

فرع هندسة الإنتاج						
المرحلة	الدكتوراه			الفصل الدراسي		الاول
اسم المقرر	طرق القطع اللاتقليدية			Non-traditional machining		
الساعات	نظري	3	عملي	----	الوحدات	3
التسلسل	الملاحظات					
1	Classification of nontraditional machining process, general survey and comparison					
2	Abrasive jet machining, jet machine and operations, processes characteristics and application, work station of abrasive jet machining process capabilities					
3	Water jet machining (hydrodynamic machining), processes characteristics and application, equipment of WJM, process capabilities, resent developments.					
4	Abrasive Water jet machining, processes characteristics and application, Abrasive Water jet machining, equipment process capabilities					
5	Ultrasonic machining equipment and operation, characteristics and application, USM equipment, oscillating system and magnetostriction effect tool feeding mechanism , stock removal rate, accuracy and surface quality ,recent development					
6	Chemical machining , Chemical milling, ectrochemical machines and operation, processes characteristics and application, elements of ectrochemical machining, ectrochemical grinding machines and operations					
7	Electrical discharge milling, process characteristics and application, ED Sinking machine, Electro-discharge Wire cutting					
8	Laser beam machining, laser types, elements of Laser system , processes characteristics, main recent applications and development					
9	Electron beam machining equipment and operation, processes characteristics and application, Electron beam machining equipment process capabilities					
10	Plasma Arc cutting systems and operations, processes characteristics, Plasma Arc cutting systems, application and capabilities of Plasma Arc cutting systems					
11	Hybrid ectrochemical processes, material removal rate accuracy and surface quality applications					
12	Advantages and disadvantages, ectrochemical honing applications, ectrochemical super-finishing, process accuracy electrochemical buffing					
13	Ultra sonic-Assisted ECM, material removal process					
14	Electrical discharge grinding ,electro-erosion dissolution machining					
15	Laser-Assisted ECM, Hybrid thermal processes					

أسم التدريسي:- أ.م.د.معن عابد توفيق

فرع هندسة الإنتاج						
الثاني	الفصل الدراسي		الدكتوراه		المرحلة	
CAD/CAM			التصميم والتصنيع المعان بالحاسوب			اسم المقرر
3	الوحدات	3	عملي	3	نظري	الساعات
الملاحظات	المفردات					التسلسل
	Introduction to CAD/CAM systems, basic elements of CAD/CAM systems, computer graphics and computer aided design, comparison between conventional design system and CAD/CAM system, advantage of CAD/CAM systems					1
	Geometric modeling, mathematical representation of : points, lines, and curve, intrinsic equations of curves, curvature and torsion of curves, explicit and implicit equation of curves					2
	Parametric equations of curves, parameter space, model space, parameterization method, points on curve, direct point solution, inverse point solution, TNB frame of the space curve					3
	Parametric representation of synthetic curves, Introduction to Bezier curve, Bezier basis functions, geometric constriction of Bezier curve, control points versus data points					4
	Closed Bezier curve, degree elevation, subdivision of Bezier curve, composite Bezier curve					5
	Parametric and geometric continuity of Bezier curve, rational Bezier curve, approximation of circular arc by Bezier curve					6
	Hermite curve, Hermite basis function, geometric coefficients of curve, three point interpolation method, four point interpolation method, composite Hermite curve, geometric continuity of Hermite curve					7
	B- spline curve, no uniform B-spline basis function					8
	uniform B-spline basis function, closed B- spline curve, NURBS, continuity of B- spline curve					9
	Bezier surfaces, Hermite surfaces, point on a surfaces, embedded curves, blended surfaces					10
	Degenerate patches, composite Bezier surfaces, composite Hermite surface, surface fairing methods, surface fitting methods					11
	Introduction to CAM systems , scope of CAD/CAM systems, CAD/CAM application, NC and CNC and CNC systems, CNC interpolation methods					12
	2 1/2 axes CNC milling machines, 3 axes CNC milling machines, 5 axes CNC milling machines					13
	Sculpture surfaces machines, tool path generation strategies, cutter contact data generation, cutter location data generation, cutter reference data generation					14
	Gouge detection, scallop detection ,collision detection, tool path verification, tool path simulation					15

أسم التدريسي :- أ.م.د. وسام كاظم حمدان

فرع هندسة الانتاج					
الثاني	الفصل الدراسي		الدكتوراه		المرحلة
Finite element method			طريقة العناصر المحددة		اسم المقرر
3	الوحدات	---	عملي	3	نظري
الملاحظات	المفردات				التسلسل
	Introduction to matrix algebra				1
	Some engineering applications of numerical analysis				2
	Introduction and basic concepts of Finite element method (FEM)				3
	One dimensional problems				4
	Direct stiffness method spring element				5
	Nodes, elements, and modeling				6
	Bars under axial loading				7
	Two dimensional problems				8
	2-D element types and modeling				9
	Beam elements				10
	Plane truss structure				11
	Review of stresses, and stress measures				12
	Loading, releases, and frame elements				13
	Some bending problems				14
	Some applications with ANSYS package				15

فرع هندسة الإنتاج						
الاول	الفصل الدراسي		الدكتوراه			المرحلة
Advanced automation & mechanization			المكننة و الاتمة المتقدمة			اسم المقرر
3	الوحدات	3	عملي	3	نظري	الساعات
الملاحظات	المفردات					التسلسل
	Types of automation and mechanization					1
	Types of automation and mechanization					2
	Sensors, actuators, analyzers, and motors					3
	Sensors, actuators, analyzers, and motors					4
	Fixed automation design for manufacturing					5
	Automated manufacturing Hardware for automation					6
	Programmable automation CNC units					7
	CNC machine tool axis Structure of the part program					8
	Machine layout facilities					9
	Single raw machine layout					10
	Double raw machine layout					11
	Group technology					12
	Cluster analysis					13
	Similarity coefficient method					14
	Raw order clustering algorithm					15

فرع هندسة الإنتاج						
الثاني	الفصل الدراسي		دكتوراه			المرحلة
High speed rate forming			التشكيل بالطاقة العالية			اسم المقرر
3	الوحدات	3	عملي	3	نظري	الساعات
الملاحظات	المفردات					التسلسل
	Survey of high energy rate metal working methods					1
	The mechanics of energy transfer					2
	Explosive forming of domes I					3
	Explosive forming of domes II					4
	Explosive Expansion of rings I					5
	Explosive Expansion of rings II					6
	Explosive forming dies I					7
	Explosive forming dies II					8
	Explosive punching I					9
	Explosive punching II					10
	Analysis and design of Explosive forming facilitie I					11
	Analysis and design of Explosive forming facilitie II					12
	Explosive behavior and energy release					13
	Effect of Explosive forming on material properties I					14
	Effect of Explosive forming on material properties II					15

فرع هندسة الإنتاج						
الثاني	الفصل الدراسي		الدكتوراه			المرحلة
Engineering plasticity			هندسة اللدونة			اسم المقرر
3	الوحدات	---	عملي	3	نظري	الساعات
الملاحظات	المفردات					التسلسل
	Basic elastic equations I					1
	Basic elastic equations II					2
	Plastic stress-strain relations I					3
	Plastic stress-strain relations II					4
	Yield criteria's I					5
	Yield criteria's II					6
	Plastic Bending of beam I					7
	Plastic Bending of beam II					8
	Plastic Torsion I					9
	Plastic Torsion II					10
	Plastic yielding of Pressure vessels I					11
	Plastic yielding of Pressure vessels II					12
	Slip line field theory I					13
	Slip line field theory II					14
	Plastic deformation in tension					15

فرع هندسة الإنتاج						
الثاني	الفصل الدراسي		الدكتوراه			المرحلة
Mechanical Behavior of Metals			سلوك مواد هندسية			اسم المقرر
3	الوحدات	---	عملي	3	نظري	الساعات
الملاحظات	المفردات					التسلسل
	Crystal structure of metals FCC,BCC&HCP					1
	Defects and their effect on mechanical properties					2
	Stress strain relation for elastic and plastic behavior					3
	Plastic deformation of single crystal and slip					4
	Plastic deformation in polycrystalline metals and slip					5
	Strengthening mechanics in metals based on distribution and grain boundary interaction					6
	Strengthening mechanics in alloys based on solutes and precipitates					7
	Cold working and work hardening ,high temperature deformation – hot working					8
	Mechanics involved in hot working process (recovery, recrystallization& grain growth)					9
	Fatigue of metal, factors to improve Fatigue behavior					10
	Creep of metals, factors promoting creep resistance					11
	Ductile – brittle behavior transition					12
	Super plasticity and plastic forming of metals					13
	Mechanicalbehavior of ceramics and strong steels					14
	Search for strong solids					15

فرع هندسة الإنتاج						
الثاني	الفصل الدراسي		الدكتوراه			المرحلة
Stress analysis			تحليل الاجهادات			اسم المقرر
3	الوحدات	---	عملي	3	نظري	الساعات
الملاحظات	المفردات					التسلسل
	Theory of stress I					1
	Theory of stress II					2
	Theory of strain I					3
	Theory of strain II					4
	Generalized hook law					5
	Formulation of elastic problems					6
	Two dimensional problems elasticity					7
	Plane stress / plane strain problems					8
	Airy stress function (rectangular and polar coordinates)					9
	Applications (circular plates)					10
	Applications (rectangular plates) I					11
	Applications (rectangular plates) II					12
	Applications (rectangular plates) III					13
	Applications (cylindrical shells) I					14
	Applications (cylindrical shells) II					15

فرع هندسة الإنتاج						
الثاني	الفصل الدراسي		الماجستير			المرحلة
CAD/CAM			التصميم والتصنيع المعان بالحاسوب			اسم المقرر
3	الوحدات	2	عملي	3	نظري	الساعات
الملاحظات	المفردات					التسلسل
	Introduction to CAD/CAM systems, basic elements of CAD/CAM systems, computer graphics and computer aided design, comparison between conventional design system and CAD/CAM system, advantage of CAD/CAM systems					1
	3D transformation, viewport, clipping, projections					2
	Parametric equations of curves, parameter space, model space, parameterization method					3
	Parametric representation of synthetic curves, Introduction to Bezier curve, Bezier basis functions, geometric constriction of Bezier curve, control points versus data points					4
	Closed Bezier curve, composite Bezier curve					5
	Parametric and geometric continuity of Bezier curve, approximation of circular arc by Bezier curve					6
	Hermite curve, Hermite basis function, geometric coefficients of curve					7
	Composite hermite curve, geometric continuity of hermite curve					8
	Parametric representation of synthetic curves: bilinear batch, Parametric equations of surfaces, Parametric surfaces of revolution, Parametric sweeping, ruled surface					9
	Bezier surfaces, Hermite surfaces, point on a surfaces, blended surfaces					10
	composite Bezier surfaces , composite Hermite surface					11
	Introduction to CAM systems, scope of CAD/CAM systems, CAD/CAM application, NC and CNC and CNC systems, CNC interpolation methods					12
	2 1/2 axes CNC milling machines , 3 axes CNC milling machines , 5 axes CNC milling machines					13
	Sculpture surfaces machining, tool path generation strategies, cutter contact data generation, cutter location data generation, cutter reference data generation					14
	Manual part programming, computer aided part programming, overview of commercial CAM software					15

فرع هندسة الإنتاج						
المرحلة	الماجستير			الفصل الدراسي		الاول
اسم المقرر	تحليلات عددية			Numerical analysis		
الساعات	نظري	2	عملي	2	الوحدات	2
التسلسل	المفردات					
1	Solution of linear algebraic equations, direct methods, gause elimination method, choleski method, iterations method					
2	Solution of linear algebraic equations, direct methods, gause elimination method, choleski method, iterations method					
3	Solution of linear algebraic equations ,direct methods, gause elimination method, choleski method, iterations method					
4	Curve fitting , polynomial regression I					
5	Curve fitting , polynomial regression II					
6	Interpolation (lagrange ,linear spline, quadratic spline)					
7	Interpolation (lagrange ,linear spline, quadratic spline)					
8	Numerical integration (Newton's-cote integration formula, trapezoidal rule segment and multi-segments, simpson's 3/8 rule, gause Legendre integration method, modified gausson quadratic.					
9	Numerical integration (Newton's-cote integration formula ,trapezoidal rule segment and multi-segments, simpson's 3/8 rule, gause Legendre integration method, modified gausson quadratic.					
10	Numerical evaluation of double integral I					
11	Numerical evaluation of double integral II					
12	The approximation solution of DOF .initial value problem [one step methods (euler,modifiedeuler ,improved polygon, raliston, 2 nd ,3 rd and 4 th R-K)					
13	The approximation solution of DOF .initial value problem [one step methods (euler,modifiedeuler ,improved polygon, raliston, 2 nd ,3 rd and 4 th R-K)					
14	multi step methods (open and closed Adam's formula, 4 th order Adam's formula).					
15	Numerical solution of boundary value problems.(harmonic , bi-harmonic, parabolic and hyperbolic equation). Introduction to FDM					

فرع هندسة الانتاج						
المرحلة	الماجستير			الفصل الدراسي		الاول
اسم المقرر	اللدونة الهندسية			Engineering plasticity		
الساعات	نظري	2	عملي	2	الوحدات	2
التسلسل	المفردات					
1	Basic elastic equations I					
2	Basic elastic equations II					
3	Plastic deformation of metals I					
4	Plastic deformation of metals II					
5	Plastic stress-strain relations I					
6	Plastic stress-strain relations II					
7	Yield criteria's I					
8	Yield criteria's II					
9	Plastic deformation in tension I					
10	Plastic deformation in tension II					
11	Plastic yielding of pressure vessels I					
12	Plastic yielding of pressure vessels II					
13	Slip line field theory I					
14	Slip line field theory II					
15	Metal forming theories					

فرع هندسة الانتاج						
المرحلة	الماجستير			الفصل الدراسي		الاول
اسم المقرر	فحوصات واختيار مواد			Material Selection & Inspection		
الساعات	نظري	2	عملي	2	الوحدات	2
ت	المفردات					الملاحظات
1	Non destructive testing introduction					
2	Visual inspection					
3	Liquid penetration inspection					
4	Magnetic particles inspection					
5	Radiography inspection					
6	X-ray inspection					
7	γ -ray inspection					
8	Ultrasonic inspection					
9	Eddy current inspection					
10	Introduction of materials selection					
11	Classification of engineering materials					
12	The elastic moduli					
13	The yield strength , tensile strength, and hardness					
14	Fracture , toughness and fatigue					
15	Case study					

فرع هندسة الإنتاج						
المرحلة	الماجستير			الفصل الدراسي		الاول
اسم المقرر	تحليل البيانات الاحصائية والسيطرة النوعية			Statistical data analysis & Quality control		
الساعات	نظري	3	عملي	2	الوحدات	3
ت	المفردات					الملاحظات
1	Definitions: Quality, Quality assurance, TQC, Fitness for use					
2	Process Variations: Introduction, Statistical concept of variability, Inherent process variation(I.P.V), Measurement of I.P.V, Process capabilities and tolerance limits					
3	Principle of control. Measurement, Setting the standard or the I.P.V of the process					
4	Determinants of quality Product and process design, Training program					
5	Determinants of quality Inspection, Environment					
6	Quality assurance programs Foundations of quality assurance, Philip Crosby, W. Edwards deming					
7	Cost of quality					
8	Sampling inspection schemes - Sampling inspection versus 100% inspection schemes - Basic concept of asampling plan					
9	Sampling inspection schemes - The operating characteristic curve (O.C) of asampling plan, - Interpretation of O.C curve - Average outgoing quality level - Sampling inspection tables					
10	Shewhart control chart, British standard control chart, American control chart					
11	Statistical process control - Process control for variables - Control limits					
12	Statistical process control - Effect of changes in the means and variability on the process					
13	Quality management for JIT systems Total quality control, Quality circles, Cause – effect diagrams, Pareto analysis					
14	Quality control throughout productive systems					
15	Quality assurance programs Foundations of quality assurance, Philip Crosby, W. Edwards deming					

فرع هندسة الإنتاج						
المرحلة	الماجستير			الفصل الدراسي		الاول
اسم المقرر	مكتنة و اتمتة الإنتاج			Production automation & mechanization		
الساعات	نظري	2	عملي	2	الوحدات	2
ت	المفردات					الملاحظات
1	Building blocks of automation Sensors , Analyzers, Actuators ,Motors					
2	Building blocks of automation Sensors , Analyzers, Actuators ,Motors					
3	Fixed automation Design for manufacturing					
4	Fixed automation Automated manufacturing, Hardware for automation					
5	Programmable automation Computer numerically controlled unit, CNC machine tool axis					
6	Programmable automation NC part program structure, Main preparatory functions, Computer assisted part program					
7	Machine layout facilities Machine layout, Single row Machine layout, Double row Machine layout, Application case study					
8	Group technology Cluster analysis method					
9	Group technology Similarity coefficient method, Rank order clustering algorithm, Application case study					
10	Industrial robotics Robot system and terminology, The manipulator, The wrist					
11	Industrial robotics The end effector, Work envelope, Degree of freedom (D.O.F)					
12	Manipulator static analysis Wrist axis, Fore arm axis					
13	Manipulator static analysis Upper arm axis, Trunk axis					
14	Dynamic analysis Link equation, Lagrangian mechanics					
15	Dynamic analysis Force analysis, Application case study					

فرع هندسة الإنتاج						
الثاني	الفصل الدراسي		الماجستير			المرحلة
Advanced metal forming			تشكيل المعادن المتقدم			اسم المقرر
2	الوحدات	2	عملي	2	نظري	الساعات
الملاحظات	المفردات					التسلسل
	Slip line theory					1
	Rotary piercing process <i>I</i>					2
	Rotary elongation process <i>II</i>					3
	Tube sinking process					4
	Mandrel tube drawing process					5
	Extrusion process					6
	Wire drawing process					7
	Rolling process					8
	Strain rate in metal forming process					9
	Stress and strain redundancy factor					10
	Homogeneous and inhomogeneous of deformation					11
	Friction in metal forming process					12
	High velocity forming processes					13
	Gas forming process					14
	Explosive forming process, Electro – Hydraulic forming process, Electro-Magnetic process					15

فرع هندسة الانتاج							
الثاني	الفصل الدراسي		الماجستير			المرحلة	
3	الوحدات	2	عملي	3	نظري	اسم المقرر	
الملاحظات	المفردات					التسلسل	
	Engineering General & measurements system					اجهزة القياس والسيطرة	
	General measurements system						1
	Static characteristics of measurements system elements						2
	Dynamic characteristics of measurements system elements						3
	Signal and noise in measurements system						4
	Sensing elements						5
	Signal conditioning elements						6
	Signal processing elements						7
	Mechanical measurements						8
	Feedback control						9
	Block diagrams						10
	Transfer functions						11
	Laplace transformation						12
	Signal processing calculations						13
	Industrial process measurements & control systems (examples)						14
	Automation						15

فرع هندسة الإنتاج						
الثاني	الفصل الدراسي		الماجستير			المرحلة
Advanced design			تصميم متقدم			اسم المقرر
3	الوحدات	2	عملي	3	نظري	الساعات
الملاحظات	المفردات					التسلسل
	Introduction of design					1
	Flywheel design I					2
	Flywheel design II					3
	The Pressure vessel design I					4
	The Pressure vessel design II					5
	cam design I					6
	cam design II					7
	Gear design I					8
	Gear design II					9
	drawing die design I					10
	drawing die design II					11
	Jigs and fixture design I					12
	Jigs and fixture design II					13
	high energy rate I					14
	high energy rate II					15

فرع هندسة الإنتاج						
الثاني	الفصل الدراسي		الماجستير			المرحلة
Advanced metal cutting			قطع معادن متقدم			اسم المقرر
2	الوحدات	2	عملي	2	نظري	الساعات
الملاحظات	المفردات					التسلسل
	Introduction to anew cutting tools					1
	Cutting tools materials					2
	Coated tools and applications					3
	Nontraditional machining					4
	Ultrasonic machining (USM)					5
	Electrochemical machining (ECM)					6
	Electro-discharge machining (EDM)					7
	Abrasive jet machining (AJM)					8
	Advanced machining ,principle ,classification					9
	Abrasive flow machining (AFM) ,					10
	Magnetic abrasive flow (MAF)					11
	Micro machining ,types method application					12
	Micro cutting tools					13
	Fabrication of micro tools					14
	Laser beam machining (LBM)					15

فرع هندسة الانتاج						
الثاني	الفصل الدراسي		الدكتوراه			المرحلة
Stress analysis			تحليل الاجهادات			اسم المقرر
3	الوحدات	---	عملي	3	نظري	الساعات
الملاحظات	المفردات					التسلسل
						1
						2
						3
						4
						5
						6
						7
						8
						9
						10
						11
						12
						13
						14
						15

الجامعة التكنولوجية

قسم هندسة الإنتاج والمعادن

فرع هندسة الانتاج

أسم التدريسي:- أ.د.محسن جبر جويج