

**Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department**



Academic Program and Course Description Guide

2023–2024

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: University of Technology.

Faculty/Institute: Department of Electrical Engineering.

Scientific Department: Electronic Engineering.

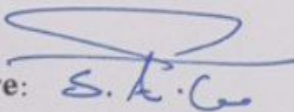
Academic or Professional Program Name: Electronic Engineering program.

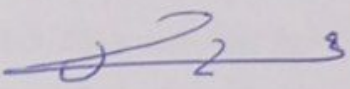
Final Certificate Name: B.Sc. Electronic Engineering

Academic System: Semester System.

Description Preparation Date: 26/03/2024

File Completion Date: 26/03/2024

Signature: 
Head of Department Name:
Assist. Prof Sabah A. Gitaffa
Date: 1/04/2024

Signature: 
Scientific Associate Name:
Prof Dr. Mohammed Yousif Hassan
Date: 1/04/2024

The file is checked by:

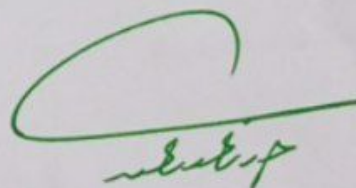
Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance

Lecturer Sarab Ali Mahmood

Date: 28 / 03/2024

Signature: 



Approval of the Dean

Assist.Prof Dr. Jabbar Khalaf Mohammed

19-4-2024

1. Program Vision

1. Program Vision

The vision of the department is to be a distinct department among nationally and globally corresponding engineering departments and to be a beacon in the scientific knowledge to keep up with scientific development and a leader in higher education and scientific research through the preparation of engineering cadres in the fields of Electronic Engineering in all specialties to serve the community and providing a motivating environment to become an international department in the ranking.

2. Program Mission

The mission of the department is to prepare and develop national engineering cadres in Electronic Engineering disciplines qualified academically, pedagogically and professionally which able to serve the community and meets the requirements of the labor market in accordance with quality assurance standards.

3. Program Objectives

1. Graduation of advanced engineering staff in all Electronic Engineering disciplines academically and professionally qualified to meet the needs of the labor market.
2. Provision of a distinct university environment for creativity and scientific research.
3. Optimal usage of resources and available possibilities to get the international academic accreditation according to quality assurance standards.

4. Working on the prosperity and development of the community by providing research projects and advisory services which contribute to the solution of the problems and the development of society.
5. Attracting the distinct scientific talents in the field of Electronic Engineering in all specialties locally and internationally to achieve the vision of the department.
6. Strengthening and developing the relations of the department with the corresponding scientific departments locally and internationally and with the related institutions and ministries to service the community.

4. Program Accreditation

The department is preparing to obtain accreditation from an organization ABET.

5. Other external influences

Scientific trips and field visits.

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
College Requirements	128	298	42%	Basic + 4 Optional
Department Requirements	65	153	42%	Basic + 2 optional
Summer Training	Yes			
Other	2	8	25%	Workshop

7. Program Description						
Year/Level	Course Code	Course Name	Credit Hours			
			Theoretical	Lab	Pra.	Tutorial
First/ Semester1 Bologna system	WSHE106	Workshops			6	
	ENLA107	English Language	2			
	DITE111	Digital Techniques	3	2		
	FUEE112	Fundamentals of Electrical Engineering 1	3	2		1
	MATH113	Mathematics 1	3			1
	PHEL114	Physics of Electronics	4			
First/ Semester2 Bologna system	DEHR105	Democracy and Human Rights	2			
	WSHE106	Workshops			6	
	COSC108	Computer	1	2		
	ENDA121	Engineering Drawing and AutoCAD		2	2	
	FUEE122	Fundamentals of Electrical Engineering 2	3	2		1
	MATH123	Mathematics 2	3			1
	MEEN124	Mechanical Engineering	3			
Year/Level	Course Code	Course Name	Credit Hours			
			Theoretical	Practical	Tutorial	
Second/ Semester 1	ECEU211	Technical English II	2			
	ECEB212	Engineering Mathematics I	3			
	ECEU213	Crimes of the Ba'ath regime in Iraq	2			
	ECEB214	Electromagnetic Fields I	2		1	
	ECEE215	Analog Electronics I	2		1	
	ECEE216	Electrical Circuits I	2		1	
	ECEE217	Electrical DC Machines	2		1	
	ECEE218	Instrumentation and Measurements	2			
	ECEP219	Analog Electronics Lab. I and DC Machines Lab.		4		
Second/ Semester 2	ECEB221	Probability Theory and Engineering Statistics	2			
	ECEB222	Engineering Mathematics II	3			

	ECEU223	Democracy and Human Rights	2		
	ECEB224	Electromagnetic Fields II	2		1
	EC EE225	Analog Electronics II	2		1
	EC EE226	Electrical Circuits II	2		1
	EC EE227	Electrical AC Machines	2		1
	ECEC228	Computer Programming	2	2	
	ECEP229	Analog Electronics Lab. II and AC Machines Lab.		4	
Year/Level	Course Code	Course Name	Credit Hours		
			Theoretical	Practical	Tutorial
Third / Semester 1	ECE311	Human Rights	1		
	ECE312	Engineering Analysis I	3		1
	ECE313	Microelectronic Circuit Design	2		1
	ECE314	Control Engineering I	2		1
	ECE315	Information Theory and Coding	2		
	ECE316	Analog Communication	2		1
	ECE317	Wave Propagation	2		
	ECE318	Instrumentation & Measurements I	2		
	ECE319	Electronic & Communication Engineering Lab. III			8
Third / Semester 2	ECE321	Democracy	1		
	ECE322	Engineering Analysis II	3		1
	ECE323	Microprocessor Engineering	2		1
	ECE324	Control Engineering II	2		1
	ECE325	Satellite & Navigation	2		
	ECE326	Digital Communication	2		1
	ECE327	Antennas	2		
	ECE328	Instrumentation & Measurements II	2		
	ECE329	Electronic & Communication Engineering Lab. IV			8

Year/Level	Course Code	Course Name	Credit Hours		
			Theoretical	Practical	Tutorial
Fourth / Semester 1	ECE411	Final Year Project I	1	3	
	ECE412	Industrial Management I	2		
	ECE413	Digital Systems' Design	2		1
	ECE414	Microwave Engineering	2		1
	ECE415	Digital Signal Processing	2		1
	ECE416	Artificial Intelligent Systems I	2		
	ECE417	Numerical Methods I	3		
	ECE418	Elective Subject (A)	2		
	ECE419	Electronic & Communication Engineering Lab. V		6	
Fourth / Semester 2	ECE411	Final Year Project II	1	3	
	ECE422	Industrial Management II	2		
	ECE423	Microcontrollers	2		1
	ECE424	Mobile Communication	2		1
	ECE425	Computer Networks	2		1
	ECE426	Artificial Intelligent Systems II	2		
	ECE427	Numerical Methods II	3		
	ECE428	Elective Subject (B)	2		
	ECE429	Electronic & Communication Engineering Lab. VI		6	

8. Expected learning outcomes of the program	
Knowledge	
1. Fundamentals of Electronic Engineering	<ul style="list-style-type: none"> • Mastery of basic concepts, theories, and principles in electronic engineering.
2. Engineering Applications	<ul style="list-style-type: none"> • Understanding of the applications of electronic engineering in various industries and fields, such as telecommunications, robotics, and control systems.

3. Latest Technologies	<ul style="list-style-type: none"> ● Knowledge of the latest technologies and innovations in the field of electronic engineering and how to apply them in solving practical problems.
Skills	
<ul style="list-style-type: none"> ● Analysis and Design 	<ul style="list-style-type: none"> ● Ability to accurately analyze engineering problems and design innovative solutions using electronic engineering principles.
<ul style="list-style-type: none"> ● Practical and Experimental Skills 	<ul style="list-style-type: none"> ● Proficiency in using electronic equipment, conducting experiments, and interpreting data to develop a deep understanding of theoretical concepts.
<ul style="list-style-type: none"> ● Technical Skills 	<ul style="list-style-type: none"> ● Mastery of using specialized engineering software, programming microcontrollers, and designing electronic circuits.
Ethics	
1. Professional Ethics	<ul style="list-style-type: none"> ● A strong commitment to ethical and professional standards, emphasizing the importance of integrity, responsibility, and respect for intellectual property rights.
2. Teamwork	<ul style="list-style-type: none"> ● Ability to work within multidisciplinary teams, with an appreciation for diversity and inclusivity in the workplace.
3. Continuous Improvement	<ul style="list-style-type: none"> ● Belief in the importance of lifelong learning and self-improvement as a foundation for professional and personal success in the field of electronic engineering.

9. Teaching and Learning Strategies

1. Presenting exercises during lectures and assigning them to students for completion at home, along with laboratory applications relevant to their field of study.
2. Monitoring students' learning methods and assessing their knowledge growth throughout the academic year, understanding their needs, weaknesses, and strengths, and possessing the ability to evaluate their progress realistically.
3. Utilizing modern electronic tools for illustration.
4. Adopting contemporary textbooks.

10. Evaluation methods

1. Exam sudden and evaluation of homework in addition to the written exam quarterly
2. A quarterly exam
3. Exam quarterly "small projects
4. Preparing quarterly reports
5. Class discussions and discussions
6. Determine the grade for daily attendance

11. Faculty

Faculty Members

Academic Rank	Specialization		Number of the teaching staff	
	General	Special	Staff	Lecturer
Professor	Electrical and Electronic Engineering	Electronic Engineering	2	
Professor	Electrical and Electronic Engineering	Radar Engineering and Signal Processing	1	

Professor	Electrical and Electronic Engineering	Laser Engineering	1	
Professor	Electrical and Electronic Engineering	Refractories	1	
Professor	Electrical and Electronic Engineering	Fiber optic Applications	1	
Professor	Electrical and Electronic Engineering	Microwave Engineering	1	
Assistant Professor	Electrical and Electronic Engineering	Electronic Engineering	1	
Assistant Professor	Electrical and Electronic Engineering	Communications Engineering	1	
Assistant Professor	Electrical Engineering	Control engineering	1	
Assistant Professor	Electrical Engineering	Electronic Engineering	4	
Assistant Professor	Electrical Engineering and Education	Communications Engineering	1	
Lecturer	Electrical and Electronic Engineering	Electronic Engineering	3	
Lecturer	Electrical and Electronic Engineering	Computer Engineering	1	
Lecturer	Electrical and Electronic Engineering	Wireless Sensor Networks	1	
Lecturer	Electrical Engineering	Electronic Engineering	9	
Lecturer	Electrical Engineering	Electronic and Communications Engineering	4	
Lecturer	Electrical Engineering	Electrical Power Engineering	1	
Lecturer	Electronic Engineering	Biomedical engineering	1	
Lecturer	Control and Systems Engineering	Computer Engineering	1	
Lecturer	Computer Science	Multimedia	1	
Lecturer	Civil Engineering	Construction Engineering	1	

Lecturer	Law	Civil Law	1	
Assistant Lecturer	Electrical Engineering	Electronic and Communications Engineering	2	
Assistant Lecturer	Electrical Engineering	Electronic Communications Engineering	1	
Assistant Lecturer	Electromechanical Engineering	Electromechanical Systems Engineering	1	
Assistant Lecturer	Computer and Communications Engineering	Information and Communications Engineering	1	
Assistant Lecturer	Mathematics Sciences	Order Theorem (algebra)	1	

Professional Development

Mentoring new faculty members

1. In the Electronics Engineering department, new members are developed through workshops, discussion circles, and training courses on topics such as teaching methods, educational qualifications, digital teaching strategies, and specialized courses in scientific research, among others. This also includes training for newly appointed staff under the supervision of competent, experienced professors from the department, and assessing their teaching eligibility to ensure it meets the requirements for obtaining an academic title.
2. Publication of a scientific paper in Scopus-indexed journals is mandatory.

Professional development of faculty members

1. Participating in courses aimed at developing teaching skills through continuing education programs.
2. Organizing specialized seminars and workshops.
3. Encouraging faculty members to participate in national and international conferences.

12. Acceptance Criterion

1. The central admission criterion from the Ministry of Higher Education and Scientific Research for high school graduates (applied sciences, biology).
2. Admission of the top 10% of graduates from vocational education institutes (within the specialization).

13. The most important sources of information about the program

- Thomas L. Floyd – “Digital Fundamentals 9e”, Publishing Pearson.
- Thomas L. Floyd – “Electronic Devices 9th”, Publishing Pearson.
- David M. Pozar – “Microwave Engineering”, Publishing John Wiley & Sons, Inc.
- Behrouz A. Forouzan – “Data Communication and Networking”, Publishing McGraw-Hill.

14. Program Development Plan

1. Developing plans to improve the curriculum and syllabus to achieve sustainable development.
2. Providing software and systems for virtual e-learning based on electronic platforms to support the continuity of the educational process.
3. Developing plans and mechanisms necessary for upgrading scientific laboratories in the department by equipping them with modern devices and equipment of reputable scientific origins to ensure optimal practical training for students in alignment with the job market, serving the community, and achieving the highest levels of sustainable development.
4. Employing new concepts in the field of Electronics engineering sciences.

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
First/ Semster1	WSHE106	Workshops	C	*	*			*	*	*			*	*	*
	ENLA107	English Language	C	*	*	*		*	*	*		*	*	*	
	DITE111	Digital Electronic I	C	*	*			*	*	*			*	*	
	FUEE112	Fundamentals of Electrical Engineering 1	C	*	*	*		*		*	*			*	*
	MATH113	Mathematics 1	C	*	*	*		*	*	*		*	*	*	
	PHEL114	Physics of Electronics	C	*	*			*			*			*	*
First / Semster2	DEHR105	Democracy and Human Rights	C	*	*			*		*	*			*	*
	WSHE106	Workshops	C	*		*		*		*	*			*	*
	COSC108	Computer	C	*	*	*		*	*	*		*	*	*	

	EDAC121	Engineering Drawing and AutoCAD	C	*	*	*		*	*	*		*	*	*	
	FUEE122	Fundamentals of Electrical Engineering 2	C	*	*	*		*	*	*		*	*	*	*
	MATH123	Mathematics 2	C	*	*			*	*	*		*			
	MEEN124	Mechanical Engineering	C	*	*	*				*		*	*	*	
Second / Semester 1	ECE211	Technical English II	C	*	*			*	*	*			*	*	*
	ECE212	Engineering Mathematics I	C	*	*	*		*	*	*		*	*	*	
	ECE213	Crimes of the Ba'ath regime in Iraq	C	*	*			*	*	*				*	*
	ECE214	Electromagnetic Fields I	C	*	*	*		*		*	*			*	*
	ECE215	Analog Electronics I	C	*	*	*		*	*	*		*	*	*	
	ECE216	Electrical Circuits	C	*	*			*			*			*	*
	ECE217	Electrical DC Machines	C	*	*			*		*	*			*	*
	ECE218	Instrumentation and Measurements	C	*		*		*		*	*			*	*

Second / Semester 2	ECE219	Analog Electronics Lab. I and DC Machines Lab.	C	*	*	*		*	*	*		*	*	*		
	ECE221	Probability Theory and Engineering Statistics	C	*	*	*		*	*	*		*	*	*		
	ECE222	Engineering Mathematics II	C	*	*	*		*	*	*		*	*	*		
	ECE223	Democracy and Human Rights	C	*	*			*	*	*		*				
	ECE224	Electromagnetic Fields II	C	*	*	*				*		*	*	*		
	ECE225	Analog Electronic II	C	*	*			*	*	*			*	*	*	
	ECE226	Electrical Circuits II	C	*	*	*		*	*	*		*	*	*		
	ECE227	Electrical AC Machines	C	*	*			*	*	*				*	*	
	ECE228	Computer Programming	c	*	*	*		*			*	*			*	*
	ECE229	Analog Electronics Lab. II and AC Machines Lab.	C	*	*	*		*	*	*		*	*	*		
	ECE311	Human Rights	C	*	*	*	*	*	*	*	*	*	*	*	*	

Third / Semester 1	ECE312	Engineering Analysis I	C	*	*				*	*		*			*
	ECE313	Microelectronic Circuit Design	C	*	*	*		*	*			*	*	*	*
	ECE314	Control Engineering I	C	*	*	*		*	*	*		*	*	*	*
	ECE315	Information Theory and Coding	C	*					*	*	*				*
	ECE316	Analog Communication	C	*	*				*	*		*			*
	ECE317	Wave Propagation	C	*	*	*		*	*	*		*	*	*	
	ECE318	Instrumentation & Measurements I	C	*	*				*	*		*		*	*
	ECE319	Electronic & Communication Engineering Lab. III	C	*	*				*			*		*	*
Third / Semester 2	ECE321	Democracy	C			*	*		*	*		*		*	*
	ECE322	Engineering Analysis II	C	*	*			*	*					*	*

	ECE323	Microprocessor Engineering	C	*	*	*		*	*	*		*	*		
	ECE324	Control Engineering II	C	*	*	*			*		*	*			
	ECE325	Satellite & Navigation	C	*	*	*		*	*	*		*	*	*	*
	ECE326	Digital Communication	C	*	*				*	*	*			*	*
	ECE327	Antennas	C	*		*	*					*		*	*
	ECE328	Instrumentation & Measurements II	C	*	*	*	*	*	*	*	*	*	*	*	*
	ECE329	Electronic & Communication Engineering Lab. IV	C	*	*				*	*		*			*
Fourth / Semester1	ECE411	Final Year Project I	C	*	*	*	*	*	*	*	*	*	*	*	*
	ECE412	Industrial Management I	C	*		*	*	*	*			*	*		*
	ECE413	Digital Systems' Design	C	*	*	*		*	*	*		*	*	*	*
	ECE414	Microwave Engineering	C	*				*	*	*				*	*

	ECE415	Digital Signal Processing	C	*	*	*			*	*					*
	ECE416	Artificial Intelligent Systems I	C	*	*	*					*	*			*
	ECE417	Numerical Methods I	C	*	*	*		*	*	*		*	*	*	*
	ECE418	Elective Subject (A)	O	*	*	*	*	*	*	*	*	*	*	*	*
	ECE419	Electronic & Communication Engineering Lab. V	C	*				*	*	*				*	*
Fourth / Semester 2	ECE411	Final Year Project II	C	*	*	*	*				*	*	*	*	*
	ECE422	Industrial Management II	C	*	*			*	*	*		*	*	*	*
	ECE423	Microcontrollers	C	*	*	*				*		*			*
	ECE424	Mobile Communication	C	*	*	*		*	*	*		*	*	*	*
	ECE425	Computer Networks	C	*	*	*	*	*			*	*			*

	ECE426	Artificial Intelligent Systems II	C	*	*			*	*		*	*	*	*	*
	ECE427	Numerical Methods II	C	*	*	*		*	*	*		*	*	*	*
	ECE428	Elective Subject (B)	O	*	*	*	*	*	*	*	*	*	*	*	*
	ECE429	Electronic & Communication Engineering Lab. VI	C	*		*	*	*	*			*	*		*

Course Description Form

1. Course Name:	
Artificial Intelligent Systems I	
2. Course Code:	
EE416	
3. Semester / Year:	
First/ 2024	
4. Description Preparation Date:	
23-3-2024	
5. Available Attendance Forms:	
Attendance in class and on line	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30/2	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Hanan A. R. Akkar Email: hanan.a.akkar@uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	<ul style="list-style-type: none"> • The basic principles of artificial neural networks and the rules learning with the presence of a supervisor and the absence of supervisor, as well as neural networks that distinguish different patterns and intelligent memory with applications for every topic in engineering fields, especially electronic engineering. • The ability to apply all types of neural networks in digital circuits. • The ability to design artificial neural networks to recognize patterns <ul style="list-style-type: none"> • • Programming using MATLAB for neural networks to recognize patterns.
9. Teaching and Learning Strategies	
Strategy	<p>A1- Knowledge and understanding of the principles and design of artificial neural networks.</p> <p>A2- Knowledge and understanding of distinguishing patterns and shapes using Hopfield, Hamming, and BAM Model.</p> <p>A3- Knowledge and understanding of the types of training for neural networks.</p> <p>A4- Knowledge and understanding of the types of forward and backward neural networks.</p> <p>A5- Knowledge and understanding of the different types of learning with and without a supervisor.</p>

A6- Knowledge and understanding of implementing neural networks using various electronic circuits.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	1A	Neural networks Basic principles of biological neural	Attendance in class and on line	Quize & semester exams Course final exams
2	2	1A	Fundamentals of Artificial neural networks (ANNs)	Attendance in class and on line	
3	2	2A	Knowledge and understanding of patterns recognition using ANN The Hamming Model for pattern classification and Maxnet The Hopfield model for pattern recognition.	Attendance in class and on line	
4	2	2A	Architecture of neu networks, Single lay networks, Multi-lay networks, Recurren networks, activation function.	Attendance in class and on line	
5	2	3A+5A	The supervised learning rules using perceptron.	Attendance in class and on line	
6	2	3A+5A	The supervised learning rules using Delta.	Attendance in class and on line	
7	2	3A+5A	The supervised learning rules using correlation and Outstar rule.	Attendance in class and on line	
8	2	3A+5A	The unsupervised learning rules using Hebb.	Attendance in class and on line	
9	2	3A+5A	The unsupervised learning rules using winner-take –all.	Attendance in class and on line	
10	2	2A	Self organization Maps: Kohonen Maps, Mexican hat network.	Attendance in class and on line	

11	2	2A	The Hopfield model for pattern recognition.	Attendance in class and on line
12	2	2A	The Hamming Model for pattern classifications and Maxnet.	Attendance in class and on line
13	2	2A	Design ANNs using Back-propagation.	Attendance in class and on line
14	2	4A	Design ANNs trained by Back-propagation.	Attendance in class and on line
15	2	6 A	Design ANNs using electronic circuits	Attendance in class and on line
11. Course Evaluation				
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc				
12. Learning and Teaching Resources				
Required textbooks (curriculum books, if any)	<ul style="list-style-type: none"> • Zurada , "Introduction to Artificial Neural System", Publishing House. 			
Main references (sources)	<ul style="list-style-type: none"> • Dr. S. N. Sivanandam, Introduction to ANNs, Vikas Publishing House PVT LTD • P. Engelbrecht," Computational Intelligence, an Introduction," John Wiley & Sons. <p>McCulloch, W; Pitts, W "A Logical Calculus of Ideas Immanent in Nervous Activity". <i>Bulletin of Mathematical Biophysics.</i> 5 (4): 115-133. doi:10.1007/BF02478259</p>			
Recommended books & references (scientific journals, reports...)	<ul style="list-style-type: none"> • Dr. J. Ebraham et. al, Intelligent System, Springer House Lipmann " Introduction to ANN" IEEE 			
Electronic Websites	Reference	https://en.wikipedia.org/wiki/Neural_network		