes,
Understand the purpose, content and correlation between ISO 9001 and ISO 9004 and other quality standards and structures,
Understand the role of an auditor: to plan, conduct and follow up a management system audit according to ISO 19011.

1.2 : Prerequisites :

No specificprerequisites

Upstream Modules	Taught Module	Downstream Modules
Business Management	**Quality Management**	

1.3 :LearningOutcomes :

Chapter	Title	Duration	Learning Outcomes
Chapter 1	Introduction to quality 1. Requirements and quality; 2. Definitions; 2.1 Quality; 2.2 Non-quality; 3. Quality issues: why quality? 3.1. Economic and commercial issues; 3.2. Human issues; 3.3. Financial issues; 4. the concept of continuous quality improvement	2hrs	By the end of this chapter, students will be able to: - define the issues of quality and conformity of a product or service - Distinguish between the different concepts and components of quality; - know the evolution of the concept of quality;

	5. Evolution of the quality concept;		
Chapter 2	Quality tools 1. Generalities; 2. Brainstorming; 3. The Q.Q.O.C.Q.P. method 4. The ISHIKAWA diagram;	3 hrs	At the end of this chapter, the student should be able to master the methods and tools of quality adapted to the situation and the objective sought, in order to successfully improve external and internal quality.
Chapter 3	Quality approach according to the "ISO9001:2015" standard 1. The problem; 2. Definitions; 3. Quality management according to the standards. 3.1; 3.1 What is ISO? 3.2 What is the ISO mission? 3.3. The ISO 9001 family; 3.4. History of the ISO 9001 standard; 3.5. The principles of quality according to ISO9001:2015; 3.6. The 7 principles of quality management; 3.7. Risks and opportunities; 3.8. The benefits of implementing a quality management system; 3.9. The main causes of failure of a quality project.	4 hrs	At the end of this chapter, students will be able to: - understand the ISO standard; - Present the history of the standard and the principles of quality management; - Know the requirements of ISO9001:2015 and the role of the QMR in its implementation: quality management system; - to know the requirements of ISO9001:2015 and the role of the QMR in its implementation: management responsibility;
Chapter 4	Certification of organisations 1. Introduction; 2. Definition of certification; 3. Advantages and disadvantages of certification; 4. Certification of organisations; 4.1. Accreditation and certification; 4.2. The main certification bodies; 4.3. Procedure for certification of companies.	3 hrs	the student is able to differentiate between certification and accreditation, to define the steps and the process to achieve this goal.
Chapter5	Quality Audits 1. Definitions; 2. Type of audit; 3. Presentation of ISO 19011: audit principles and auditor competencies; 4. Objectives of audits; 5. Types of audit evidence; 6. Conduct of the audit; 7. Managing the audit programme; 8. Audit findings; 8.1. Types of findings; 9. Drafting audit findings; 10. Documentation of a non-conformity report; 11. Reporting non-conformity; 12. Follow-up audit; 13. Certification decision; 14. Renewal audit. - Audit programme exercise; - Audit plan exercise;	6 Hrs	- The student has a good command of the requirements of ISO 19011: auditing principles and auditor's competences, is familiar with the tasks and mission of an auditor, especially from the case studies dealt with in the course and from the lectures which deal with internal or external audit cases on selected processes. This leads the student to make a small report of non-conformities and propose corrective actions.

	- Presentation of the audit checklist; - Exercise: Drawing up an audit checklist for the sales process. - Exercise: Drawing up audit findings; - Exercise: Non-conformity report.		

2.METHODOLOGY

Written assignments and/or

Presentations (written and oral)

Integrated courses (h)	24h
Practicalwork (h)	
Project (h)	12h
Visits (h)	12h

3.Assessment:

Designation	Chapter(s)	Rating
Mini-project		
Practical works		
Continuous assessment		25 %
Presentation		25 %
Final Exam		50 %

4. Bibliographic references

Internet:

- www.iso.org/iso/fr/
- http://pagesperso-orange.fr/nathalie.diaz/
- http://membres.lycos.fr/hconline/engineer1_fr.htm

livres:

- « l'approche processus » de Hans Brandenburg et Jean-Pierre Wojtyna - Editions d'Organisation.
- « Dictionnaire de la qualité » de Bernard Froman et Christophe Gourdon - AFNOR
- « Comprendre les normes ISO 9001 version 2000 » de Stéphane Mathieu - AFNOR
- « le guide qualité de la résolution de problème » De Katsuya Hosotani - Dunod
- « Management au Quotidien », Professeur SHIBA.
- « Guide des méthodes qualité », J.P. Hubérac – Maxima

▪

	MODULE DESCRIPTION	**Department :Industrial Engineering**
		2nd year Semester: 2
		Version number: 02 **Date: 15/10/2021**

Module: Manufacturing process

Code: MGIND22.49

Module group: GM2-5

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
x			

Teacher : Jamel Louati

Status: Professor

Mail: jamel.louati@enis.rnu.tn

Course	Practical work	Personal work	Total volume
30 h	- h	20h	60 h

Coefficient :	ECTS credits :
1,5	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department :Industrial Engineering** **2nd year Semester: 2** **Version number: 02** **Date: 15/10/2021**

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

In an industrialisation process, the preparation of a production requires a perfect link between the different departments involved in the production. The manufacturing preparation departments provide the links between the design departments and the manufacturing departments. Their main role consist in establishing a manufacturing process using all the company's resources.

The manufacturing process must respect, among other things: the quality prescribed for the products, a minimum cost price, the required deadline, and the best possible working conditions.

1.2 Objectives

- For a preliminary draft manufacturing study or a provisional phase contract, the student should develop for each phase and sub-phase, the principles and means of positioning and holding the part in position which will ensure the positioning rules (support, orientation, clamping)
- To become able to compute manufacturing quotation and the specifications to be obtained for each phase or sub-phase.
- Mastering the chronological study of processes
- Develop a manufacturing process

1.3 Prerequisites :

Technical drawing; Manufacturing technology. Processing technology with material removal

Upstream modules	Module taught	Downstream modules
	MGIND22.49	

1.4 Learning outcomes

Chapter	Heading	Duration	Learning outcomes
Chapter 1	Analysis of manufactured parts	8	At the end of this chapter students will be able to analyse a machined part
Chapter 2	Manufacturing dimension	10H	By the end of this chapter students will be able to dimension and identify a part

Chapter 3	Chronological study of the processes	12	At the end of this chapter students will be able to develop a machining operations sequence

2. METHODOLOGY

Integrated courses (h)	30 h
Practical work (h)	
Project (h)	30 h
Visits (h)	

3. Evaluation

Designation	**Chapter(s)**	**Weighting**
Mini-project		0.25
Practical work		
Continuous monitoring	Chp1 -chp2	0.25
Presentation		
Final Review	Chp 1+2+3	0.5

4. Bibliographic References

Manufacturing quotation and metrology, Volume 3. Hermès, Lavoisier 2003 Optimization in manufacturing. Les éditions CEPADUES 2000.
Production Technician's Guide. HACHETTE Technique 1999. Elements of manufacturing. Editions ELLIPSES 1995.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department :Industrial Engineering** **2nd year Semester: 2** **Version number: 02** **Date: 15/10/2021**

Module: Programming of CNC machine tools

Code: MGIND22.50

Module group:
GM2-5

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the practice of profession
X		X	X

Teacher : Jamel Louati

Status: Professor

Mail: jamel.louati@enis.rnu.tn

Course	Laboratory and Practical works	Individual work	Total volume
30 h	**24 h**	**30 h**	**84 h**

Coefficient :	ECTS credits :
2	**3**

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department :Industrial Engineering** **2nd year Semester: 2** **Version number: 02** **Date: 15/10/2021**

1. RSE DESCRIPTION AND COMPETENCIES :

1.1 Description

This course provides the fundamental knowledge of setting up and programming numerically controlled machine tools for machining parts

1.2 Objectives

- Write an NC program in ISO language for machining a part on a CNC machine
- Use CAD/CAM software for tool path simulation and automatic NC program generation
- Setting up a NCM
- Machining on CNC

1.3 Prerequisites:

Reading and understanding a definition drawing (morphology, functional specifications: roughness, dimensional, geometric position and shape tolerances, general tolerances and roughness) Selection of tools and machining operations. Preparation of machining ranges. Selection of part assembly and isostatism Choice of cutting parameters

Upstream modules	Module taught	Downstream modules
	MGIND22.50	

1.4 Learning outcomes

Chapter	Title	Duration	Learning outcomes
Chapter 1	CNC Machine Tools: Definition, Structure and Characteristics	2h	Know the difference between conventional and CNC machine tools.
Chapter 2	Morphology of CNC Machine Tools	2h	Composition and role of each element.
Chapter 3	CNC Machine Tool Programming	10h	Complete a program in G code conversational language to machine a profile.

Chapter 4	The Fixed Shooting Cycles	8h	Complete a conversational language program with fixed cycles of turning.
Chapter 5	Fixed Cycles for Milling - Drilling, Boring and Tapping Cycles	8h	Complete a conversational language program with fixed milling cycles.
Practical work	Manual writing of a turning and milling program through the machine control panel. Program transfer through simulation software.	24h	Know how to handle a CNC Machine tool for milling and turning cases.

2. METHODOLOGY

Integrated courses (h)	24h00
Labs and Practical work (h)	30h00
Project (h)	40h00
Visits (h)	

3. Assessment

Activity	Chapter(s)	Rating
Mini-project		
Practical work		0.25
Proctored homework		0.25
Presentation		
Final Exam		0.5

4. Bibliographic References

[1] CAMERON R., Technology and CNC Machining, Elements of Computer Aided Manufacturing. Edition Saint-Martin, 1996.

[2] HAZARD C., La commande numérique des machines-outils. Edition Foucher, 1984.

[3] GONZALEZ P., La commande numérique par calculateur. Edition Casteilla Educalivre, 1993.

[4] RIMBAUD, LAYES, MOULIN, Guide Pratique de l'usinage, 1 Fraisage. Edition Hachette Technique, 1992.

[5] JACOB, MALESSON, RICQUE, Guide Pratique de l'usinage, 2 Tournage. Edition Hachette Technique, 1992.

	Module Description	**Department :Electromechanical Engineering Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

Module: Processing without material removal

Code: MGIND22.51

Module group: GM2-5

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
X			

Teacher : Moez Souissi

Status : Assistant Professor

Mail: souissi.moez@yahoo.fr

Course	Practical work	Personal work	Total volume
27 h	15 h	30h	72 h

Coefficient :	ECTS credits :
2	2.5

	Module Description	**Department :Electromechanical Engineering Engineering**
		Date : 15/10/2021
		Version N°: 2
		Semester : 1

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

The aim of this module is to teach students about all the manufacturing processes for metal parts, and then describes in details the forming operations by plastic deformation without removing material. After specifying the geometry and kinematics of the various processes, the chapter presents the practical implementation of the processes according to the temperature and the type of the main alloys (iron, aluminium and copper base).

1.2 Prerequisites

Implementation and manufacturing technology

Upstream modules	Module taught	Downstream modules
	MGIND22.51	

1.3 Learning outcomes

Chapter	Title	Duration	Learning outcomes
Chapter 1	Foundry materials	2	Review on the different types and characteristics of foundry materials.
Chapter 2	General	2	Comparison between processing of materials methods with and without chip removal.
Chapter 3	Sand casting	8	Define the architecture, method of preparation of the sand moulds taking into account all the calculation parameters necessary to determine the dimensions and shape of the model. Understand the areas of application. To know the characteristics of the parts made.

Chapter 4	Shell moulding	2	Define the method of making a shell mould. Understand the areas of application. To know the characteristics of the parts made.
Chapter 5	Moulding in expanded polystyrene	2	Learn how to make a model in expanded polystyrene. Method of preparing a shell for casting. Understand the areas of application. To know the characteristics of the parts made.
Chapter 6	Lost wax casting	2	Method of preparing lost wax moulds. Understand the areas of application. To know the characteristics of the parts made.
Chapter 7	Introduction to metal moulding	2	Difference between permanent and non-permanent moulds. Comparison of the quality of parts obtained by different processes.
Chapter 8	Casting in metal moulds	7	Method of preparing metal moulds. Understand the areas of application. To know the characteristics of the parts made.
Practical work	Lab activity 1: Sand casting Lab avctivity 2: Shell Lab activity 3: Lost wax casting	15	Melting of the metal to be cast. Prepare a sand mould and make the casting. Finishing of the resulting parts. Casting of the Aluminium in a metal mould. Assignment of the necessary finishing operations.

2. METHODOLOGY

Integrated courses (h)	27
Practical work (h)	15
Project (h)	
Visits (h)	

3. Assessment

Activity	**Chapter(s)**	**Rating**
Mini-project		
Practical works		0.25
Continuous assessment	1 à 4	0.25
Presentation		
Final Exam	1 à 8	0.5

4. Bibliographic References

https://dl.ummto.dz/bitstream/handle/ummto/3903/Ammar,%20Aziz.pdf?sequence=1
http://www.isetgf.rnu.tn/ENS/uploads/nciri_rached/M%C3%A9thodologie%20de%20la%20conception_Cours_Rached%20Nciri.pdf

	Module Description	Department :Industrial Engineering
		Date :22 /10/2021
		Version N°: 02
		Semester :04

English for Specific Purposes

Code : MGIND22.52

GM2-8

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession

Teacher : Ms Mariem FEKI

Status : Permanant

e-mail :fekimariem@gmail.com

Courses	Practicalworks	Individualwork	Total volume
24h		15h	39 hrs

Coefficient:	ECTS credits :
1	1.5

	MODULE DESCRIPTION	Department : Industrial Engineering
		Date : 30/10/2021
		versionN° : 02
		Semester :04

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

4.1 Description :

This course is directed to second-year industrial engineering students. it allows students to get accustomed to different business situations in different industries.

4.2 Objectives :

- develop fluency enhancement

-Improve listening skills for meetings and teleconferences

-Role, company and sector-specific vocabulary

-Achieving clarity in written English, and effective written communication techniques.

1.3 Prerequisites :

Intermediate level in general English

Knowledge of basic notions of business in English.

Mastery of basic writing strategies and speaking skills.

Upstream modules	Taught module	Downstream modules

1.4 Learning outcomes:

Chapters	Title	Duration	Learning outcomes
Chapter 1	Managers	6hrs	Students learn the different types of entrepreneurs, management strategies and departments of organizations. Top of organizations/HR/Leadership styles.
Chapter 2	Employees	6hrs	The main outcome sought is to have students acquainted with hiring and firing, remunerations, Industrial relations, increasing productivity. To have knowledge on these concepts and practice writing and talking about them.
Chapter3	Competition	6hrs	The unit's outcomes are mainly based

			on getting a knowledge on competitive language, extending a product range. Students should learn how to speak hypothetically; and participate in interviews.
Chapter4	Reading	3 hrs	The main outcome of this unit is to develop student's ability to read an article, be it scientific or newspaper article in the field of business. Then students should get trained on summarizing and paraphrasing articles and using references.
Presentations	Presentig/writing		In every class a group of students should introduce a chosen topic in a presentation or in a written essay.

2.METHODOLOGY :

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the self-study activities, students have to do the exercises given as homework.

Integrated courses (h)	21hrs
Practicalwork (h)	
Project (h)	
Visits (h)	

3. Assessment:

Designation	**Chapter(s)**	**Rating**
Mini-project		
Practical works		
Continuous assessment		
Presentation	All chapters	20%
Final Review	All chapters	80%

4. Bibliography :

Cotton.D, Falvey.D,Knet .S,: *Market leader: Intermediate Practice File*, ed Longman.

O'Brien, Josephine. English for Business. Ed, Thomson Heiln.

Walker, J (Ed), Practice tests for the Bec preliminary,Students' book. Express Publishing.

Sue, Robbins'. Collins Cobuild Business Vocabulary in Practice. Ths Univesity of Birmingham.

Brook-Hart, Guy. Business Benchmark, Student's book. Ed Bulats, Cambridge.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department :Electromechanical** **-Semester: 2** **Version number: 02** **Date: 15/10/2021**

Module: Mini project

Code: MGIND22.53

Module group: GM2-6

Specialty modules	Basic module	Engineering Sciences and Techniques	Preparation for the profession
			X

Teacher : Frikha Moez

Status : Assistant Professor

Mail: frmoez@gmail,com

Course	Practical work	Personal work	Total volume
- h	15 h	30h	45 h

Coefficient :	ECTS credits :
1	1,5

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION** **M.GEM22.46**	**Department :Electromechanical** **-Semester: 2** **Version number: 02** **Date: 15/10/2021**

1. COURSE DESCRIPTION AND COMPETENCIES :

1.1 Description

The mini-projects are an opportunity for the student to deepen and apply the concepts acquired during the courses. After the selection of a solution and the design, the student is asked to check the correct running and the resistance of its constitutive components.

1.2 Objectives

- Drawing up the specifications for a project according to requirements.
- Propose solutions and select the best one among the proposed solutions.
- Achieve the system design of the selected solution
- Sizing of the various system components by analytical procedures and finite element simulation
- Produce a prototype of the system by 3D printing and check that its proper work

1.3 Prerequisites

- Mechanical design

- Strength of materials

Upstream modules	Module taught	Downstream modules
	MGIND22.53	

1.4 Learning outcomes

Chapter	Heading	Duration	Learning outcomes

Practical work	- Study of the existing situation and problematic - Formulation of the specifications - Functional analysis and selection of solutions - Design with Solidworks - Sizing of the different components of the system - Prototyping of the designed system by 3D printing		- Understand the relationships between the system under study and the environment around it. - Define all the parameters to be taken into account for the proper running of the system. - Propose technological solutions to ensure system operation - Finite elements simulation and strength verification of all parts of the designed system - Creation of a reduced - prototype of the system by 3D

2. METHODOLOGY

Integrated courses (h)	—
Practical work (h)	30 H
Project (h)	20 H
Visits (h)	—

3. Evaluation

Designation	**Chapter(s)**	**Weighting**
Mini-project	———	
Practical work	———	0.5
Supervised Homework	———	
Presentation	———	0.5
Final Review	———	

4. Bibliographic References

- Guide de calcul en mécanique, *D. SPENLE & R. GOURHANT*, Hachette, edition n°3, 2001.

- Guide du dessinateur industriel, *A. CHEVALIER*, Hachette, 2004.

- Mémotech Productique: conception et dessin, *C. Barlier& R. Bourgeois*, Casteilla, edition n°3, 1995.

- Mémotech Génie Mécanique, C. Barlier& B. Poulet, Casteilla, edition n°3, 1995.

GIND 3

	Module description	**Department : Industrial Engineering**
		Date : 11/10/2021
		Version N° : 02
		Semester :1

Distribution Logistics

Code : MGIND31.55

Module group: GM3--2

Specialty modules	Main module	Engineering Science and Techniques	Preparation for the profession
x			x

Teacher : Karim KAMMOUN

Status : Assistant professor HDR

Mail : kammoun_karim@yahoo.fr

Courses	Practical work	Personal work	Total volume
24		**25**	**49**

Coefficient :	ECTS credits :
2	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module description**	**Department : Industrial Engineering**
		Date : 11/10/2021
		Version N° : 02
		Semester :1

1. DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED:

1.1 : Description

Distribution logistics is the practice of traditional logistics methods for a more optimized management of the various customer order flows from the supplier's warehouse (factory warehouse, distribution warehouse) to the delivery location, while taking an interest in both the movement of physical flows through the distribution network (transport management, inventory management, etc.), but also in the management of the logistic infrastructures that make up this network (locations, warehouse management, etc.). And having as its purpose to accomplish, in the best economic conditions and as soon as possible, the delivery of customer orders by the organization and the realization of the shipments of the goods from the place of taking at the supplier (manufacturer, distributor, etc.) to the place of final consumption.

Objectives :

- Understanding distribution channels via logistics platforms
- Mastering the management of the freight vehicle tour mainly in urban areas
- Familiarize yourself with some distribution logistics tools and methods

1.2 : Prerequisites:

Upstream modules	Taught module	Downstream modules
Order, operational research, transport management	Distribution logistics	Supply chain management

1.3 Learning outcomes :

Chapters	**Title**	**Duration**	**Learning outcomes :**
Chapter 1	Distribution Logistics: Fundamental Issues and Concepts	7h	The place and challenges of distribution logistics (missions/constraints)
Chapter 2	Warehouse and platform management	7h	Organisation of flows in warehouses and platforms, warehouse positioning issues
Chapter 3	Management of vehicle tours	7h	Issues of tour optimization, scheduling, Types of tours
Chapter 4	DRP (Distribution Resource Planning)	7h	DRP: Principle, Procedure and Difficulties of DRP

Practical work		20h	

2. METHODOLOGY

Contact hours consist of presenting different concepts, rules and diagrams. Practical applications are dealt with separately in directed exercises and practical work. For self-study activities, students must do the exercises given as homework.

Integrated courses (h)	24
Practical work (h)	
Project (h)	20
Visits (h)	

3. Evaluation

Designation	**Chapter (s)**	**Weighting**
Mini-project		25%
Practical work		
Continuous Assessment		25%
Presentation		
Final Rewiew		50%

4. Bibliographic references

XU Jian, (2007), « Modèles stochastiques évolutionnaires pour la gestion de tournées de véhicules avec fenêtres de temps souples et demandes floues »

Livre blanc, (2014), « mettre en place une solution pour optimiser ses tournées de véhicules »

Aurélien Rouquet, Kiane Goudarzi, (2009), « La logistique aval de la firme de distribution : « servir le client » ou « se servir du client ? »

Isabelle Gozé-Bardin, (2009), « LES DÉFIS DE LA LOGISTIQUE DE DISTRIBUTION À L'HORIZON 2035 », Management & Avenir n° 24 | pages 217 à 236

Gillett, B.E., & Miller, L.R. 1974. A heuristic algorithm for the vehicle-dispatch problem.

Operations research, 22(2), 340–349.

Ait Haddadene, S.R., Labadie, N., & Prodhon, C. 2016b. NSGAII enhanced with a local

search for the vehicle routing problem with time windows and synchronization constraints.

IFAC-PapersOnLine, 49(12), 1198–1203.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department : Industrial Engineering**
		Date : 10/18/2021
		N° version : 02
		Semestre : 2

Design and performance of Production Systems

Code : MGIND31.56

Module group: GM3--1

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession

Teacher : Wassim Masmoudi

Status : Assistant professor

Mail : wacim.masmoudi@gmail.com

Course	Practical Works	Personal work	Total Volume
24 h	15 h	15h	54 h

Coefficient :	Credits ECTS :
2	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department : Industrial Engineering**
		Date : 10/18/2021
		N° version : 02
		Semestre : 2

1. DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

1.1 :Description

Objectives

At the end of this course, the student should be able to:

1. Identify the different types of Production Systems (PS) design as well as their advantages and disadvantages

2. Master the simple methods of designing different types of layouts: Job-shop, flow-shop and cellular

3. Measure thePSs'performance indicators in general and processing lines in particular (balancing indicator, mean machines'utilisation rates, etc.)

This module allows the student to master production flows and be able to locate problems and find remedies. It also allows him to cover a large family of research problems: Decision-making for the design of a high-performance PS, Ability to improve and guarantee continuous improvement of the actions of a PS, etc.

1.2 : Prerequisites :

1. Production Management
2. Mastery of the different types of layouts
3. Mastery of the different types of PS' resources
4. Statistical analysis

Upstream modules	Taught module	Downstream Modules
MGIND12.14, MGIND22.47, MGIND22.49	MGIND31.56	MGIND31.65

1.3 :Learning outcomes

Chapters	Title	Duration	Learning outcomes
Chapter 1	General Information on Production	10h	- Production Concepts / Production Management - Characterization of a Production System (SP) - Different types of SPs - Elements making up a SP - Liaison of the SP with the work environment: internal and external - Classification of SP according to the type of

			Production
Chapter 2	Organization of manufacturing systems	10h	- Concept of flow and associated concepts - Characterization of a flow in industrial production - Formalization of a process - Different types of resources - Different types of layouts
Chapter 3	Performance of manufacturing systems	15 h	- Concept of performance and performance indicators - Time associated with equipment - Some performance indicators - Some ratios
Chapter 4	Optimized Production Technology (OPT)	19h	- Foundation of the OPT - Bottleneck and non-bottleneck machines - Basic principles of OPT - Implementation of the OPT
Practical work			-

2. METHODOLOGY

The face-to-facehours consist of presenting different concepts, rules and diagrams. The practical applications are treated separately in the tutorials and the practical works. Regarding self-study activities, students should do the exercises given as homework.

Integrated courses (h)	24 h
Practical work (h)	15 h
Project (h)	15h
Visits (h)	

3. Assessment

Designation	**Chapter (s)**	**Rating**
Mini-project		
Practical works		
Continuous assessment		
Presentation		
Final Review		

Bibliographic references

1. Ait Hssain A., (2000), "Optimisation des flux de production", méthodes et simulation, édition DUNOD, Paris.

2. Artigues, C., C. Briand, M. Portmann et F. Roubellat, (2002). "Pilotage des systèmes de production.", Edition Hèrmes.

	Module Description	Department : Industrial Engineering
		Date : 10/18/2021
		Version N°: 2
		Semester : 1

Project management

Code : MGIND31.57

Module group: GM3--3

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession
x			

Teacher : Sameh Chtourou

Statut : Assistant professor

Mail : sameh.chtourou@isgis.usf.tn

Courses	Practical works	Individual work	Total volume
24		**30**	**54**

Coefficient:	ECTS credits :
2	2

	MODULE DESCRIPTION	Department : Industrial Engineering
		Date : //2021
		versionN° :
		Semester :1

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

3.1 :Description

Project management is the process of leading the work of a team to achieve all project goals within the given constraints. This information is usually described in project documentation, created at the beginning of the development process. The primary constraints are scope, time, and budget. The secondary challenge is to optimize the allocation of necessary inputs and apply them to meet pre-defined objectives.

Objectives :

The objective of project management is to produce a complete project which complies with the client's objectives. In many cases the objective of project management is also to shape or reform the client's brief to feasibly address the client's objectives. Once the client's objectives are clearly established they should influence all decisions made by other people involved in the project – for example project managers, designers, contractors and sub-contractors.

3.2 Prerequisites :

Upstream modules	Taught module	Downstream modules
- Manufacturing process management - Management Graph theory	Project management	

1.3 Learning outcomes:

Chapters	Title	Duration	Learning outcomes
Chapter 1	Introduction to project management		Define a project
Chapter 2	Concept of project and project management		Know the main phases of a project
Chapter 3	Planning project		Determine more easily the different tasks that we will have to perform in order to complete a project.
Chapter 4	Scheduling technique		Monitor the progress of the project as part of project governance

Practical works	Initiation to MS-Project software		

2.METHODOLOGY :

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the self-study activities, students have to do the exercises given as homework.

Integrated courses (h)	24h
Practicalwork (h)	0
Project (h)	30h
Visits (h)	

3. Assessment:

Designation	**Chapter(s)**	**Rating**
Mini-project		10%
Practical works		
Continuous assessment		15%
Presentation		
Final Review		75%

4. Bibliographic references :

- « L'essentiel de la gestion de projet », Roger Aim, Gualino Editions, 11e édition.

- « Pratiques de management de projet – 46 outils et techniques pour prendre la bonne décision », Vincent Drecq, Dunod, 2e édition.

	Module description	**Department : Industrial Engineering**
		Date : 10/18/2021
		Version N° : 02
		Semester : 1

TRANSPORT MANAGEMENT

Code : MGIND31.58

Module group: GM3-2

Specialty modules	Main module	Engineering Science and Techniques	Preparation for the profession
X			

Teacher : Noomen GUIRAT

Status : Assistant professor

E-Mail : noomenguirat@gmail.com

Courses	Practical works	Individual work	Total volume
21h		**25h**	**46h**

Coefficient :	ECTS credits :
2	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module description**	**Department : Industrial Engineering**
		Date : 18/10/2021
		Version N° : 02
		Semester : 2

1. DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED:

3.3 : Description

This course presents and describes in a first part the different modes of transport composed of gear and infrastructure, emphasizing the specificities of each mode and its adaptability to the quantity and nature of the goods transported.

In a second part, this course explains how multimodality and intermodality could play a key role in the fluidification of traffic, the minimisation of transport costs, and the preservation of the ecological environment.

Objectives :

- Mastering what a transport system is
- Knowing the different modes of transport with the specificities of each
- Understanding how to align what is being transported with the appropriate conveyance
- Become familiar with multimodality and intermodality concepts and master their advantages
- Knowing how to make the best modal choice to transport

3.4 : Prerequisites:

No prerequisites required for this course

Learning outcomes:

Chapters	Title	Duration	Learning Outcomes
Chapter 1	Presentation of the different modes of transport	15	Mastering transportation system and the various modes associated with it
Chapter 2	Transport, multimodality and intermodality	15	Mastering multimodality and intermodality concepts, knowing how to estimate a transport cost according to modal choice
Chapter 3	Technological aspects of intermodal transport	18	Know the biggest innovations in this field

2. METHODOLOGY

The first six sessions are devoted to the definitions of concepts related to transport and the presentation of all modes (road, rail, maritime, air and river), and to specify each for the type of content in order to acheve the best transport operation.

The next three sessions focus on modal choice by illustrating multimodality and intermodality as solutions to reduce transport costs and improve delivery times and environmental performance.

Students are asked to prepare research to strengthen understanding in class, exercises to calculate transportation costs and ecological choices are also treated. Field visits are planned.

Integrated courses (h)	12H
Practical work (h)	
Project (h)	24H
Visits (h)	12H

4. Assessment

Designation	**Chapter (s)**	**Weighting**
Mini-project		
Practical work		
Continuous Assessment		25%
Presentation		
Final Review		75%

5. Bibliographic references

- Lamy, M-N. (2007). Multimodality in Online Language Learning Environments : Looking for a methodology. In Baldry, Anthony Montagna, Elena (eds.). Interdisciplinary Perspectives on Multimodality: Theory and practice. Proceedings of the Third International conference on Multimodality. Campobasso : Palladino, p. 237-254.
- Norris S. (2004). Multimodal Dicourse Analysis : A conceptual Framework. In Levine P. & Scollen, R. (eds) Discourse & Technology, multimodal discourse analysis, Washington, George Town University.
- Torrès, E. (2005) « La ville durable : quelques enjeux théoriques et pratiques », in : Mathieu N., (2005) et al., La Ville Durable, du politique au scientifique, Indisciplines, Nancy.

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module description**	**Department : Industrial Engineering**
		Date : 10/18/2021
		Version N° : 02
		Semester : 2

SUPPLY CHAIN MANAGEMENT

Code : MGIND31.59

Module group: GM3-2

Specialty modules	Main module	Engineering Science and Techniques	Preparation for the profession
x			

Teacher : Noomen GUIRAT

Status : Assistant professor

E-Mail : noomenguirat@gmail.com

Courses	Practical works	Individual work	Total volume
21h	**0**	**30h**	**51h**

Coefficient :	ECTS credits :
2	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**Module description**	**Department : Industrial Engineering**
		Date : 10/18/2021
		Version N° : 02
		Semester : 2

1. DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED:

1.1 : Description

Supply Chain Management is an integrated vision of logistics that takes care of all the flows and processes of making products available from suppliers to end customers throughout the product life cycle.

Objectives:

Know how to drive the key processes of a global supply chain, optimize the management of the company's partner networks upstream and/or downstream by better management of customer flows to the supplier and manage internal teams in a cross-functional approach.

1.2 : Prerequisites:

Upstream modules	Taught module	Downstream modules
Management of the company	Supply Chain Management	

1.3 : Learning outcomes :

Chapters	**Title**	**Duration**	**Learning outcomes :**
Chapter 1	Conceptual and contextual framework of Supply Chain Management (SCM)	15	Mastering SCM concepts, mastering the context in which SCM operates
Chapter 2	Supply Chain Management towards a global optimization of flows	15	Mastering the flow planning in global logistics within the extended company, knowing how to measure the overall performance of the company
Chapter 3	Case studies	18	- SCM models - Warehousing - Zara - Amazon - IBM - Xerox

			- Coca Cola

2. METHODOLOGY

The first five sessions consist in familiarizing oneself with all the concepts related to the global logistics chain by illustrating the different definitions explained in the literature (Supply Chain Management, Global Logistics, Integrated Logistics, flows, etc.).

The following five sessions will highlight the different definitions into practice to illustrate how companies have shifted from conventional logistics to global logistics by outsourcing.

Meanwhile, the students are called upon to prepare investigative work on what was presented during the first ten sessions in multinational models. This work will be presented, debated and noted during the last six sessions.

A final global assessment review is given at the end of the semester.

Integrated courses (h)	30
Practical work (h)	
Project (h)	18
Visits (h)	

3. Assessment

Designation	**Chapter (s)**	**Weighting**
Mini-project		
Practical works		
Continuous Assessment		25%
Presentation		
Final Review		75%

	MODULE DESCRIPTION	**Department: Industrial Engineering**
		Date: 10/18/2021
		Version No.: 02
		Semester 1

INVENTORY MANAGEMENT

Code: MGIND31.60

Module group: GM3--2

Speciality modules	Main module	Engineering Science and Techniques	Preparation for the profession
X			

Teacher: Diala DHOUIB

Status: Professor

E-mail: diala.dhouib@isgis.usf.tn

Courses	Practical works	Individual work	Total volume
24h		**30h**	**54 h**

Coefficient:	ECTS credits:
2	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department: Industrial Engineering**
		Date: 10/18/2021
		Version No.: 02
		Semester: 1

1. DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED:

1.1 :Description

This course shows students that inventory management is a set of activities that complement supply management and depend on production planning. The purpose of these activities is to minimize the cost of acquiring and owning different types of inventories while respecting several operational constraints.

Objectives

This course allows the student to:

- Master the various inventory management models that optimize the quantity to order or produce.
- Distinguish between deterministic and probabilistic models according to the nature of the demand, originating from Wilson's fundamental model by violating one of his assumptions each time.

1.2 : Prerequisites

Upstream modules	Taught module	Downstream modules
Management of production Management of the enterprise	Inventory and Supply Management	

1.3: Learning Outcomes

Chapters	**Title**	**Duration**	**Learning Outcomes**
Chapter 1	Supply Management	15 H	Know the procurement process
Chapter 2	Procurement Management	19 H	Know the purchasing process
Chapter 3	Inventory Management	20 H	Master deterministic and probabilistic stock management models

2. METHODOLOGY

Contact Hours consist of presenting different concepts, processes, and models. Practical applications are dealt with in an integrated way in the course and also separately in directed works. Regarding self-study activities, students do the exercises given as homework.

Integrated courses (h)	27H
Practical work (h)	
Project (h)	27H
Visits (h)	

3. Assessment

Designation	Chapter (s)	Weighting
Mini-project		
Practical work		
Continuous Assessment		25%
Presentation		
Final Review		75%

4. Bibliographic references

- ***Alain Garreau, et Michel Greif :*** Management Industriel et Logistique : Concevoir et piloter la Supply Chain, Economica, 2013.
- ***Alexandre Kamyab Samii*** : Stratégie logistique – Supply chain management : Fondements - Méthodes – Applications, Dunod, 2004.
- ***Cédric Stien*** **:** L'approche Supply Chain : Apprendre à manager par les risques, Afnor, 2009.
-***Martin Christopher*** :Supply Chain Management : Créer des réseaux à forte valeur ajoutée Broché, Pearson 2005.
-***Philippe-Pierre Dornier et Michel Fender*** : La logistique globale et le Supply Chain Management : Enjeux, principes, exemples, Eyrolles, 2007.

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	MODULE DESCRIPTION	**Department : Industrial Engineering**
		Date : 15/10/2021
		N° version : 02
		Semester :01

Predictive techniques

Code : MGIND31.61

Module group: GM3-3

Specialty modules	**Main module**	**Engineering Sciences and Techniques**	**Preparation for the profession**
		x	x

Teacher :Mohamed Cheikh

Status : Temporary

Mail :

Cours	**Travaux Pratiques**	**Travail personnel**	**Volume total**
30hrs		**20hrs**	**50hrs**

Coefficient :	**Crédits ECTS :**
2	2

	MODULE DESCRIPTION	**Department : Industrial Engineering**
		Date : 15/10/2021
		N° version : 02
		Semester :01

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

1.1: Description

Objectives

At the end of this module, students will be able to :

- Define time series
- Identify the different trend, seasonal, cyclical and random components
- Identify the appropriate forecasting methods for each time series
- Establish sales forecasts and distribution requirements in order to plan production

Upstream Modules	Taught Module	Downstream Modules
-Statistics - Econometrics	Predictive techniques	

1.3 :Learning Outcomes :

Chapter	Title	Duration	Learning Outcomes
Chapter 1	Introduction		Detect the evolution of a phenomenon over time, identify time series and their components
Chapter2	Forecasting methods for stationary series		Identify stationarity and predict the phenomenon from its past evolution
Chapter3	Prediction methods for series with a trend		Identify the trend and predict the phenomenon from its past evolution with the appropriate methods
Chapter 4	Forecasting methods for series with		Detecting seasonal and trend variations jointly according to the

	trend and seasonality		different patterns and applying the necessary methods to make the forecast
Practical Works			

5. METHODOLOGY

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the self-study activities, students have to do the exercises given as homework.

Integrated courses (h)	30hrs
Practicalwork (h)	
Project (h)	20h
Visits (h)	

1. Assessment:

Designation	**Chapter(s)**	**Rating**
Mini-project		
Practical works		
Continuous assessment		25
Presentation		
Final Exam		75

	MODULE DESCRIPTION	**Department : Industrial Engineering**
		Date : 15/10/2021
		N° version : 02
		Semester :05

Enterprise Resource Planning

Code : MGIND31.62

Module group: GM3--3

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession
x			

Teacher :Ramzi ELLOUZE

Status : Temporary

Mail :

Courses	Practicalworks	Individualwork	Total volume
	30h	20h	50h

Coefficient:	ECTS credits :
1.5	2

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department : Industrial Engineering**
		Date : 15/10/2021
		N° version : 02
		Semester :05

1.DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

Description

With the development of information technology and operations management methods, companies must integrate information systems to organise data, control supply chain parameters and industrial costs. All these parameters allow work to be planned correctly taking into account related constraints such as resource availability, capacity adequacy, etc. ERP (Enterprise Resource Planning) is the global information system that organizes the different functionalities and data of a company in an automatic way. This course gives the students an idea about the different types of ERP and the most used in the world. The different steps to follow to implement an ERP are then presented. After that, the students will work on das ERP which is one of the most used ERP by Tunisian industrial companies. The most important functionalities will be studied through this tool: machines, workers, workstations, planning with MRP, industrial costing, warehouse management, etc.

Objectives :

At the end of this course, students will know what an ERP is and its different parameters as well as the most used systems in the world. Using das ERP, students will be able to parameterize an ERP by introducing different master data and information related to workshops, warehouse, manufacturing sequences, planning methods, and industrial costing.

Prerequisites:

Inventory management, SCM, Planning

Upstream Modules	Taught Module	Downstream Modules
MGIND22.47 MGIND31.57 MGIND31.60	MGIND31.62	MGIND32.70

1.3 Learning Outcomes :

Chapter	Title	Duration	Learning Outcomes
	Introduction to ERP systems	2hrs	- Definitions of an ERP system

Chapter 1			- History of ERP systems - The different types of ERP offerings - The main ERP systems
Chapter 2	Project management of the ERP mplementation	2Hrs	ERP Project Stakeholders - ERP selection methodology - ERP implementationsteps
Chapter 3	Setting up company parameters in DAS-ERP	2Hrs	-Practical and functional architecture of DAS-ERP - Creation of a company operating in the automotive sector in das-ERP. - Plants, warehouses and domainparameters - Machines, workstations and operator parameters
Chapter4	Standard industrial cost in DAS-ERP	12hrs	**- Manufacturing sequence parameters** **- Status of material parameters** **- Graphical modelling of production sequences in DAS-ERP** **- Standard calculation of industrialcosts** **- Sales price determination based on target gross margin**
Chapter 5	Driving the end-to-end supply chain with DAS-ERP	12Hrs	- Inventory of stocks - Input of customer and supplier data - Procurement process: order tracking, net requirement calculation, inventory management. - Manufacturing process: Master production schedule, workload plan, material availability - Delivery, invoicing and packaging

2. METHODOLOGY :

The Contact Hours consist of an introduction to different related concepts. Several manipulations of the DAS-ERP will be performed in this course according to different functionalities

Integrated courses (h)	10hrs
Practicalwork (h)	20hrs
Project (h)	
Visits (h)	

3.Assessment:

Designation	Chapter(s)	Rating
Mini-project		
Practical works	Chapitre 1 à Chapitre5	100%
Continuous assessment		
Presentation		
Final Exam		

4. Bibliographicreferences :

- « Manager avec les ERP » de Jean-Louis LEQUEUX, éditions EYROLLES
- « ERP et PGI, comment réussir le changement » de Jean-Louis Tomas, éditions DUNOD
- LA DOCUMENTATION DAS-ERP

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department : Industrial engineering**
		Date : 10/18/2021
		Version N° : 02
		Semestre : 1

Industry 4.0 Advanced Operator

Code: MGIND31.63

Module group: GM3--1

Speciality modules	Main module	Engineering Sciences and Techniques	Preparation for the profession

Teacher: Sameh CHTOUROU

Status : sameh.chtourou@isgis.usf.tn

Mail : Assistant-Professor

Courses	Practical works	Individual work	Total volume
30h		20h	50 h

Coefficient :	Credits ECTS :
2	2

	MODULE DESCRIPTION	**Department : Industrial Engineering**
		Date : 10/18/2021
		Version N° : 02
		Semestre : 1

1. DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED:

1.1 : Description

Definition, tools, technologies and concepts of Industry 4.0 for the implementation of the digital transformation of companies' business processes in the context of the 4th industrial revolution. Application of technologies: internet of things (IOT), Big data, cloud computing et cloud manufacturing cyber physical system (CPS), artificial intelligence. Challenges: strategic positioning, development of new processes, Products and services; implementation of new monitoring capabilities, control, optimization and autonomy. Key principles: interoperability, decentralization of decision-making, real timing, integration, agility. Deployment strategies. Information system for industry 4.0.

Objectives

-To provide students with the knowledge enabling them to understand the challenges of new technologies, to master the concepts and finally to deploy and manage Industry 4.0 in their company.

- Analyze the situation of a company in order to determine the strategic, operational and organizational requirements and challenges necessary for the implementation of the new Industry 4.0 tools.

- Identify industrial transformation actions in the development, production and value proposition functions that can be profitably deployed in an industrial company.

- Oversee the deployment of Industry 4.0 throughout the company while managing the change management aspect, and assess the human, managerial and decision-making impacts in the company.

1.2: Prerequisites :

General knowledge of the fundamentals of strategy, industrial management, production systems, logistics, marketing, controlling et R & D

1.3 Learning Outcomes

Chapters	Title	Duration	Learning Outcomes
Chapter 1	General introduction to Industry 4.0: the principles and perspectives of concepts	7	Mastery of concepts
Chapter 2	Innovation and impact on Industry 4.0:	9	Control of the impact of innovation

	challenge or opportunities?		on Industry 4.0
Chapter 3	Lean, six sigmas and industry 4.0: successful transformation	9	Knowing how to combine quality methods with Industry 4.0
Chapter 4	Product development 4.0: the new frontier of competition	5	Understand the relationship between competition and industry 4.0
Chapter 5	Manufacturing 4.0: towards more operational efficiency	5	Know the role of manufacturing 4.0
Chapter 6	Offer value 4.0: transform to create and capture more value	5	Being able to create value with Industry 4.0
Chapter 7	Artificial intelligence and predictive analytics	5	Master the tools leading to artificial intelligence
Chapter 8	Industry4.0 Roadmap	5	Mastering the Industry 4.0 Roadmap

2.METHODOLOGY :

The Contact Hours consist of the presentation of different concepts, rules and diagrams. Practical applications are dealt with separately in tutorials and assignments. For the self-study activities, students have to do the exercises given as homework.

Integrated courses (h)	30h
Practicalwork (h)	
Project (h)	20h
Visits (h)	

3. Assessment:

Designation	**Chapter(s)**	**Rating**
Mini-project		
Practical works		
Continuous assessment		25%
Presentation		
Final Review		75%

	MODULE DESCRIPTION	**Department: Industrial Engineering**
		Date: 10/18/2021
		Version No.: 02
		Semester: 1

LEAN MANUFACTURING

Code: MGIND 31.64

Module group: GM3--4

Specialty modules	**Main module**	**Engineering Science and Techniques**	**Preparation for the profession**
X			

Teacher: Diala DHOUIB

Status: Professor

E-mail: diala.dhouib@isgis.usf.tn

Courses	**Practical works**	**Individual work**	**Total volume**
24		**30**	**54**

Coefficient:	**ECTS credits:**
2	2

2. DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED:

2.1 :Description

The course takes the form of an educational game entitled: «Muda». The aim of this game is to introduce participants to the principles and methods of Lean Manufacturing.

This educational game is a new way of teaching that simulates reality in order to better absorb the problems and real situations experienced by the company. Teaching through play makes participatory training, reduces resistance to change, promotes learning and facilitates the sharing of knowledge and know-how. With this game of Lean Manufacturing, the student closely touches the waste that can occur in the different processes of a company and contributes effectively to the improvement of performance.

The students lead a Lean project in a fictitious company (DOMOTICA company manufacturing household appliances). The group is divided into 4 teams, each with responsibility for part of the company: Purchasing, Production, Sales, Head Office.

Objectives

This course allows the student to:

- Discover what Lean Manufacturing is.
- Understand why many companies engage Lean projects.
- Know the implementation tools

2.2 : Prerequisites

Upstream modules	Taught module	Downstream modules
Management principles	Lean Manufacturing	

1.3: Learning Outcomes

Chapters	Title	Duration	Learning Outcomes
Chapter 1	Evolution of management models	6 H	Positioning of Lean in relation to other models
Chapter 2	Lean Manufacturing Basics	8 H	Notions of addedvalue / not addedvalue; waste (Muri, Mura, Muda); basic principles of lean

Chapter 3	Lean Manufacturing Approaches, Methods and Tools	14 H	Mastery of some lean methods (SMED, KANBAN, Poka Yoke, TPM, DMAIC, etc.)
Chapter 4	Educational game (3 phases: Diagnosis, Analysis, Action plan)	20 H	Launching a Lean project within a company

3. METHODOLOGY

First, the evolution, concepts, basic concepts, and methods related to Lean Manufacturing are advanced to students. Then, these requirements will be applied to a fictitious enterprise by simulating reality, in the form of an educational game. Finally, individual projects will be presented by the students. Everyone chooses a method that can be applied in a Lean project and presents it at the end of the semester in three stages: a PPT presentation, a participatory activity (a game, a video,) and a support (page A4, flyer, etc.) which summarizes the method for disseminating it within the group.

Integrated courses (h)	24 H
Practical work (h)	
Project (h)	24 H
Visits (h)	

4. Assessment

Designation	**Chapter (s)**	**Rating**
Mini-project		
Practical works		
Continuous Assessment		25%
Presentation		
Final Review		75%

5. Bibliographic references

- Lean Management: Tools, methods, feedback, questions/answers, Christian Hohmann
- The basics of Lean Manufacturing: In PMI and technology workshops, Pierre Bédry
- Lean management: 2nd edition updated, Michael Ballé
- Practical guide to 5S and visual management: for managers and supervisors Christian Hohmann

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department : Industrial Engineering**
		Date : 10/18/2021
		N° version : 02
		Semester : 2

Modeling and Simulation of Production Flows

Code : MGIND31.65

Module group: GM3--1

Specialty modules	Main module	Engineering Sciences and Techniques	Preparation for the profession
X		X	

Teacher : Wassim Masmoudi

Status : Assistant professor

Mail : wacim.masmoudi@gmail.com

Course	Practical Works	Individual work	Total Volume
21h	**15**	**30**	**66 h**

Coefficient :	Credits ECTS :
2,5	2,5

Université Privée Du Sud POLYTECHNIQUE DES SCIENCES AVANCÉES SFAX - TUNISIE	**MODULE DESCRIPTION**	**Department : Industrial Ingineering**
		Date : 10/18/2021
		N° version : 02
		Semester : 2

1. DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED :

1.1 :Description

Objectives

The objective of this course is to understand and master the evolution over time of real phenomena (analyze, model and study the behavior of a real system (production or service)) and to simulate the running of a production system in order to evaluate its performance.

Simulation-based flow analysis is a method that allows the student to predict the final performance of production systems. It also enables him to cover a vast family of research problems: sizing of production systems (PS), workshop management, launch of new products, increase in production, scheduling, planning, etc.

1.2 : Prerequisites :

1. Production Management
2. Production flow
3. Design of PSs and evaluation of their performance
4. Statistical analysis

Upstream modules	Taught module	Downstream Modules
MGIND12.14, MGIND22.47, MGIND22.49, MGIND31.56	MGIND31.65	

1.3 :Learning outcomes

Chapters	Title	Duration	Learning outcomes
Chapter 1	Modeling process	10 h	- Definitions: Model, Modeling - Prerequisites for modeling - Typology of models / Classification of models - Usefulness of modeling - Different types of models used - Resolution methods: Limitations and

			advantages of each method - Case study of the literature
Chapter 2	Simulation process	15 h	- Definition of simulation - Discrete event simulation - Areas of application of simulation - Advantages and disadvantages of simulation - Transitional regime and permanent regime - Statistical aspects of the results - Choice of a simulator - Examples of simulator
Chapter 3	Setting up a Simulation Project	15 h	- Stages of a simulation project - Collection of simulation results - Case of finite running system models - Case of infinite running system models - SIMAN / Arena simulation software - Case study
Chapter 4			
Practical work	Use of SIMAN / Arena simulation software	26 h	- Familiarization with ARENA modules - Development of a model - Simulation of the running of the model - AnalysisResults

2. METHODOLOGY

The face-to-facehours consist of presenting different concepts, rules and diagrams. The practical applications are treated separately in the tutorials and the practical works. Regarding self-study activities, students should do the exercises given as homework.

Integrated courses (h)	40 h
Practical work (h)	26 h
Project (h)	
Visits (h)	

1. Assessment

Designation	Chapitre (s)	Rating
Mini-project		
Practical works		0.25
Continuous assessment	Ch1-2	0.25
Presentation		
Final Review	Ch1-2-3-4	0.5

Bibliographic references

1. Ait Hssain A., (2000), "Optimisation des flux de production", méthodes et simulation, édition DUNOD, Paris.

2. Habchi, G. (2001). Conceptualisation et Modélisation pour la Simulation des Systèmes de Production. Rapport d'habilitation à diriger des recherches, Université de Savoie.

	MODULEDESCRIPTION	**Department: Industrial engineering**
		Date: 10/18/2021
		N° version: 02
		Semester: 1

Module: RESEARCH METHODOLOGY

Code: MGEM31.66

Module group: GM3-4

Specialty modules	Main module	Engineering sciences and techniques	preparation for the profession
X			x

Teacher: Noomen GUIRAT

Status: Assistant-Professor

E-mail: noomenguirat@gmail.com

Course	Practical work	Individual work	Total volume
30		**30**	**60**

Coefficient:	ECTS's credits:
2	2

	MODULE DESCRIPTION	**Department: Industrial engineering**
		Date: 11/10/2021
		N° version: 02
		Semester:

1. DESCRIPTION OF THE COURSE AND COMPETENCES TO BE ACHIEVED:

1.1 Description:

1. Explain the engineer's science approach characteristics.
2. Define a research problem
3. Choose a research technique and method in connection with the define problem
4. Build a data gathering tool/instrument according to the previously chosen technique and method
5. Carry out/Execute the data gathering with the tool built
6. Analyze the collected data
7. Interpret the obtained results

1.2 Objectives

Overall course's goal: apply the scientific approach to empirical research

Specifics objectives:

- Master the constituting elements of the scientific approach
- Execute/Apply all the steps of scientific approach

1.3: Prerequisites

Upstream modules	Modules taught	Downstream modules
	MGIND31.66	

1.4: Learning Outcomes

Chapters	**Title**	**Duration**	**Learning outcomes**
Chapiter 1	Characteristics of the engineer's scientific approaches	6	Master characteristics of the engineer's scientific approaches

Chapiter 2	Steps of a scientific work	6	Know how to plan scientific research
Chapiter 3	Engineering research techniques in science	6	Have an idea on the tools and methods invested in the research
Chapiter 4	Data gathering tools	6	Be able to collect data where it is located
Chapiter 5	Results analysis and interpretation	6	Promote the research

2. METHODOLOGY

Contact hours consist to present the scientific research in the engineer's world. Chapters are organized as seminar and organized with real practical case in the scientific research world.

Integrated courses (h)	30
Practical work (h)	
Project (h)	30
Visits (h)	

3. Assessment

Name	**Chapiter (s)**	**Weighting**
Mini-project		
Practical work		
Continuous Assessment		0.25
Presentation		
Final Review		0.75

4. Bibliographical references

- HUBERMAN A.Michael. / MILLES Matthew B. : ANALYSE DES DONNEES QUALITATIVES. Editeurs : DE BOECK UNIVERSITE Collation : 626p.

-LARDY Jean Pierre, RECHERCHE D'INFORMATION SUR L'INTERNET : outils et méthode ADBS EDITIONS Collation : 118p

- LARAMEE Alain / VALLEE Bernard : LA RECHERCHE EN COMMUNICATION : Eléments de méthodologie Notice générale. Editeurs : PRESSES UNIVERSITAIRE DE QUEBEC. 377p.

- LENOBLE-PINSON Michèle LA REDACTION SCIENTIFIQUE : Conception, rédaction, présentation, signalétique Titre. DE BOECK UNIVERSITE Collation: 152p

	DESCRIPTION DU MODULE	Département : Génie Informatique
		Date : 11/10/2021
		N° version : 02
		Semestre :

Information System Management

Code : MGIND31.69

Module group: GM3-3

Modules de spécialité	Module de base	Sciences et Techniques de l'Ingénieur	Préparation à l'exercice de la profession
x			

Enseignant :Nawel Jmaiil

Statut : Maitre de Conférence ESC

Mail :

Cours	Travaux Pratiques	Travail personnel	Volume total
45		15	60

Coefficient :	Crédits ECTS :
2	2

	DESCRIPTION DU MODULE	Département : Génie Industriel
		Date : 11/10/2021
		N° version : 02
		Semestre :

1. DESCRIPTION DU COURS ET COMPETENCES VISEES :

1.1 :Description

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Objectifs

Understand what a business information system is; ω Understand the different constituent dimensions of an IS: technical, organizational and managerial dimension

Understand the different elements of an IS: management, decision-making and operational system

Acquire the articulation of the IS with the corporate strategy (IS governance - IS project management)

Glimpse the management of an IS project and methods of supporting change

Discover the management of integrated software packages-ERP

1.2 : Prérequis :

Modules en amont	Module enseigné	Modules en aval
MGIND12.15		

1.3 :Résultats d'apprentissage

Chapitre	Intitulé	Durée	Résultats d'apprentissage
Chapitre 1	Introduction: What is an information system?	6	Corporate information systems infrastructure. IS and strategy: "the strategic role of IS
Chapitre 2	IS project management	12	Operational information systems Integrated management software

			Customer relationship management and IS. E-commerce
Chapitre 3	Work and communication systems	12	- Decision-making systems (SIAD) Information systems for the management of the company
Project	Supply chain and IS management	15	

2. METHODOLOGIE

Integrated courses (h)	**30h**
Practicalwork (h)	
Project (h)	**15h**
Visits (h)	

3. Évaluation

Mini-project	**Chapitre (s)**	**Pondération**
Practical works		
Continuous assessment		
Presentation		25%
Final Review		
Mini-project		75%

10. Regulations

Annex 9

Exams regulations

IPSAS EXAMS REGULATION BOOK

Preface

The purpose of this document is tointroducethe framework of regulatory provisions, the organization and validation of examinations within the Private Polytechnic Institute of Advanced Sciences of Sfax, here in after referred to as IPSAS. It applies to all IPSAS training courses. This document sets out the exam charter established in October 2018 and the general exam regulations.

1- PREPARATION AND ORGANIZATION OF EXAMINATIONS

1-1 Summons of student to pass exams:

Every student regularly registered with IPSAS and have paid his tuition fees is automatically registered for the exams.

The exam schedules are communicated to students by posting on the institution's notice boards and by email at least 07 days before the scheduled date to sit for the exams.

Every student whohave accumulated more than three absences in a module is subject to the non-authorization to sit for the exam relating to this module in the main- session exam.

Instead, he will be able to sit for the exam in the re- sit exam session. The lists of eliminations by module are displayed at least 7 days before the scheduled exam start dates.

1-2 Exam schedules:

The exam calendars including the date, time and place of each exam are brought to the attention of students by publishing on closed panels reserved for this purpose, at least 10 days before the outset of the exams and should no longer be modified, except in cases of force majeure duly noted.

The publishing of the written and oral exam calendars constitutes an individual invitation to the exams except for students eliminated for various reasons.

1-3 Special conditions for students with disabilities:

Students recognized as having temporary or permanent disabilities, who have previously obtained specific authorization from the competent service, benefit from special conditions within the framework of the examinations.

These conditions are as follows:

- The one third (1/3) of the overtime organized by the service in charge of examinations, in compliance with regulatory texts;

- It is urgently needed to get applicable, a special examination room and educational assistance (a person having been authorized by the administration to help him in composing andwriting in his place).

1-4 Exam subjects:

Each teacher has, alone and personally, the educational responsibility for the subject he delivers and its confidentiality until it is sent to the service responsible for the duplication. Indeed, he ensures the duplication in the strictest confidence with the printing service and ensures that a sufficient number of sealed envelopes are placed with the service in charge of examinations. Exceptionally, in case of impediment, he designates a replacement (necessarily a teacher) and gives his contact details in order to be reachable in case of emergency or need.

The subject must necessarily be proportional to the provided content and correspondent with the duration of the test.

The subject must recall the title and duration of the test and specify the scale of questions according to the test and the list of authorized documents or materials. In the absence of an intentional indication to the contrary, no document or material is authorized throughout the duration of the event.

The procedure for duplicating and submitting subjects to the service in charge of examinations is determined by each component according to its specialty, while respecting strict confidentiality.

The submission and printing of the subject must be made at least one week in advance, the date of the test or exam.

The teacher can propose an additional subject which will be adopted in the absence of confidentiality of the main subject as a substitute.

1-5 Materialpreparation for exams :

Administrative and / or personal services involved in the organization of exams:

- Prepare, in conjunction with teachers, the exam schedule.
- Convenestudents and supervisors .
- Plan and prepare the examination rooms and equipment necessary for the running of the tests.

- Receive the envelopes containing the examination papers and keep them in a safe and arrangethem to be sent to the site (s) of the test.
- Prepare the enrollment lists and examination inspection reports.
- Distribute the envelopes containing the tests on the day of the exam.
- Implement the logistical means necessary for the smooth running of the exams (according to the capacities and resources of the institution).
- Implement the necessary and adapted provisions for students with disabilities and inform supervisors of the special conditions from which these students would benefit from.
- Providestudentswith:
    - The number of perfectly legible copies of the subject.
    - Anonymous copies.
    - Easily identifiable draft papers (color, and stamp)
- Implement the means guaranteeing the anonymity of the copies to ascertain that it is anonymous.
- Ensure that material not used at the end of a test is recovered and returned to the service in charge of the exams.
- Keep the copies as well as the jury observations after the deliberations.

1-6 Anonymity of copies :

Anonymity of copies is mandatory regardless of the medium used. If necessary, the competent pedagogical secretariat is empowered to hand over anonymity when entering grades which will be validated by the responsible lecturer throughout a well-defined platform.

2- Examination process and realization :

2-1 Conditions of access for candidates to the examination room :

The student must be present in front of the examination room at least 15 minutes before the outset of the examination. First to remember, access to the examination room is prohibited before the arrival of supervising teachers.

It must be remembered, if a candidate presents himself after opening the envelopes containing the subject, the supervisor responsible for the examination room may, exceptionally (when the delay is due to a case of force majeure) subject to an entry authorization issued by the

examination center, authorize him to compose provided that the delay does not exceed 15 minutes after the outset of the test. In particular, no additional time will be given to this candidate, the indication of the delay and its reasons will be entered in the examination report.

2-2 Student's rights and duties regarding the exam :

The student must:

- Be present in front of the examination room at least a quarter of an hour before the outset of the test.
- Do not disturb the tranquil running of the exams, including in the immediate environment of the examination room.
- Respect all of the supervisor's instructions and commands and do not disturb the smooth running of the exam, in particular the change of seat and to stop writing instructionsby the end of the exam.
- Be provided with all the necessary documents for identification (the student card and the invitation to the exam are obligatory to bring with).
- Sign the entry and exit list.
- Sit in the seat reserved for him when a numbered assignment has been notified.
- Use the stamped exam papers and drafts made available by the administration.
- Each student is not allowed to possess any documents not expressly authorized for the test (course, manual, dictionary, etc.);
- Submit your copy at the time indicated for the end of the tests, even if it is a white copy, in which case do not forget to write your name.
- Be equipped with the school supplies authorized to sit for their exam and cannot exchange it between peers throughout the course of the exam.
- Not be in possession of any gadgets for storing and transmitting information such as electronic diary and mobile phone (even for clock use) which must be turned off and placed on the supervising teacher's table.
- Do not smoke in the examination room and it will under no circumstances be allowed to leave the examination room except in cases of absolute necessity.

2-3 Identification:

Another key to realize, to be admitted to the test, students must be in possession of their student cards and their invitation to the exams. In the hope that, they must be able to present an identity document with a photo (national identity card, passport, driving license).

When place numbers have been assigned, the student must first check his place number, by consulting the exhibited lists in the schooling data.

2-4 The instructions:

The student must under no circumstances be in possession of documents not expressly authorized for the examination.

Equally important, the student's personal belongings, including mobile phones and devices for storing and distributing information that must be turned off, must be left at the entrance to the examination room or at the place indicated by the supervisors.

2-5 Regulation of entry and exit to examination rooms:

Access to the examination rooms remains possible for any unpunctual student for a maximum of 30 minutes following the outset of the exams. After 30 minutes the late student will no longer have the right to enter the examination room and he would automatically be deprived to sit for the exam and maybe he would recapitulate it in the re-sit exam if not validated.

It is immediate that students make sure before entering the examination room that they take the necessary steps to remain in the examination room without leaving until after they have finished their composition work. Certainly, except for justified medical reasons or for urgent cases that student can leave the examination room to go to the toilet.

Equally important, no candidate may temporarily or definitively leave the examination room (even in the event that a white copy is handed over) before the elapse of 45 minutes from the outset of the examination.

Correspondingly, candidates who wish to temporarily leave the examination room will be allowed only for an emergency and those for one time only and must be accompanied, if

possible, by one of the supervisors. They must necessarily give their copies to the supervisor, who will give back copies to them on their return.

In any case, the student must not leave the examination room before having checked the identity and without having signed in front of his name for the delivery of a copy even if it is a unwritten copy (white copy: without wording). An unwritten copy must be identified by the student by writing his name and last name.

Once he left the examination room he is no longer authorized to go back to it once his copy has been delivered. Surely, the student must then even leave the environment of the examination rooms.

2-6 The monitoring mission:

The supervision of the examinations constitutes an educational act which constitutes part of the statutory obligations of the lecturers in the same way as the preparation of the subjects and the correction of the exams.

The lecturer responsible for the subject, even if he is not a proctor of his test, is required to be present at the examination room for assistance or to be reachable throughout the duration of the test. In the event of major impediment, he appoints a qualified representative and indicates to the service in charge of examinations the contact details allowing him to be reached.

The supervisors go before the start of the exams to the schooling service, which specifies their supervisory tasks and gives them all the documents necessary for maintaining of the exam.

Students have indeed the right to ask the supervisor to call on their course teachers for clarification whenever a crucial problem arises. By all means, the course teacher has the right to a single entry into the examination room and must clarify unclear points without, however, directing the student to the solution.

Supervisors will clearly be informed of the special examination conditions from which certain candidates benefit (1/3 additional composition time and / or any special provision in favor of students with disabilities).

Supervisors must be present at least 15 minutes before the outset of the exam and ensure that the material preparation of the examination room (places, copies, drafts ...) are properly organized and arranged in advance. They have full authority to determine the place of the students.

Add to this, supervisors verify obligatorily the identity of candidates. Only students who are concerned for the exams' call have the right to compose after their legal enrollment. With attention to, any candidate who cannot prove his identity will not be authorized to compose or deliver his copy.

Before the outset of the exam, the supervisors remind the candidates of the conditions under which they must compose.

Any candidate has sat to compose an exam must necessarily return a copy, even a blank one.

2-7 Exam report :

For eachexam , an examination report is drawn up including the date, nature and times of the exam , the name and signature of the supervisors.

At the end of the exam, the candidate hands on his copy to the supervisor by signing on the attendance list. By the same token, the responsible supervisor completes the examination report specifying:

- The number of students who attended the exam and notified as present, the number of absent ones, the identity of those present not appearing on the call list and authorized to dial subject to effective registration for the exam.
- The number of copies which were submitted.
- The observations or incidents observed during the test.

The responsible supervisor takes into charge for retrieving the copies, the attendance list, the exam report and their submission to the pedagogical secretariat concerned.

3- EXAM FRAUD

Any fraudster will be subject to the provisions of the already setregulations. And then, the finding of fraud can be made during or outside the exams. As a preventive measure, active and continuous surveillance constitutes an effective means of deterrence.

Any fraud committed during an examination may lead to a disciplinary sanction for the culprit, which may go as far as a definitive ban on taking any registration and undergoing any examination leading to a diploma or title issued by IPSAS.

In the event of fraud or attempted fraud, the responsiblesupervisor for the examination room must:

- Take all necessary measures to put an end to the fraud without interrupting the student's participation in the test (except in special cases: in the presence of substitution of person or disturbances affecting the course of the test, expulsion from the examination room may be spoken by the responsible supervisor)
- Seize immediately the document (s) or material used to subsequently establish the reality of the facts.
- Draw up a report about the fraud's type or way (precise and detailed report).
- Report the fraud to the attention of the Examinations Coordinator, the Secretary General and the Director of the Institution who may submit it to the disciplinary section of the Institution's Disciplinary Board.

In the most frequent cases where the candidate is not excluded from the examination room, the jury will deliberate on his grades and results under the same conditions as for any other ordinary candidate. Equally important, no certificate of achievement or transcript may be handed to him before the scientific Council delivers its sanction and punishment.

The disciplinary decision may touch the annul disputed test, the subject, the teaching unit, the semester or even the academic year if the trickery is of great significance.

Note: Any blatant distinguishing marks appearing on the student's copy will be considered an attempt at fraud and will be reported to the exams department.

4- CORRECTIONS, DELIBERATIONS AND COMMUNICATION OF RESULTS

4-1 The correction:

For the purpose to guarantee equity between the students a sufficient correction period which does not exceed 10 days is left to the correctors, taking into account the type of examination and the number of copies to be corrected.

Copies are corrected markedly under the authority of the teacher responsible for the teaching of the unit being examined. Specifically, in case of multiple correctors, the person in charge ensures the unity of the correction and the compliance of the marks while respecting the

principle of egalitarianism between the students. Again, the issue of correction respects compulsorily the anonymity of the copies.

The deadlines and modalities for the transmission of marks are fixed in advance by each department.

The General secretary of IPSAS is charged of transmitting the information about: online platform of marks, deadlines, regulations and dates of deliberations for each department where attendance is obligatory for all the tutors concerned by each department by forwarding an informative e-mail for all the responsible teachers who would ultimately respond to his instructions and commands promptly.

4-2 The Jury's Deliberation:

The jury is made up of teachers concerned by the teaching units evaluated. It includes the teachers of the Teaching Units and the qualified personalities who have contributed to the teachings. The composition of the juries as well as the name of the President of the jury are displayed before the start of deliberations. Participation in juries constitutes for the teaching staff an educational act included in the service. Therefore, attendance at deliberations is an obligation for lecturers.The jury deliberates sovereignly on the basis of all the results obtained by the student, in compliance with the procedures for checking knowledge.

It is highlyrecommended that students bring to the attention of the exam coordinator and / or director of the establishment, within 48 hours of the end of the exams, any information or event likely to have had an impact on the progress of their studies or exams results.

The juries remain sovereign in their decisions.

The various elements (copies, reports, briefs, etc.) used for the ratings must be made available to the jury during the deliberation as well as the attendance lists.

The jury ensures that the anonymity of copies is quietly respected and that anonymity is lifted and that the entry of marks and the validation of teaching units are checked.

The President of the jury ensures the regularity of the deliberation (presence of half of the members). At the end of the deliberation, the present members of the jury sign the minute the document where results are already displayed.

4-3 Communication of results:

At the end of the jury's deliberation, no further modification can be made to the meeting minutes except in the event of a material error in the postponement or calculation duly noted by the Chairman of the jury. In this case, the latter must immediately inform the other members of the jury. The marks and the “admitted” or “adjourned” results are communicated to the students by posting and the application of IPSAS intended to communicate with students.

4-4 Consultation of copies or works:

Students have the right, on their request and within 3 days of the results being displayed, to the communication of their copies and / or to an interview with the teacher (or teachers) responsible for teaching.

The teachers responsible for the examinations must organize a consultation session for the copies which will be clearly indicated by posting.

4-5 Issuance of certificates and diplomas:

The issuance of transcripts, certificates of achievement and diplomas can only be made to the concernedstudent, on presentation of an official identity document (national identity card, passport) or to a representative provided with a power of attorney given for this purpose, his own official identity document, and a photocopy of both sides of an identity document of the student giving the power of attorney.

The diploma is issued after deliberation by the jury.

5- General notes:

5-1 For lecturers :

The convening of teachers for exam supervision sessions includes the following instructions:

"In the event of a planned absence, you are requested to notify the Head of the Education Department in good time and inform him of the name of the colleague who will substitute you.

On the one hand, in order to optimize the course of exams:

• An "exam papers office" has been set up to accommodate supervising teachers.

• You are kindly requested to report to the exams office 15 minutes before the scheduled time for the exam.

• The exam papers will be given to you on your arrival by one of the members of the Examinations Committee who will indicate to you the examination room where the surveillance will take place.

• Any incident occurring during the exams must be reported to the members of the Examinations Committee present and will appear in the examination report.

On the other hand, the following instructions are worth remembering and must be scrupulously applied:

Before the start of the event:

• In the event of the absence of one or more students at the time scheduled for the exam, respect the regulatory 10 minutes granted to latecomers before opening the envelopes containing the exam papers.

• No student is allowed to enter the examination room after opening the envelopes containing the examinations, without being authorized by the examination committee.

• Remind students before the outset of the test of the need to respect the place number assigned to them.

• Remind students before the outset of the test of the regulatory points, concerning penalties in the event of fraud.

5-2 For students:

The general examination regulations are made known to all students and are posted on the boards and in front of all examination rooms. It comprises 12 articles :

- Article 1: Students must comply with the provisions of these regulations as well as the measures and decisions taken by the teacher responsible for the examination room.
- Article 2: Each student must, upon entering the examination room, bring his student card and / or his national identity card and his individual summons.

- Article 3: The candidate must deposit at the entrance to the examination room all documents and objects such as handbags and suitcase and especially duly closed cell phones.
- Article 4: The candidate is not authorized to carry any document with him.
- Article 5: The candidate must equip himself with everything necessary to face the exam.
- Article 6: The candidate is required to sign the enrollment list at the beginning and at the end of the examination session. The second signature must take place after the examination copy has been handed over directly to the teacher in charge of the examination room.
- Article 7: No student will be admitted to the examination room after the start of the test if he is not authorized by the examination committee.
- Article 8: No student will be allowed to leave the examination room before the end of the first half hour of each session and during the last quarter of an hour of said session.
- Article 9: No student is allowed to temporarily leave the examination room for any reason. In the event of force majeure, he must be accompanied by an administrative officer, in this case the liaison officer placed in front of the examination rooms.
- Article 10: Any fraud or attempted fraud exposes its perpetrator (s) to regulatory sanctions, the following acts are considered as such: possession of an unauthorized document, discussion or exchange of objects with another student whatever either the pattern, the throwing of documents, scrap paper or other on the ground or elsewhere.
- Article 11: When a student commits fraud or attempted fraud or any breach of the discipline of exams, he may be excluded from the examination room by the teacher in charge.
- Article 12: The use of the mobile phone during the examination session is considered an act of fraud which results in the immediate exclusion of the candidate.
- Important: Students must take the tests in their examination room and at their assigned place. Otherwise, they will be considered absent and will be assigned a grade of zero.

6- Conditions for success and passage from one level to another:

6-1 For licenses and bachelor degree:

During the deliberation of the main session, is declared admitted, any student with an overall average of at least 10/20 and having validated a minimum of 45 credits.

Any student who has not met these two conditions is declared adjourned. The adjourned student has the right to take the tests of all modules in which he or she has not obtained the general average of the subject.

6-2 For preparatory cycles:

During the deliberation of the main session, is declared admitted, any student with an overall average of at least 10/20.

Students who have been postponed will retake the exams for the subjects they have not passed.

The bar is set at a minimum average of 09/20.

6-3 For engineering cycles programs:

Examination regulation for engineering programs is summarized on the table below:

Main Session	OverallAverage	Average of the groups of modules
Passed	≥ 10/20	≥ 08/20
Control Session .Situation (1)	≥ 10/20	1G.M. or more have an average of less than 08/20. In this situation, the student can only take the exams of the non-validated subjects of this (these) group(s) of modules.
Control session .Situation (2)	≤ 10/20	The student can sit for the exams of all non-validated subjects.
Control session		
Admitted	≥ 10/20	≥ 08/20
Redemption (1)	9.5≥Average <10	≥ 08/20
Redemption (2)	≥ 10/20	A single group of modules averaging between 7.5 and 7.99
Admittedwithcredit	≥ 10/20	Only one group of modules averaging between 7 and 7.49

6-4 Redundancy and Granted Credits:

Any repeating student, whether he or she is an IPSAS student or from another institution, retains his or her validated credits. In other words, he retains the grades for subjects with an average of 10/20 or higher. They must attend classes in non-validated subjects and pass all tests (Continuous Assessment and Examination)

6-5 Average calculation:

PrivatePolytechnic Institute of Advanced Sciences of Sfax (IPSAS)

Direction of Studies on 02/09/2020

Calculation of Averages, for the Engineering Specialties :

- **Main Session**

  oSubject Mixed system (Continuousassessment (DCC)+Examination (E) : Average = ((0.5 x DCC)+(1 x E)) / 1.5

  oSubject Mixed system (Continuousassessment +Practicalwork(PW) +Examination (E) : Average = ((0.5xDCC)+(0.5xPW)+(1xE)) / 2

  o Workshop or Mini Project (PW, practicalwork) : Average = score of PW

- **Control Session**

  oSubject Mixed regime (DCC+E) : Average = ((0.5xDS)+ (1 x Superior score(E of main or control session)) / 1.5

  o Subject Mixed regime (DCC+PW+E) : Average = ((0.5xDCC)+(0.5xTP)+ (1 x Superior score(E of main or control session)) /2

  o Workshop or Mini Project (TP) : Average = Score PW

Calculation of Averages, Preparatory Cycle :

- **Main Session**

  oSubject Mixed system (Continuousassessment +E) :Average = ((0.5 x DCC)+(1 x E)) /1.5

  oSubject Mixed system (Continuousassessment +Practicalwork +Examination) :Average = ((0.5xDCC)+ (0.5xTP)+ (1xExamen)) /2

- **Control Session**

  oSubject Mixed regime (DCC+Exam) :Average = ((0.5xDS)+ (1 x superior score (E of main or control session)) /1.5

  oSubject Mixed regime (DCC+TP+Exam) : Average= ((0.5xDCC) +(0.5xTP) +(1x superior score (E of main or control session)) /2

Overall average: OV

OV= ∑ ((Each module average x correspondent module coefficient)) / (∑ Coefficients)

11. The student`s chart

CHARTER

of the IPSAS students

Article 1: Purpose

The CHARTER presents the internal regulations for the students of IPSAS. It determines the fundamental rules that are strictly obligatory to be respected by each student during his/her administrative membership of this university institution. It presents a personal contract of the student with the IPSAS Administration, which aims at the good progress of the education and mutual respect between all

Article 2: Commitment of the student:

I, the undersigned, ... …….

CIN (Passport) ..... Tel: .....

E-mail : .....

Student in the following course: ..... A.U.: .....

(to be specified)

I undertake and confirm by signing this CHARTER that :

2.1. I accept and will comply fully and correctly with all the rules described in this CHARTER during the period of my administrative membership of the ULS (IPSAS),

2.2 In case of non-compliance or violation of my commitments described in this CHARTER I will suffer all the administrative, financial and legal consequences provided for.

Article 3: Registration of students:

Training at IPSAS is not free of charge and enrolment is compulsory within the stipulated deadlines. The tuition fees are fixed by the Administration and are payable in instalments as follows: the first instalment is required at registration, the second instalment must be paid before the end of December and the third instalment is to be paid at the latest before the end of April during the academic year.

Article 4: Organisation of teaching

4.1 Teaching

Teaching at IPSAS is carried out according to the study plans approved by the Tunisian Ministry of Higher Education and specific for each speciality. The organisation of the curricula and the annual calendar are ensured by the IPSAS Administration. An academic year is divided into two semesters, each of which lasts 15 weeks of teaching plus one week reserved for examinations.

Students are required to attend all courses (lectures, practical work, seminars and company visits). It is controlled by the teachers and the Administration. When absences in a unit or element exceed 20% of the module's hourly volume, the student concerned is not allowed to attend the main examination session.

Attendance at all examinations (tests, assignments, examinations, viva voce, etc.) is compulsory. Any absence from a test will result in a zero mark.

It should be noted that medical certificates do not necessarily constitute a justification for absences.

Students are obliged to keep themselves informed through the IPSAS websites (www.uls-ens.net or www.ipsas-ens.net) about all announcements concerning the organisation of studies, timetables, assignments and exams, internships and cultural and social life. For students in their final year of study, the course includes the preparation of a professional final year project.

Article 5: Internships

During their university education at IPSAS, each student must complete two internships:

a) An internship in the 1st year (working internship) lasting one month, the host structure of which may be a company, an association or .....

b) An internship in the 2nd year (technician internship) lasting one month, which must be carried out in a company.

At the end of each internship, the student must present an internship diary and a report which are evaluated by a jury. The host organisation gives an assessment of the trainee at the end of the placement.

If a traineeship is declared inconclusive by the jury, a replacement traineeship must be carried out and evaluated under the same conditions.

Article 6: Final projects

Upon successful completion of the final year exams, each student must prepare a 5-month Final Year Project (FWP).

The PFE is defended before a Jury appointed by IPSAS.

Students are allowed to defend the FDP in the following cases:

* all validated GM,
* all internships validated,
* compliance with all conditions required by the IPSAS Administration (payment of tuition fees, etc.)
* submission of the necessary documents (dissertation, technical file, postcard, CD, written authorisation for the defence, ...) within the deadlines set by the IPSAS Administration.

Note: All documents presented by students for the PFE defence must be checked and signed by the academic supervisor.

Article 7: Students' rights :

The student registered at IPSAS and signatory of this CHARTER has the right to :

a) All information from the IPSAS Administration that concerns him/her,
b) Access to classrooms and practical training rooms according to the posted timetable,
c) Access to rooms authorised for preparation during revision periods.
d) Pedagogical consultations with the teachers,
e) For any problem concerning courses or practical work, the student must contact the Coordinator of the speciality,
f) Participation in IPSAS clubs according to the rules of the desired club,
g) Participation in the sports and cultural life of IPSAS students,
h) Participation in applied industrial research teams within IPSAS for the development of industrial projects
i) Participation in the different training courses and/or events provided for in the Conventions between IPSAS and its national and international partners.

Article 8: Obligations of the student :

The student, registered at IPSAS, undertakes to respect the following rules:

a) Attendance during the course and practical sessions:

Late arrivals at the beginning of the sessions are to be avoided. In case of repeated lateness, the IPSAS Disciplinary In case of repeated lateness, the IPSAS Disciplinary Board will take action. Absences are counted and are taken into account for the continuous assessment grade,

b) Telephone calls and cigarette breaks are strictly forbidden during class sessions and exams.

c) Entrance and exit from the rooms are signalled by a bell that must be respected.

d)The duration of breaks must be respected and teachers will be asked not to accept latecomers,

e) The student is obliged to have for each session of class, practical work, homework or exam

f) The student is obliged to have the material required by the teacher (course notes, calculators, etc.). In case of non-compliance with these obligations the teacher has the right to take appropriate measures.

g) The use of unauthorised equipment and documents by students during tests is the use of unauthorised equipment and documents by students during tests is forbidden,

h) The student's participation in the course, his/her attendance, the execution of personal work required by the teacher, arerequired by the teacher are taken into account in the marking of the continuous assessment.

i) Attempts to cheat in any test will be severely punished.

Article 9: Appearance before the Disciplinary Board:

The IPSAS Disciplinary Board is chaired by the Director of the institution. A student is summoned to appear before the IPSAS Disciplinary Board in the following cases

a) Having been the subject of a report of disrespect towards a teacher or an agent of the Administration,

b) After an attempt to cheat during the tests (exam, homework or continuous assessment). This situation leads to the exclusion of the student from the examination room. A mark of zero is automatically awarded and the student's file is submitted to the Disciplinary Board. The student is called to appear before the Discipline Council in writing and must be informed of the facts of which he or she is accused. The student has the right to defend himself.

The Discipline Council deliberates on one of the following sanctions:

- Warning,

- Ban on taking examinations for one or two sessions,
- Exclusion from the institution for a maximum period of one academic year,
- Permanent exclusion from the institution.

Note: In the last two cases, the student is not entitled to a refund of tuition fees.

Article 10: Validity of the Charter

10.1. This CHARTER is valid after its signature by the Director of IPSAS and the student, until the student's final departure.

10.2. The CHARTER is made in two signed copies: one for the IPSAS Administration one for the IPSAS Administration and one for the student.

Done in Sfax, on .....

Student: Director of IPSAS:

....