Nile Higher Institute for Engineering and Technology
Communication and Electronics Engineering Department
Basic Science and Mathematics Classes

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1. Course Number and Name

HUM 012 – English language 1.

2. Credits (Contact Hours/Week for Fall/Spring Semester)

2 (28) / FALL

3. Course Coordinator

Shahen, Hamdy

4. Textbook and Supplemental Materials

Mark Hancock & Annie McDonald, English Result - Intermediate Level, Oxford University press, Last Edition.

5. Course Information

Catalog Description: a practical approach to English for engineering: sentences in English – modals – slang - proverbs – order letters – a routing slip – memos – reports – the people in my life – how do you meet and greet? – How do you address people? – writing an E-self introduction – how to explain your point of view – how to talk about hopes and wishes – signs of the zodiac – CV.

Prerequisites None. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course:** SE.

6. Course Objectives and Outcomes

This course is for student of English who need training and guidance during and after their study at Nile Academy Higher Institute for Engineering. It is more useful to offer learners like materials, samples and train them in comprehension strategies to enable them to deal with materials. They must not be hurried but must feel that they can learn as many times as they need and that they can share and compare their understanding with fellow students.

- **This course supports student outcomes by developing:**

Student Outcomes	Selection
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	
3. An ability to communicate effectively with a range of audiences.	✓
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	
6. An ability to develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions.	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

7. List of Topics

The major topics covered in this course are:

- Talking English – miscellaneous topics.
- Speak English like a native speaker.
- Diverse topics.

1. Course Number and Name

BAS 011– Mathematics 1

2. Credits (Contact Hours/Week for Fall/Spring Semester)

3 (42) / FALL

3. Course Coordinator

Ziada, Eman

4. Textbook and Supplemental Materials

- E. Swokowski, M. Olinick, and D. Pence, Calculus, PWS Publishing Company- Boston, 2005.
- Mary Attenborough, Engineering Mathematics, McGraw – Hill Book Company Europe, 2006.
- R. Smith, and R. Minton, Calculus, Mc-Graw-Hill Companies, Inc., Boston, 2000.

5. Course Information

- **Catalog Description:** Introduction to Functions, Partial fractions, Theory of equations, Matrices, System of algebraic equations and some mathematical and engineering applications series.

Prerequisites None. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course:** Required.

6. Course Objectives and Outcomes

Students who successfully complete this course will be able to:

- Gain an understanding of solving Partial fractions.
- Gain an understanding of solving system of algebraic equations and Matrices.
- Gain an understanding of theory of Functions and its Derivatives.
- Gain an understanding of limits and continuity
- Gain hands-on usage of the lhopital Rule.
- How important Talyor and Macalurine theorems.

This course supports student outcomes by developing:

Student outcomes	Selection
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	✓
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	
3. An ability to communicate effectively with a range of audiences	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

7. List of Topics

The major topics covered in this course are:

- Vector Algebra.
- Binomial theorem.
- Partial fractions.
- Theory of equations.
- Numerical methods.
- Matrices –System of algebraic equations and applications.
- Gauss elimination method.
- Differential Calculus.
- Function – Basic functions.
- Limits- Continuity.
- Derivatives – Indefinite forms - Talyor and Macalurine theorems.
- Application – Expansions – Curve fitting.
- Some mathematical and engineering applications – Approximation.
- Introduction to partial differentiation.

1. Course Number and Name

BAS 021 – Physics 1

2. Credits (Contact Hours/Week for Fall/Spring Semester)

3 (42) / FALL

3. Course Coordinator

Rabea, Ayamn.

4. Textbook and Supplemental Materials

- Shipman, Wilson, Todd, An introduction to physical Science, D.C.Health and Company, Toronto, 1990.

5. Course Information

Catalog Description. Measurements : Physics and measurements – (Length , mass , time , the international system of unit SI) Elastic properties of solid (stress, Strain , International system of unit SI) Elastic properties of solid (stress, strain, elastic modules …) Dynamic of ideal fluid) static and dynamic) – oscillatory motion : Wave motion , sound Waves, thermodynamics, temperature, heat and first Law of thermo dynamics, kinetic theory of gases , heat engines, ntropy and the second law of thermodynamics, Newton's law of gravitation and applications – potential – Energy – Continuity equation – Oscillations – simple harmonic motion . Electrostatics : Electric charge and Coulomb's law – Gauss law – Electrostatic field- Electrostatic field – Electrostatic potential – Dielectrics and capcitances – Energy**.**

Prerequisites None. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course:** Required.

6. Course Objectives and Outcomes

Students who successfully complete this course will be able to:

- Identify and display dimensional analysis, elastic properties of solid materials, oscillatory motion and dynamics of ideal fluid.
- Describe and define Coulomb's and Gauss' laws and principles of electrostatics.
- Acquiring the principles of design, a conducting experiment within realistic constraints to analyze performance.

- **This course supports student outcomes by developing:**

Student outcomes	Selection
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	✓
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	
3. An ability to communicate effectively with a range of audiences	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	✓
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

7. List of Topics

The major topics covered in this course are:

- Physics and Measurements for
- Electrical Force
- Electrical Potential
- Capacitor and Capacitance.
- Electrical Current.
- Fluid Mechanics
- Mechanical properties of metals
- Oscillation

1. Course Number and Name

BAS 041 – Engineering Chemistry

2. Credits (Contact Hours/Week for Fall/Spring Semester)

3 (42) / FALL

3. Course Coordinator

Al-Azaly, Ali (Senior) & Gebriel, Ahmed

4. Textbook and Supplemental Materials

Theodore L. Brown, et al, Chemistry the central Science, Prentice Hall Int. (Personal International Latest edition), 2009.

5. Course Information

Catalog Description: Introduction to physical and engineering chemistry which include the studying of how matter behaves on a molecular and atomic level and how chemical reactions occur based on understanding chemical properties and describing their behavior using theories of physics and mathematical computations.

Prerequisites None. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course:** Required.

6. Course Objectives and Outcomes

Students who successfully complete this course will be able to:

- State the fundamental properties of matter, the general characteristics of solutions and the principles of equilibrium to chemical systems.
- Apply skills for determining quantities of matter and energy in fuel combustion, perform calculation with thermodynamic function.
- Discuss the constructions of electrochemical and chemical industrial processes for production of cement and fertilizer.
- Use laboratory equipment to conduct engineering chemistry experiments approaches.

This course supports student outcomes by developing:

Student outcomes	Selection
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	✓
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	
3. An ability to communicate effectively with a range of audiences	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	✓
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

7. List of Topics

The major topics covered in this course are:

- Equations of state.
- General properties of solutions.
- Basic principles in Electrochemistry.
- Dynamic Equilibrium in physical and chemical.
- Introduction to chemical Thermodynamics.
- Introduction to Corrosion Engineering.
- Industry and chemistry of Cement.
- Chemical Fertilizer Industries.

1. Course Number and Name

MED 111 – Principles of Manufacturing Engineering

2. Credits (Contact Hours/Week for Fall/Spring Semester)

2 (28) / Spring

3. Course Coordinator

Al-Sadaty, Maher.

4. Textbook and Supplemental Materials

Serope Kalpakjian, Steven Schmid, manufacturing engineering& technology, Prentice Hall, 6th Ed., 2009.

5. Course Information

Catalog Description: Material properties, Casting Operations, Plastic Deformation, Bulk Deformation, Welding Processes, Sheet Metal forming, Machining Process.

Prerequisites None. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course:** Required.

6. Course Objectives and Outcomes

Students who successfully complete this course will be able to:

- Understand the basic principles of manufacturing processes (assessed through homework, assignments, exams, and project).
- Identify the engineering materials and their types.
- Identify skills to describe casting and molding processes, joining processes, fusion welding and forming of metals and plastics.
- Apply the ideal manufacturing method for metal cutting.

This course supports student outcomes by developing:

Student outcomes	Selection
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	✓
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	✓
3. An ability to communicate effectively with a range of audiences	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

7. List of Topics

The major topics covered in this course are:

- Engineering Materials.
- Casting Processes.
- Plastic Deformation.
- Bulk Deformation Processes.
- Welding Processes
- Sheet Metal Forming.
- Machining Processes.

1. Course Number and Name

MED 011 – Engineering Drawing and Projection.

2. Credits (Contact Hours/Week for Fall/Spring Semester)

3 (42) / FALL

3. Course Coordinator

Al-Sadaty, Maher.

4. Textbook and Supplemental Materials

- Richard Shelton Kirby, the fundamentals of mechanical drawing, Nabu press, 2009.
- Cecil Jensen, Jay Helsel, Dessin Short, engineering drawing and design, McGraw Hill, 7th, Ed., 2007.

5. Course Information

Catalog Description: This course covers the fundamentals of mechanical engineering
Working drawings and their standards. It introduces various types of mechanical elements in terms of function, terminology, geometry and common standards.

Prerequisites None. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course:** Required.

6. Course Objectives and Outcomes

Students who successfully complete this course will be able to:

- Apply the engineering standards and best practices in engineering drawing.
- Recognize the function, terminology, and common standards associated with the different types of mechanical elements.
- Practice on normal and auxiliary projection using computer drafting packages…etc.

This course supports student outcomes by developing:

Student outcomes	Selection
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	✓
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	✓
3. An ability to communicate effectively with a range of audiences.	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	
6. An ability to develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions.	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

7. List of Topics

The major topics covered in this course are:

- Techniques and Skills of Engineering Drawing,
- Normal and auxiliary projections.
- Solid geometry.
- Intersections between planes and solids.
- Development, sectioning, drawing and joining steel frames.
- Assembly drawing of some mechanical parts reading drawings
- Steel Structures.

1. Course Number and Name

HUM 013 – English language 2.

2. Credits (Contact Hours/Week for Fall/Spring Semester)

2 (28) / SPRING

3. Course Coordinator

Shahen, Hamdy

4. Textbook and Supplemental Materials

Richard Acklam, Total English - Upper - Intermediate Level, Pearson Education Limited - Longman, Last Edition

5. Course Information

Catalog Description: talking English: greeting – weather – calling a friend – describing people – sports – invitation to a movie – sharing news and information – etc. Speaking English like a native: bobs day at work – bob returns home with bad news – teds day at school – Susan stays home and bakes cookies. Diverse topics: time expressions – dairy – conditional sentences – had better – relative pronouns- etc.

Prerequisites HUM 012. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course:** SE.

6. Course Objectives and Outcomes

Students who successfully complete this course will be able to:

- Display most of the linguistic features of the English spoken as well as written.
- Help Ss' towards understands the native toing of the English language and be able to negotiate with native spoken people with an ease.

This course supports student outcomes by developing:

	Student outcomes	Selection
1.	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	
2.	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	
3.	An ability to communicate effectively with a range of audiences.	✓
4.	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
5.	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	
6.	An ability to develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions.	
7.	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

7. List of Topics

The major topics covered in this course are:

- Talking English – miscellaneous topics.
- Speak English like a native speaker.
- Diverse topics.

1. Course Number and Name

BAS 012– Mathematics 2

2. Credits (Contact Hours/Week for Fall/Spring Semester)

3 (42) / SPRING

3. Course Coordinator

Ziada, Eman

4. Textbook and Supplemental Materials

- E. Swokowski, M. Olinick, and D. Pence, Calculus, PWS Publishing Company- Boston, 2005.
- Mary Attenborough, Engineering Mathematics, McGraw – Hill Book Company Europe, 2006.
- R. Smith, and R. Minton, Calculus, Mc-Graw-Hill Companies, Inc., Boston, 2000.

5. Course Information

Catalog Description: Introduction to Equation of second degree, Equation of pair of straight lines, Translation and rotation of axes, Conic sections, Indefinite integral, and Definite integral and application of definite integral.

Prerequisites: BAS 011. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course:** Required.

6. Course Objectives and Outcomes

Students who successfully complete this course will be able to:

- Gain an understanding of solving indefinite integral methods.
- Gain an understanding of solving definite integral (direct and indirect).
- Gain an understanding of the conic sections.
- Gain hands-on usage of the application of definite integral.

This course supports student outcomes by developing:

Student outcomes	Selection
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	✓
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	
3. An ability to communicate effectively with a range of audiences.	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	
6. An ability to develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions.	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

7. List of Topics

The major topics covered in this course are:

- Equation of second degree – Equation of pair of straight lines – Translation and Translation and rotation of axes.
- Conic sections.
- Method of representing a vector in space – Equation of sphere and Surface of revolutions.
- Plain equation in space.
- Equation of second order – Translation, rotation of axis in space.
- Indefinite integral Method of method of Integration (theory and functions).
- Definite integral (direct and indirect).
- Application of definite integral (areas and volumes).
- Numerical integration.

1. Course Number and Name

BAS 022 – Physics2.

2. Credits (Contact Hours/Week for Fall/Spring Semester)

3 (42) / SPRING

3. Course Coordinator

Gebril, Ahmed (Senior) & Mahrous, Hamdy.

4. Textbook and Supplemental Materials

- Shipman, Wilson , Toddy, An introduction to physical Science , D. C. Heath and Company , Toronto, 1990 .
- Richard T. Weidner, Physics – Revised Version , Allyn and Bacon , Boston , USA , 1989.
- Serway – Beicher , Physics for Scientists and Engineering with Modern, Saunders Collage Publishing , USA , 1989.

5. Course Information

Catalog Description Principal of heat and Thermodynamics: Temperature- Heat – thermal expansion – quantity of heat – First law of thermodynamic – Entropy and the second law of thermodynamic – Car not engine – the absolute temperature scale. Electricity and magnetism: Electrical current and resistance – Ohm's law- electric power – semiconductors – electromotive force – Kirchhoff's rules – Magnetic fields – Maxwell equations – Ampere's law, Maxwell s equations – Fraday's – Gauss's law.

Prerequisites BAS 021. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course:** Required.

6. Course Objectives and Outcomes

Students who successfully complete this course will be able to:

- Demonstrate and describe electrical circuits, electrical power, magnetic fields, considering Kirchhoff, faraday and Maxwell's equations.
- Display and define different units of temperature measurement and concept of heat transfer, recognizing first and second law of thermodynamics.
- Acquiring the principles of design, a conducting experiment within realistic constraints to analyze performance.

- **This course supports student outcomes by developing:**

Student outcomes	Selection
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	✓
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	
3. An ability to communicate effectively with a range of audiences	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	✓
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

7. List of Topics

The major topics covered in this course are:

- Temperature and first law of thermodynamics.
- Heat, thermal expansion and Laws of thermodynamics.
- Current and resistance.
- Direct current circuits.
- Magnetism.
- Optics.

1. Course Number and Name

HUM 011– Arabic Language

2. Credits (Contact Hours/Week for Fall/Spring Semester)

2 (28) / SPRING

3. Course Coordinator

El-Gaiedy, Mahmoud.

4. Textbook and Supplemental Materials

- Adequate Grammar - Hassan Abbas
- Mosque of Arabic Lessons - Mustafa El Ghalayiny

5. Course Information

Catalog Description: The beauty of the Arabic language and its literature, and that the student acquires the ability to study the branches of the Arabic language. Helping the student to understand complex structures and ambiguous methods, and enable the student to think precisely and delicate mental research.

Prerequisites: None. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course:** SE.

6. Course Objectives and Outcomes

Students who successfully complete this course will be able to:

- Identify the beauty of the Arabic language and its literature.
- Develop the literary taste of the student in order to realize the aesthetic aspects of speech styles, meanings and images.
- Develop the ability and skill of spelling and writing so that he can write correctly in all respects.

This course supports student outcomes by developing:

Student outcomes	Selection
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	
3. An ability to communicate effectively with a range of audiences.	✓
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	
6. An ability to develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions.	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

7. List of Topics

The major topics covered in this course are:

- Arabic sentence between nominative and predicate
- Cases of parsing and construction of nouns and verbs
- Estimate each parsing and assigning some of its signs for some
- Arabic sentence transcripts and sentence changes
- The five verbs and the five nouns pictures of their expressions
- Cases of prevention from exchange
- Photo distinction number

1. Course Number and Name

HUM 081 – Computer Skills.

2. Credits (Contact Hours/Week for Fall/Spring Semester)

0 (0) / SPRING

3. Course Coordinator

Al-bakry, Hazerm

4. Textbook and Supplemental Materials

• Norton, P. (2000). Peter Norton's introduction to computers. Glencoe/McGraw-Hill.
• Timothy J. O'Leary and Linda I O'Leary, "Computing Essentials, Complete 2010, McGraw Hill.

5. Course Information

Catalog Description Principal of information technology: Introducing Computer Systems- Interaction with Your Computer – Processing Data– Storing Data– Using Operating Systems– Protecting Your Privacy. Modem CPUs: look inside the processors- advanced micro devices -microcomputers processor -intel processors. Storing Data: how data stored and organized on local disk – CD drive- internal memory structure- external memory structure. Using Operating Systems: operating systems basics – graphical user interface -built in applications – control panel navigation. Introduction to programing: flowcharts – algorithmic thinking - software development life cycle – start coding with visual basic.

Prerequisites: None. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course**: SE.

6. Course Objectives and Outcomes

Students who successfully complete this course will be able to:

- Apply knowledge of information technology concepts to business needs and helping the development of student's computer skills that will support the educational process.
- Acquiring the principles of programming and prepare the student to handle more advanced computer science courses in upcoming years.
- This course also will give the appropriate computer background for non-specialist student

- **This course supports student outcomes by developing:**

Student outcomes	Selection
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	
3. An ability to communicate effectively with a range of audiences.	✓
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	✓
6. An ability to develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions.	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

7. List of Topics

The major topics covered in this course are:

- Information technology fundamental.
- Programs flowcharts and algorithmic thinking
- Web design in HTML.

1. Course Number and Name

MED 021– History of Engineering & Technology

2. Credits (Contact Hours/Week for Fall/Spring Semester)

1 (14) / SPRING

3. Course Coordinator

El-Boghadady, Amr (Senior) & Al-Azaly, Ali.

4. Textbook and Supplemental Materials

- James E. McClellan & Harold Dorn, Science and Technology in World History: An Introduction, The Johns Hopkins University Press, 2nd. Ed., 2006.

5. Course Information

Catalog Description: History of civilization and technology development, humanities and social sciences, engineering education and its disciplines, scientific thinking and analysis, technology and training, different work methodologies and ethics, application examples, course project

Prerequisites: None. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course:** SE.

6. Course Objectives and Outcomes

Students who successfully complete this course will be able to:

- Gain an understanding History of civilization and technology development
- Gain an understanding engineering education and its disciplines
- scientific thinking and analysis, technology and training

This course supports student outcomes by developing:

Student Outcomes	Selected
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	
3. An ability to communicate effectively with a range of audiences.	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	✓
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	
6. An ability to develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions.	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

7. List of Topics

The major topics covered in this course are:

- History of Civilization and Technology Development
- Humanities and Social Sciences
- Engineering Education and its Disciplines
- Scientific Thinking and Analysis
- Technology and Training
- Different work Methodologies and Ethics

1. Course Number and Name

BAS 031 – Mechanics

2. Credits (Contact Hours/Week for Fall/Spring Semester)

4 (56) / SPRING

3. Course Coordinator

El-Kalla, Ibrahim

4. Textbook and Supplemental Materials

Engineering Mechanics: Statics, 9e, Hibbeler, 2001, Prentice Hall

5. Course Information

Catalog Description: Resultant of forces, Moment of forces, Equilibrium of rigid body, Projectile Particle motion and Newton's law of motion.

Prerequisites: None. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course:** Required.

6. Course Objectives and Outcomes

Students who successfully complete this course will be able to:

- Identify, formulate, and solve mechanical engineering problems.
- Determine the support reactions on a structure.
- Determine the resultant of a system of forces.
- Draw complete and correct free-body diagrams and write the appropriate equilibrium equations from the free-body diagram.
- Understand and use basic terms for the description of the motion of particles, vector functions and the fundamental laws of Newtonian mechanics.

This course supports student outcomes by developing:

Student outcomes	Selection
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	✓
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	
3. An ability to communicate effectively with a range of audiences.	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	
6. An ability to develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions.	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

7. List of Topics

The major topics covered in this course are:

- Resultant and equilibrium of concurrent Forces in 2D.
- Resultant and equilibrium of concurrent Forces in 3D.
- Non-Concurrent Forces and Moments in 2Dand 3D
- Equilibrium of Rigid Body in 2D
- Equilibrium of Rigid Body in 3D
- Kinematics of a Particle.
- Curvilinear Motion.

1. Course Number and Name

BAS 111 – Mathematics 3

2. Credits (Contact Hours/Week for Fall/Spring Semester)

3 (42) / FALL

3. Course Coordinator

Ibrahim, Hegazi

4. Textbook and Supplemental Materials

Peter V.O. Neil, Advanced Engineering Mathematics, Chirrs Carson publication, UK, 2007.

5. Course Information

Catalog Description: Introduction to Differential Equations, Partial Differentiation, Multiple Integral, Laplace transformation and Fourier series.

Prerequisites: BAS 012. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course:** Required.

6. Course Objectives and Outcomes

Students who successfully complete this course will be able to:

- Solve the First Order Differential Equations and the High order Differential Equations.
- Calculate the Areas and Volumes of any rigid bodies using the concept of Multiple Integral
- Identify and Apply Laplace transform techniques to Differential Equations.
- Analyze and solve the higher order Differential Equations like Laplace transformation.
- Apply divergence, curl, and gradient theories and implement their applications using double and triple integrals.

This course supports student outcomes by developing:

Student outcomes	Selection
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	✓
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	
3. An ability to communicate effectively with a range of audiences.	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	
6. An ability to develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions.	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

7. List of Topics

The major topics covered in this course are:

- First order Differential Equations.
- Partial Differentiation.
- Multiple Integral.
- Laplace transformation.
- Fourier series.
- Gradient, Divergence, and Curl
- Triple Integrals and Applications

1. Course Number and Name

BAS 211 – Mathematics 4

2. Credits (Contact Hours/Week for Fall/Spring Semester)

3 (42) / SPRING

3. Course Coordinator

Zyada, Eman

4. Textbook and Supplemental Materials

Peter V.O. Neil, Advanced Engineering Mathematics, Chirrs Carson publication, UK, 2007.

5. Course Information

Catalog Description: Introduction to Functions of complex variables, Analytic Functions, Harmonic Functions, complex integration, Taylor and Laurent Series, and Cauchy Riemann theorems, also Special Functions, Fourier Series and Integrals, and Partial Differential Equations.

Prerequisites: BAS 111. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course:** Required.

6. Course Objectives and Outcomes

Students who successfully complete this course will be able to:

- Identify the basics of complex numbers to apply some calculations on complex functions.
- Solve Complex Integration problems.
- Apply Cauchy-Riemann and Cauchy Residue theorems.
- Solve integrals problems using principles of special functions as Gamma, Beta, Bessel, and Legendre equations.
- Use Fourier expansion rules to expand different forums for mathematical series.
- Identify Fourier integral rules and Perceval's rules for power expansion.
- Solve partial differential equations and its applications as wave and potential equations.

This course supports student outcomes by developing:

Student outcomes	Selection
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	✓
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	
3. An ability to communicate effectively with a range of audiences.	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	
6. An ability to develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions.	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

7. List of Topics

The major topics covered in this course are:

Part01: Special Functions and Fourier Analysis

- Special Functions (Gamma, Beta, Bessel, and Legendre)
- Fourier Series
- Fourier Integral and Perceval's Identity
- Partial Differential Equation
- Wave Equation
- Potential Equation

Part02: Complex Analysis

- Complex Numbers and Roots of Complex Numbers
- Analytic Functions
- Cauchy – Riemann Equations
- Harmonic Functions
- Trigonometric Functions
- Complex Integration
- Taylor and Laurent Series
- Cauchy Residue Theorem

1. Course Number and Name

BAS 212 Statistics and probability theory

2. Credits (Contact Hours/Week for Fall/Spring Semester)

3 (42) / SPRING

3. Course Coordinator

Sakr, Hesham

4. Textbook and Supplemental Materials

- Arnold, Barry C., Narayanaswamy Balakrishnan, and Haikady Navada Nagaraja. A first course in order statistics. Society for Industrial and Applied Mathematics, 2008.

5. Course Information

Catalog Description: This course introduces the following topics:

- The birth of statistics, definition of statistics, presentation of statistical data.
- Sets and probabilities: random experiments, sample spaces, sets operations.
- Binomial distribution, the Poisson distribution, Poisson approximation of binomial probabilities.
- Continuous random variables.
- Sampling Theory and Inferences
- Regression and correlation.

Prerequisites: BAS 111. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course:** Required.

6. Course Objectives and Outcomes

Students who successfully complete this course will be able to:

- Illustrate the different ways for random experiments, sample spaces, sets operations, counting data probability, and conditional probabilities.
- Solve regression and correlation problems and its applications.
- Identify sampling theory and central limit theorem.
- Explain different statistical distributions as binominal, possion's, and geometric distribution.

This course supports student outcomes by developing:

Student outcomes	Selection
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	✔
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	
3. An ability to communicate effectively with a range of audiences	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

7. List of Topics

The major topics covered in this course are:

- Definition of statistics and data.
- Sets and probabilities: random experiments, sample spaces, sets operations, counting data probability, conditional probabilities, Bayes' theorem.
- Sampling theorem and central limit theory.
- Discrete random variables, the Hyper - geometric distribution, Binomial distribution the Poisson distribution, Poisson approximation of binomial probabilities Continuous random variables.
- Regression and correlation: Simple linear regression by least square method validation the model and correlation coefficient.

1. Course Number and Name

BAS 311 – Mathematics 5

2. Credits (Contact Hours/Week for Fall/Spring Semester)

3 (42) / FALL

3. Course Coordinator

Zyada, Eman

4. Textbook and Supplemental Materials

Peter V.O. Neil, Advanced Engineering Mathematics, Chirrs Carson publication, UK, 2007.

5. Course Information

Catalog Description: Introduction to curve fitting, interpolation techniques and applications, spline analysis, heat equations, Euler method to solve O.D.E., Numerical Differentiation and Integration theorems.

Prerequisites: BAS 211. **Corequisites:** None. **Pre or Corequisites:** None. **Type of Course:** Required.

6. Course Objectives and Outcomes

Students who successfully complete this course will be able to:

- Solving curve fitting problems and interpolation theorems in numerical analysis concepts.
- Apply the concept of Euler method to solve the ordinary differential equations.
- Use some numerical approximations to solve numerical integrals and differentiations.
- Solving linear, quadratic, and cubic equations using spline analysis theorems.
- Solving heat equations using numerical principles and second order differential equations.

This course supports student outcomes by developing:

Student outcomes	Selection
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	✓
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	
3. An ability to communicate effectively with a range of audiences.	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	
6. An ability to develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions.	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

7. List of Topics

The major topics covered in this course are:

- Curve Fitting
- Interpolation
- Spline Analysis
- Heat Equation
- Euler Method to Solve O.D.E.
- Numerical Differentiation
- Numerical Integration