Program Engineering

Specialization	**Civil Engineering**
Course Number	**20104181**
Course Title	**Statics**
Credit Hours	**2**
Theoretical Hours	**2**
Practical Hours	**0**

Brief Course Description:

❖ Statics of particles; equilibrium of particles; rigid bodies; equivalent system of forces; centroids and centers of gravity; analysis of structures; frames, machines; moments of inertia.

Course Objectives:

Upon the completion of the course, the student will be able to:

1. Develop the ability of using basic mechanics principles .
2. Analyze any problem in a simple and logical manner.
3. Apply to its solution a few understood basic principles

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	**Introduction**	▪ What is Mechanics? ▪ Basic Concepts ▪ Newton's laws ▪ Law of gravitation ▪ System of Units	
2.	**Force System**	▪ Introduction ;Scalars and vectors ▪ Vector operations ▪ Forces on particles ▪ Resultant of a several concurrent forces ▪ Resolution of a force into components ▪ Rectangular Components of a force ▪ Moment of a forces about a point ▪ Varignon's Theorem ▪ Moment of a Force about a Given Axis ▪ Moment of a Couple ▪ Resolution of force into a force and a couple ▪ Reduction of a system of forces to one forces and once couple ▪ Equivalent system of forces	
3.	**Equilibrium**	▪ Equilibrium of particle ▪ Equilibrium of a rigid body ▪ Reaction at Supports and Connection for a two Dimensional Structure ▪ Equilibrium of a Two-Force	

		Body ■ Equilibrium of a Three-Force Body ■ Equilibrium of Rigid Body in Three Dimensions.	
4.	**Distribution Forces**	■ Introduction ■ Center of Mass ■ Centroids Lines Areas and Volumes ■ Composite Bodies and Figures ■ Teorems of Pappu	
5.	**Forces in Beams**	■ Introduction ■ Internal Forces Members ■ Various Types of Loading and Support ■ Shear and Bending Moment in a Beam	
6.	**Moments of Inertia**	■ Introduction ■ Moments of Inertia of Area ■ Polar Moment of Inertia ■ Parallel Axes Theorem ■ Moment of Inertia of Composite Areas	

Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

Teaching Methodology:
❖ Lectures

Textbooks & References:

الكتاب المقرر:
1. إستاتيكا، د.ياسر الحنطيني، 2006
المراجع:

1. "Engineering Mechanics, Statics ", R. C. Hibbler./2002

2. Vector Mechanics for Engineering Statics by Ferdinal P. Beer & Russel Johnston Jr./ 1996

3. Engineering Mechanics, Volume 1, Statics", J. L. Meriam, and L. G. Kraige

Engineering Program

Specialization	Common
Course Number	20204121
Course Title	Strength of Materials
Credit Hours	2
Theoretical Hours	2
Practical Hours	0

Brief Course Description:
- ❖ Principles of static's including equilibrium and static equivalence. Determination of moment and force resultants in slender members. Introduction to mechanics of deformable bodies; concepts of stress and strain, classification of material behavior, stress-strain relations and generalized Hook's Law. Application to engineering problems involving members under axial load, torsion of circular rods and tubes, bending in beams, buckling of columns.

Course Objectives:
After presenting this course student should:
1. Analyze the different types of loading
2. Classify the types of beams support.
3. Distinguish between the effect of concentrated or distributed load

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	**Introduction**	▪ Types of loads ▪ Normal and shear stresses ▪ Concept of strain	
2.	**Stress & Strain**	▪ Normal strain under axial loading ▪ Stress strain diagram for mild steel ▪ Modulus of elasticity (Young's Modulus) ▪ True stress & true strain ▪ Strain energy. Factor of safety ▪ Factor of safety ▪ Stresses in stepped bars ▪ Stress in compound columns ▪ Poison's ratio	
3.	**Shear Stress & Shear Strain**	▪ Complementary shear stresses, modules of rigidity	
4.	**Torsion**	▪ Torsion stresses and strains in solid and hollow shafts ▪ Twist angle in elastic range	
5.	**Bending moment**	▪ Bending stresses and axial strain in symmetrical sections ▪ Types of bending loads. Concentrated loads, uniformly distributed loads	
6.	**Columns**	▪ Euler's formula for pin ended columns ▪ Types of end conditions of columns	

❖ **تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2008/2009**

Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

Teaching Methodology:
  ❖ Lectures

Textbooks & References :

الكتاب المقرر:

1. مقاومة مواد م. اياد الداهوك، م. شادي أبو سريس 2004

المراجع:

2. Mechanics of materials by Bear and Johnson 3rd edition 2002
3. Mechanics of materials R.C. Hibller 2nd edition 1994
4. Mechanics of materials James M. Gere 5th edition 2002

❖ **تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2008/2009**

Program Engineering

Specialization	Common
Course Number	20204122
Course Title	Strength of Materials Lab
Credit Hours	1
Theoretical Hours	0
Practical Hours	3

Brief Course Description:
- ❖ Applying theory gained within the strength of materials theoretical through practical experimentation

Course Objectives:
After presenting this course student should:
1. Distinguish between the behavior of brittle and ductile materials under tensile.
2. Distinguish between the behavior of brittle and ductile materials under torsion test.

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Tensile and compression test for ductile and brittle materials		
2.	Torsion test		
3.	Bending test		
4.	Tension and compression of springs		
5.	Deflection of beams		
6.	Buckling of columns		
7.	Shear test		

Evaluation Strategies:

Exams		Percentage	Date
Exams	Assignment	30%	--/--/----
	Med- term	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:
   ❖ Laboratory

Textbooks & References :

الكتاب المقرر:

1. مقاومة مواد م. اياد الداهوك، م. شادي أبو سريس 2004

المراجع:

1. Mechanics of materials by Bear and Johnson 3rd edition 2002
2. Mechanics of materials R.C. Hibller 2nd edition 1994
3. Mechanics of materials James M. Gere 5th edition 2002

❖ **تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2008/2009**

Program Engineering

Specialization	Civil Engineering
Course Number	20104251
Course Title	Soil mechanics
Credit Hours	2
Theoretical Hours	2
Practical Hours	0

Brief Course Description:

❖ (Physical properties of soil, atterberg limits, soil classification systems , stresses in soil, shear strength of soil, water in soil and theory of permeability and settlements of soil, lateral earth pressure and retaining structure, soil compaction, bearing capacity.)

❖ الوحدات السابعة والثامنة والتاسعة(settlement, soil compaction, soil bearing capacity) يتم التركيز على المفاهيم الاساسية وبدون حسابات .

Course Objectives:

❖ To enable student to know the properties of soil and the relationship between soil , water and loads .

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	**Introduction to soil Mechanics**	▪ Soil ▪ Cohesive soil and non - cohesive soil ▪ Organic soil ▪ Rocks.	
2.	**Soil Properties**	▪ Physical properties ▪ Atterberg limits.	
3.	**Soil Classification**	▪ Broad classification ▪ Casagrandes classification ▪ U.s Public Roads Administration (AASHTO)	
4.	**Permeability of Soil**	▪ Types of water in soil. ▪ Total and effective pressure ▪ Permeability of soil	
5.	**Soil Stress Analysis**	▪ Stress distribution under concentrated and distributed loads	
6.	**Soil shear Strength**	▪ Shear strength for cohesive and non- cohesive soil ▪ Coulomb law ▪ Mohr envelope	
7.	**Settlement**	▪ Reasons of settlement ▪ Types of soil settlement ▪ Factors influencing soil settlement	
8.	**Soil Compaction**	▪ Relationship between soil density and moisture content ▪ Degree of Compaction ▪ Soil stabilization	
9.	**Soil Bearing Capacity**	▪ Introduction ▪ Methods of increasing soil bearing capacity	
10.	**Retaining walls**	▪ Types of retaining walls ▪ Lateral earth pressure ▪ The influence of water	

❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

Evaluation Strategies:

Exams			Percentage	Date
Exams	First Exam		20%	--/--/----
	Second Exam		20%	--/--/----
	Final Exam		50%	--/--/----
Homework and Projects			10%	
Discussions and lecture Presentations				

Teaching Methodology:
> ❖ Lectures

Textbooks & References :

الكتاب المقرر:

1. د . عبد الله معصراني، الوجيز في هندسة التربة والأساسات ،2000

المراجع:

1. Principals of Soil Mechanics and Foundation by VNS Murthy, 2001.
2. Soil Mechanics and Foundation by Dr.B.C.Punamia ،1994
3. م . خلدون سراج الدين، ميكانيكا التربة ،1995
4. د.نبيل سالم ، ميكانيكا التربة ،1992.
5. د. محمد مروان حمزه ميكانيكا التربة
6. كودة استطلاع الموقع ، وزارة الاشغال العامة،عمان،1998.
7. كودة القواعد و الجدران المساندة، وزارة الاشغال العامة،عمان،1998

Program Engineering

Specialization	**Civil Engineering**
Course Number	**20104252**
Course Title	**Soil And Asphalt Lab**
Credit Hours	**1**
Theoretical Hours	**0**
Practical Hours	**3**

Brief Course Description:
- ❖ Experiments of Soil and asphalt pavement .

Course Objectives:
Upon the completion of the course, the student will be able to:
1. perform appropriate tests on soil and asphalt
2. make their own judgment about asphalt and soil

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	**Soil Tests**	▪ Water content test – Oven drying – Speedy moister tester ▪ Specific gravity of soil. ▪ Atterberg Limits : – Liquid limit test – Plastic limit test – Shrinkage limit test ▪ Grain Size Analysis : – Sieve analysis – Hydrometer method ▪ Determination of in- situ soil dry density – sand cone and rubber balloon – Proctor Compaction Test: – Standard proctor test – Modified proctor test. ▪ Soil Permeability : – Constant head test – Falling head test ▪ California bearing ratio -CBR ▪ Unconfined compression test ▪ Triaxial compression test	
2.	**Asphalt Tests**	▪ Specific Gravity for solid and Simi-solid asphalt ▪ Softening point ▪ Penetration ▪ Ductility ▪ Viscosity ▪ Flash and fire point ▪ Spot test ▪ Float test ▪ Separation of asphalt components ▪ Marshal test	

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Evaluation Strategies:

Exams		Percentage	Date
Exams	Assignment	30%	--/--/----
	Med- term	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:
- ❖ Laboratory

Textbooks & References :
Textbook
1. Experimental Soil Mechanics " Bradet, Prentice Hall, 1997"
References:

1. Soil Mechanics Laboratory Manual Engineering ,1997
2. د. صالح السويلمي ، تصميم الخلطات الإسفلتية للطرق ،2002

Program Engineering

Specialization	**Common**
Course Number	**20104261**
Course Title	**Highways Engineering**
Credit Hours	**2**
Theoretical Hours	**2**
Practical Hours	**0**

Brief Course Description:

- ❖ Highway types ,road users ,highway geometric design ,horizontal and vertical alignments of roads ,cross sections ,design of rigid and flexible pavement, drainage and erosion control traffic engineering, road maintenance.

Course Objectives:

1. This course is oriented to focus on the highway operations ,highway engineering studies highway safety , geometric design ,drainage ,location ,principles of pavement design and environmental impact

Al-Balqa' Applied University

جامعة البلقاء التطبيقية

تأسست عام 1997

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	**Introduction**	▪ Objectives of transportation components, modes, highway planning and design ▪ Highway engineering ▪ Traffic engineering	
2.	**Transportation**	▪ Types of transportation ▪ Types of highways ▪ Highway classification	
3.	**Vehicle and Curves**	▪ Vehicle characteristics and road characteristics ▪ Friction ▪ Super elevation ,sight distance	
4.	**Traffic Volume**	▪ Volume studies ,travel time and delay studies ▪ Traffic volume ,rate of flow highway capacity	
5.	**High way location**	▪ Factors affecting highway location ▪ Route surveying	
6.	**Horizontal and Vertical Alignments**	▪ Horizontal and Vertical curves ▪ Speed studies	
7.	**Cross Section Elements**	▪ Shoulders ,lanes ,side slopes ▪ Islands ,ditches ,retaining walls	
8.	**Surface Drinage**	▪ Box culverts ▪ Pipe culverts	
9.	**Pavements**	▪ Types of pavements ▪ Advantages and disadvantages ▪ Factors affecting pavement design	
10.	**Layers of Pavements**	▪ Sub grade , sub base, base and surface	
11.	**Bituminous Materials**	▪ Types of asphalt ▪ Design of asphalt mixture	
12.	**Road Deformation**	▪ Types of deformation ▪ Maintenance and resolutions	
13.	**Traffic Engineering**	▪ Traffic signs and marking ▪ Intersections and interchanges	

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Evaluation Strategies:

Exams			Percentage	Date
Exams	First Exam		20%	--/--/----
	Second Exam		20%	--/--/----
	Final Exam		50%	--/--/----
Homework and Projects			10%	
Discussions and lecture Presentations				

Teaching Methodology:
  ❖ Lectures

Textbooks & References :
Textbooks:

1. البسيط في هندسة الطرق (ج1+ج2) د.روحي الشريف 1992

References :
  1. Traffic And Highway Engineering By Nicholas Garber, 2002.
  2. تغطية مساحية للطرق ، د يوسف صيام،1999
  3. تصميم الخلطات الأسفلتية للطرق، د صالح السويلمي ،2002
  4. A policy Geometric Design of Highway and Streets,2001

❖ **تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2008/2009**

Program Engineering

Specialization	Civil Engineering
Course Number	20104271
Course Title	Projects Management
Credit Hours	2
Theoretical Hours	2
Practical Hours	0

Brief Course Description:

❖ Introduction to Project Management, Scheduling Methods, Arrow Networks, Critical path Method (CPM), Bar Chart, Cost-time Trade –off, Analysis of Resources, Computer- Aided Project Management.

Course Objectives:

❖ The objective of this course is to familiarize the students with the fundamentals of construction practice and the engineering management system ,present and discuss the management tools and techniques of construction projects during their accomplishment in the field .

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	**Management**	▪ Introduction ▪ Levels of management ▪ Management system ▪ Work breakdown structure	
2.	**Traditional Procedures**	▪ Gant bar -charts ▪ Data preparation and tabulation ▪ S-Curve.	
3.	**Network Diagram**	▪ Activity ▪ Activity list ▪ Dependency relationships (represent logic) ▪ Critical path method	
4.	**Arrow Diagram**	▪ Drawing arrow diagram ▪ Redundant Dummies ▪ Advantages of arrow diagram	
5.	**Calculations of arrow diagram**	▪ Duration of project ▪ Early start ,early finish ▪ Late start ,late finish ▪ Total float ,free float ▪ Determination of article path ▪ Numerical problems	
6.	**Calculation of Precedence diagram**	▪ Duration of project ▪ Early start ,early finish ▪ Late start ,late finish ▪ Total float ,free float ▪ Determination of critical path ▪ Numerical problems	
7.	**Overlapping Networks**	▪ Basic relationships ▪ Start to start ▪ Start to finish ▪ Finish to start ▪ Finish to finish	
8.	**Program of Time**	▪ Gant bar -chart ▪ S-curve	
9.	**Cost Time Trade off**	▪ Cost classification ▪ Basic principles ▪ Numerical problems	

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10.	**Control**	▪ Feed back channels ▪ Network techniques for controlling ▪ Progress monitoring and regulations ▪ Updating	
11.	**Site Organization**	▪ Importance of site organization ▪ Location of construction equipment, offices, construction materials . ▪ Safety precautions	
12.	**Computer Applications**	▪ Primavera software ▪ Explanatory example	

Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

Teaching Methodology:
❖ Lecture

Textbooks & References :

الكتاب المقرر:

1.   د. غالب يوسف عباسي، أساسيات إدارة المشاريع المتكاملة ، 1995 .

References

1. د.موسى محمد الدرابيع ،الأساليب الحديثة لإدارة المشاريع الإنشائية ، 1996
2. م. محمد عبد المقصود ، إدارة المشاريع الهندسية ، 2005 .
3. Building Management   6th Edition by , D.C.H.COLES، 1995

❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

Program Engineering

Specialization	Civil Engineering
Course Number	20104243
Course Title	Reinforced Concrete
Credit Hours	2
Theoretical Hours	2
Practical Hours	0

Brief Course Description:

❖ Properties of Concrete & Steel. Ultimate Strength Design. Flexural analysis of R.C sections. Design Beams for bending Singly and Doubly reinforced sections.T-sections and other shapes. Shear Design.. One-way solid and ribbed slabs. Design of columns. Axially loaded short columns.. Design of isolated footings.

Course Objectives:

Upon the completion of the course, the student will be able to:

1. Study the properties and behavior of reinforced concrete components
2. Design different types of reinforces concrete members
3. Use the ultimate strength design method

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	**Introduction**		
2.	**Properties of R.C materials**		
3.	**Ultimate strength design**		
4.	**Flexural design of R.C sections**		
5.	**Design of beams sections (T- sec, rec., L-sec.)**		
6.	**Design of shear**		
7.	**Design of slabs(soled, ribbed)**	**Design of one way simply supported S.S, ribbed slabs.**	
8.	**Design of columns(axially loaded short columns)**		
9.	**Design of isolated footings**		

Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

Teaching Methodology:
> ❖ Lectures

Textbooks & References :

الكتاب المقرر:

1. الدليل الإرشادي لكوده الخرسانة العادية والمسلحة، عمان، وزارة الأشغال العامة 1998

References:

2. A.H. Nilson, Design of Concrete Structures, McGraw-Hill Book Co., New York, 1996.

3. Reinforced Concrete a Fundamental approach5th edition, 2002 .by Nawy.E.

4. تصميم المنشآت الخرسانية والمنشآت مسبقة الإجهاد، د. علاء التميمي 1998.

5. كودة الاحمال و القوى ، وزارة الاشغال العامة عمان2001.

❖ **تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2008/2009**

Program Engineering

Specialization	Civil Engineering
Course Number	20105221
Course Title	Sanitary Engineering
Credit Hours	2
Theoretical Hours	2
Practical Hours	0

Brief Course Description:

❖ Water recourses and water demand, water characteristics, water distribution, hydraulics, pumping stations, sanitary fixtures, sewage disposal and sewage treatment, solid waste disposal , central heating.

Course Objectives:

Upon the completion of the course, the student will be able to understand:
1. Water resources
2. Water properties,
3. Sewage treatment
4. Central heating

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	**Water resources**	▪ Water resources ▪ Water circulation	
2.	**Water Transmission**	▪ Transmission and distribution of water ▪ Reserving water.	
3.	**Uses of water in**	▪ agriculture ▪ industry ▪ drinking and cooking	
4.	**Water properties**	▪ Physical ▪ Chemical ▪ Microbal	
5.	**Hydraulics**	▪ Pascal's law ▪ Water pressure law ▪ Atmospheric pressure	
6.	**Flow calculations**	▪ Speed of flow ▪ Flow measurement ▪ Factors influencing speed of flow ▪ Theory of seepage	
7.	**Treatment**	▪ Filtration ▪ Sedimentation ▪ Percolation ▪ Sterilization ▪ Ventilation	
8.	**Water Distribution**	▪ Diagonal system ▪ Treelike system ▪ Chesslike system ▪ Circular system	
9.	**Sanitary Facilities**	▪ Sanitary fixtures ▪ Pipes and fittings ▪ Central heating	
10.	**Pumps**	▪ Types of pumps ▪ Uses of pumps	
11.	**Sewage disposal**	▪ Methods of sewage disposal ▪ Types of pipes ▪ Pipe testing	
12.	**Manholes**	▪ Types of manholes	

❖ **تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2008/2009**

		▪ Construction of manholes ▪ Requirements of manholes	
13.	**Rainwater disposal**	▪ Rainwater disposal.	
14.	**Sewage treatment**	▪ Basic Principles of Sewage treatment ▪ Solid waste disposal ▪ Factors affecting treatment	
15.	**Excavation**	▪ Excavation of trenches ▪ Supporting excavations ▪ Compaction ▪ Fill properties	

Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

Teaching Methodology:
  ❖ Lecture

Textbooks & References :

الكتاب المقرر:

2.م.داؤد شحادة خلف ، مبادئ الهندسة الصحية (مياه ومجاري) ،عمان، 1992

المراجع:

1. إسلام محمود إبراهيم ، الهندسة الصحية، عمان، 2005
2. احمد عبد الباسط الرجوب ، هندسة المياه، 1994

❖ **تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008**

Program Engineering

Program	Engineering
Specialization	Civil Engineering
Course Number	20104231
Course Title	Structural Analysis
Credit Hours	2
Theoretical Hours	2
Practical Hours	0

Brief Course Description:

❖ Basic statics, determinacy and stability of structures, structural analysis of plane trusses, analysis of frames, analysis of beams .

Course Objectives:

After presenting this course student should :

1. Analyze different types of loading.
2. Distinguish between determinate and indeterminate structures.
3. Analyze different structures.

☐ **Detailed Course Description:**

Unit Number	Unit Name	Unit Content	Time Needed
1.	**Basic Static's**	▪ Loads, Supports and connections. ▪ Free body diagrams. ▪ Equilibrium equations. ▪ Shear and moment diagrams.	
2.	**Introduction to structural analysis**	▪ Types of structures. ▪ Analysis and design. ▪ Structural components.	
3.	**Stability and static indeterminacy**	▪ Geometric Stability. ▪ Statically Determinate Structures. ▪ Statically indeterminate structures. ▪ Internally determinate structures. ▪ Externally indeterminate structures.	
4.	**Analysis of beams**	▪ Bending moment and shear force diagrams. ▪ Application of super-position principle.	
5.	**Analysis of frames**	▪ Analysis of statically determinate frames. ▪ Shear force, normal force and bending moment diagrams.	
6.	**Analysis of trusses:**	▪ Truss notations. ▪ Methods of truss analysis (joint and section methods).	

Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

Teaching Methodology:
❖ Lecture

Textbook:

Structural analysis R.C. Hibbler 4th edition, 2002

References :

1. Matrix Structural Analysis Felton Lewisp , 1997.

2. علم الإنشاءات البرفسور د. اودونه 2000

Program Engineering

Program	**Engineering**
Specialization	**Civil Engineering**
Course Number	**20104241**
Course Title	**Concrete Technology**
Credit Hours	**2**
Theoretical Hours	**2**
Practical Hours	**0**

Brief Course Description:
- ❖ Cements and aggregates، water، admixtures، concrete industry، properties of fresh concrete، properties of hardened concrete، special types of concrete، mix design.

Course Objectives:
To study:
1. Different materials used in manufacturing of concrete and their properties and factors affecting.
2. Concrete properties and factors affecting.
3. Special types of concrete.
4. The handling, transporting, placing and testing of concrete.

☐ **Detailed Course Description:**

Unit Number	Unit Name	Unit Content	Time Needed
1	**Cement**:	▪ Introduction. ▪ Components and manufacturing methods. ▪ Types and properties. ▪ Testing of cement.	
2	**Aggregate**	▪ Properties of aggregate . ▪ Types of aggregate . ▪ Tests carried on aggregate . ▪ The effect of aggregate properties on concrete.	
3	**Water**	▪ Properties of water used in concrete. ▪ Factors influencing water cement ratio. ▪ The uses of water in concrete.	
4	**Additives**	▪ Introduction. ▪ Advantages, disadvantages. ▪ Classification of additives. ▪ (accelerators, retarders, plasticizers,………).	
5	**Design of Concrete mixes**	▪ The purpose of design. ▪ Methods of design. ▪ ACI method. ▪ Trial method. ▪ Approximate method.	
6	**Manufacturing of Concrete (1)**	▪ Preparing. ▪ Formwork . ▪ Mixing . ▪ Transiting. ▪ Placing. ▪ Compacting.	
7	**Manufacturing of Concrete (2)**	▪ Curing. ▪ Removing the formwork . ▪ Rehabilitation of surfaces.	
8	**Prosperities of Fresh Concrete**	▪ Workability. ▪ Consistency. ▪ Segregation. ▪ Bleeding	
9	**Properties of Hardened Concrete**	▪ Compressive and tensile strength of concrete. ▪ Shear strength and flexure strength. ▪ Factors affecting concrete strength	

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		▪ Cement, aggregate. ▪ wlc. ▪ Compaction. ▪ Curing.	
10	**Ready-mixed concrete**	▪ Properties. ▪ Components. ▪ Manufacturing and usages.	
11	**Pre-cast units**	▪ Properties ▪ Usages	
12	**Light weight concrete**	▪ Properties ▪ Components ▪ Manufacturing and usages	

Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

Teaching Methodology:
  ❖ Lecture

Textbook:

1.تكنولوجيا و خواص الخرسانة ، د. روحي الشريف ،1992.

References :

1. Properties of Concrete, 4th edition, by Nevile,A,M; 1995.
2. دليل المهندس الانشائي(الجزء الثاني الخرسانة العادية)، ا.د.عبدالرحمن مجاهد 2002
3. المواصفات الفنية العامة للمباني (الأعمال المدنية والمعمارية) وزارة الأشغال العامة/ 1996.
4. دليل صناعة المواد الإنشائية – د. زهير سمارة / 2003 .
5. أسس وأساليب ضبط الجودة والسيطرة النوعية للمواد الإنشائية–– د.م. زهير محمد سمارة 1999

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Program Engineering

Program	**Engineering**
Specialization	**Civil Engineering**
Course Number	**20104242**
Course Title	**Concrete Technology Lab.**
Credit Hours	**1**
Theoretical Hours	**0**
Practical Hours	**3**

Brief Course Description:

- ❖ Experiments of Concrete 'Cements; aggregates ; Fresh concrete ; Hardened concrete; nondestructive testing of concrete.

Course Objectives:

1. To enable students to perform appropriate tests on cements, aggregate ,fresh and hardened concrete.
2. To enable students to make their own judgment about concrete and its quality.

□ **Detailed Course Description:**

Unit Number	Unit Name	Unit Content	Time Needed
1.	**Cement Tests**	▪ Fineness of cement. ▪ Specific weight of cement. ▪ Initial and final setting time of cement. ▪ Compressive strength of cement. ▪ Tensile strength of cement.	
2.	**Aggregate Tests**	▪ Grading of aggregate (sieve analysis). ▪ Flakiness index and elongation index. ▪ Specific weight and absorption ratio of coarse and fine aggregate. ▪ Unit weight and percentage of voids. ▪ percentage of clay ,silt and fine dust in sand. ▪ Los Angels abrastion test . ▪ Impact value test.	
3.	**Concrete Test**	▪ Slump test. ▪ V.b. consistometer test . ▪ Compacting factor test .	
4.	**Hardened Concrete Tests**	▪ Preparations of cube and cylinder samples. ▪ Compressive tests on cube and cylinder samples. ▪ Testing concrete strength by Schmidt hammer (non-destructive test). ▪ Tensile tests: a) split-cylinder test. ▪ b) Flexure test.	
5.	**Brick and Tiles Tests**	▪ Absorption ratio of bricks . ▪ Absorption ratio of tiles. ▪ Testing brick strength .	

Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

Teaching Methodology:
❖ Laboratory

Textbook:
1. Properties of Concrete, 4th edition , by Nevile,A,M; 1995.

References :
1. المواصفات الفنية العامة للمباني (الأعمال المدنية والمعمارية) وزارة الأشغال العامة/ 1996.
2. دليل صناعة المواد الإنشائية – د. زهير سمارة / 2003 .
3. أسس وأساليب ضبط الجودة والسيطرة النوعية للمواد الإنشائية–– د.م. زهير محمد سمارة 1999

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Program Engineering

Program	Engineering
Specialty	Common
Course Number	20104121
Course Title	Civil Engineering Drawing
Credit Hours	2
Theoretical Hours	0
Practical Hours	6

Brief Course Description:

❖ Basic concepts and conventional symbols of building drawing , topographic maps , plans, elevations , vertical sections , detailing of stairs , foundations ,beams , columns , slabs , manholes ,and inlets , Drawing of open and closed traverses, different types of horizontal, vertical curves and slopes , cross sections, different types of intersections and interchanges , mass haul diagram, lighting and marking of the roads.

Course Objectives:

partI

1. The student must know the conventional symbols of building drawing.
2. The student must be able to draw :
   - Architectural drawing.
   - Structural drawing

Part II

This course is oriented to focus on the drawing of highway routes, horizontal and vertical curves , intersections, interchanges ,cross-sections, culverts and manholes

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
	Part I		
1.	**Symbols Content**	▪ Symbols building drawing ▪ Types of lines ▪ Scales	
2.	**Surveying Drawing**	▪ Topographic maps & contour lines ▪ Contour interval ▪ Drawing contour lines ▪ Site plan ▪ Area schedule ▪ Rain water plan	
3.	**Plans**	▪ Drawing plans	
4.	**Elvations**	▪ Drawing elevations	
5.	**Stairs and Floors**	▪ Drawing plans of stairs ▪ Drawing vertical sections of stairs ▪ Drawing details of floors	
6.	**Vertical Sections**	▪ Drawing different vertical sections	
7.	**Foundations & Columns**	▪ Drawing plans of footings ▪ Drawing vertical sections of columns and footings	
8.	**Slabs**	▪ Drawing solid slabs (one way,two way) ▪ Drawing ribbed slab ,(one way ,two way)	
9.	**Sewage**	▪ Drawing a profile with manholes, slopes and distances	

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10.	**Walls**	▪ Drawing details of different types of walls	
	Part II		
11.	**Travers and routes**	▪ Drawing traverse ▪ Drawing routes ▪ Distance and horizontal angles.	
12.	**Horizontal Curves**	▪ Types of horizontal curves ▪ Drawing horizontal curves.	
13.	**Vertical Curves**	▪ Elements of vertical curves ▪ Drawing vertical curve ▪ Sag and crest curves	
14.	**Cross – Sections**	▪ Elements of cross -section ▪ Drawing cross -section ▪ Typical section	
15.	**Mass haul diagram**	▪ Elements of mass haul diagram ▪ Drawing mass haul diagram	
16.	**Culvert**	▪ Pipe culverts ▪ Box culverts ▪ Retaining walls	
17.	**Traffic Engineering**	▪ Lanes and islands ▪ Traffic signs and marking	
18.	**Intersections**	▪ Types of intersection ▪ Canalized intersection ▪ Interchanges	

Evaluation Strategies:

Exams		Percentage	Date
Exams	Assignment	30%	--/--/----
	Med-tream Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:
- ❖ Laboratory

Textbooks:

1. الرسم المعماري، محمد عبد الله الدرايسة / 2005.
2. البسيط في هندسة الطرق (ج1+ج2)، د. روحي الشريف 1992.

Reference:

3. Traffic And Highway Engineering By Nicholas Garber2002
4. تغطية مساحية للطرق، د يوسف صيام ،1999
5. تصميم الخلطات الأسفلتية للطرق، د صالح السويلمي ،2002
6. Apolicy Geometric Design of Highway and Streets2001
7. مبادئ في هندسة المساحة ،د. بسام صالح،2002

8. الواضح في إنشاء المباني، د . سليم الفقيه /2005.
9. Reinforced concrete A Fundamental Approach 5 th Edition-by NAWY .E /2002
10. الدليل الارشادي لكودة الخرسانة العادية و المسلحة ،عمان ، وزارة الاشغال العامة 1998.

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