



جامعة الأميرة نورة بنت عبدالرحمن
Princess Nourah bint Abdulrahman University

Laboratory Guidelines

College of Engineering

Industrial and Systems Engineering

Department

Industrial and Systems Engineering

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2. List of laboratories

The table below provides a list of laboratories that support the courses within the Industrial and Systems Engineering program.

	Laboratory name	Location
1	Work Study laboratory	Building 150, room 0.203
2	Maintenance and reliability laboratory	Building 150, room 0.203
3	Metrology Laboratory	Building 150, room 0.203
4	Materials Science and Engineering laboratory	Building 150, room 0.606
5	Human Factor Laboratory	Building 150, room 0.203
6	Engineering Drawing Laboratory	Building 150, room 0.608
7	Computer laboratory	Building 150, room 0.608-0.607-0.609



3. Work Study Laboratory

This Lab is intended for undergraduate industrial engineering students as well as for beginners in Work Analysis and Design. It provides broad knowledge about the areas of methods, measurement, and management of work.

Vision

The vision of the work study laboratory is to support teaching and research in work methods engineering, time, and motion study.

Missions

The mission of the work study laboratory is to provide an environment enhancing the learning experience through the use of work measurement tools, techniques and equipment.

Location

Building 150, room 0.203

Courses

ISE 361 work and study improvement

The important experiments:

- MOST (Maynard Operation Sequence Techniques) Software
- Work Sampling

The important equipment



Spur gear Assembly Kit



High-Speed Multi-Camera Motion Capture
System



Shut-off valve Assembly Kit

4. Maintenance and Reliability Laboratory

This Lab is intended for undergraduate industrial engineering students to provide the broad knowledge about the areas of machine diagnostic, calibration and maintenance.

Vision

To be a world-class maintenance and reliability laboratory and the reference laboratory in Saudi Arabia.

Missions

To provide maintenance fundamentals of prototyping and reliability fundamentals of laboratory equipment that enables and supports both quality education and valuable research for undergraduate and graduate students.

Location

Building 150, room 0.203

Courses

ISE 332 Maintenance and reliability

The important experiments:

- Introduction to PT 500 (Machinery Diagnostic System)
- Balancing in one plane
- Roller Bearing Faults Detection
- Effects of Damage to Gears on Vibration Behavior
- Calibrating a Pressure Sensor

The important Equipment



Machinery diagnostic system, base unit



Brake & load unit



Computerized vibration analyzer



Roller bearing faults kit



Belt drive kit



Damage to gears kit



pressure sensor calibrator



Assembly materials tester



Assembly & maintenance : centrifugal pump kit



Assembly & maintenance: multistage centrifugal
pump kit



5. Metrology Laboratory

This lab includes a set of equipment measurement using precision measuring methodology for lengths, dimensions, and angles. It is also used to calibrate the measurements, in addition to measure the quality of surfaces. Students collect and analyze measurement data, evaluate measurement methodologies, and learn the capabilities and limitations of measurement technologies.

Vision

The vision of Metrology Laboratory is to conduct teaching, research and development in dimensional metrology and equipment precision.

Missions

The mission of the metrology laboratory is to provide the foundation of dimensional measurements by teaching, conducting research, developing new measurement methods, and providing measurement services.

Location

Building 150, room 0.203

Courses

ISE 230 Quality Control, ISE 344 Metrology

The important experiments:

- Measuring dimensions by Vernier calipers
- Measuring dimensions by micrometers and universal goniometer
- Non-contact measurement of angles
- Surface roughness measurements
- Measurement of linear and angular dimensions

- Scanning of Product using Non-Contact Laser Scanners
- Scanning & Inspection of Product using Touch Probe

The important Equipment



Dimensional metrology : training kit 1



Dimensional metrology : training kit 2



Dimensional metrology : training kit 3



Digital Vernier calipers



Inside micrometers



surface leveler



precision granite block with steel stand



contact type scanners



Hand-Held LCR Meter



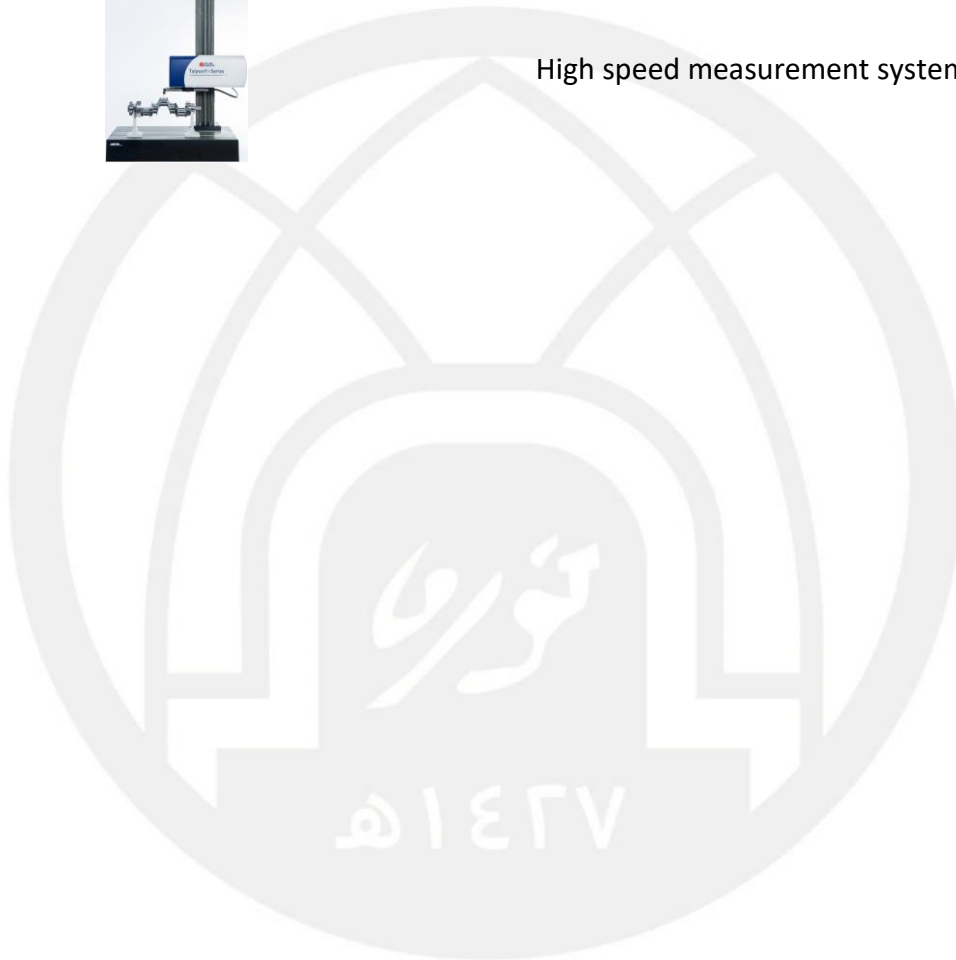
Form Talysurf i-Series



High Precision measurement



High speed measurement system





6. Materials Science and Engineering Laboratory

This lab is intended for undergraduate industrial engineering students as well as for beginners in materials engineering. It provides the broad knowledge about manufacturing materials' properties, behaviors and their recognition.

Vision

The vision of laboratory is to conduct teaching, research and development in advanced materials and testing equipment, and to support scientific and industrial communities' needs, both public and private.

Missions

Develop an understanding of the impact of modern materials on products' performance.

Develop an understanding of the classes of engineering materials (metal alloys, polymers, ceramics and composites), with an emphasis on their properties and their uses.

Disseminate knowledge through teaching & best practices.

Understand how the materials' selection process fits into the product design, development and manufacturing nowadays industry processes. Conduct research in materials development and testing.

Location

Building 150, room 0.606

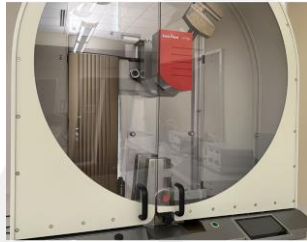
Courses

ISE 204 Materials science and engineering

The important experiments

- Specimen preparation
- Hardness Test
- Tensile Test
- Charpy Impact Test
- Torsion Test

The important Equipment



Charpy Testing Machine



Abrasive Cutters



Compression Mounting



Grinding-Polishing



Heat treatment furnace



Optical microscope -Image capturing system



Brinell Hardness Testing Machine



Vickers Hardness Testing Machine



Rockwell Harness Testing Machine



SFM- Test System



Torsion machine



7. Human Factors Laboratory

This Lab is intended for undergraduate industrial engineering students as well as for beginners in Human Factors Engineering. It provides the broad knowledge about human factors principals.

Vision

The Human Factors lab, through sustained excellence, is presenting world leader aspects of human factors in education and research, constantly enhancing global industrial and service safety.

Missions

The mission of the laboratory assignments is to provide an environment enhancing the learning experience through the use of human factors tools :

Educating students so that they can apply the principles of human factors engineering to help people by improving products and systems.

conducting research to make contributions in the field of human factors engineering that will help people to improve the person-product/system interface.

Location

Building 150, room 0.203

Courses

ISE 260 Human factor engineering

The important experiments

- Audiometry measurement
- Anthropometric Measurement and work design
- Light intensity measurement.

- Air pollution and gases percentage measurement
- Physical Workload Measurement
- Lifting Capacity Measurement
- Evaluation of the impact of inappropriate postures using (RULA) method.
- NIOSH Lifting Equation and Manual Material Handling

The important Equipment



Electromyography (EMG) Measurement System



Weight & Height Measuring Scale



Jackson Strength Evaluation System



Noise Dose Meter



Vibration Meter



Multifunction Thermo-Hygrometer



Carbon Dioxide Monitor



Heart Rate Monitor



Weather Meter



Pocket Vibration Meter



Digital Anemometer



Light Intensity Meters



treadmill



Air Humidifier



Noise Dosimeter/Data logger with PC Interface



Ergonomics Bike

8. Engineering Drawing Laboratory

This Lab is intended for college engineering students to provide broad knowledge about the areas of machine drawing. Various aspects of drawing such as free hand sketching; dimensioning; tolerances; types of lines; drawing projections, etc. are provided in this lab.

Vision

Enhance the software and programming skills of young engineers to serve Saudi industries, focusing on various aspects of computer usage in engineering.

Missions

Develop engineers' skills in various fields in engineering drawing.

Location

Building 150, room 0.608

Courses

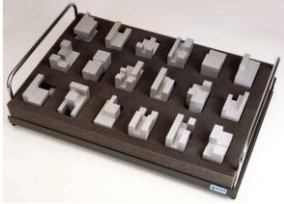
ISE 201 Engineering Drawing

The important experiments

- Drawing standards & fits and tolerances
- Introduction to 2D drafting (dimensioning, hatching, and text)
- Conic sections and special curves
- Orthographic projections and Sectioning
- Solid Modelling (Screw, Basic shapes, Pyramid)
- Assembly Drawing (Screw Jack, Joints, couplings, and vice)
- Experiments based on GUNT kits.
- Introduction to Computer aided drafting

- sketching, and Basic Drafting

The important Equipment



TZ-130 prismatic work samples with slanted cut-outs



TZ-100 Engineering drawing three dimensional display



TZ 200.02 Engineering drawing casting



TZ 200.11 bending device : Assembly kit



TZ 200.06: Drilling Jig for an annular disc



9. Computer Laboratory

The Lab provides the undergraduate students a broad knowledge of different software, programming skills, and statistical analysis. The interactive nature of the lab gives the authority to the instructor to access workstation of any student, so to teach them interactively. The lab is equipped with all necessary software and language tools to cover various subjects and courses. It serves as a computer simulation lab, quality control and design of experiments lab, and also general computer applications lab. The lab is used for educational as well as research purpose

Vision

Raise young industrial engineer software and programming skills to serve the Saudi Industries. Focusing on various aspects of use of computers in Industrial engineering

Missions

Develop young industrial engineers' skills in various fields such as design, simulation, programming, and statistical analysis

Location

Building 150, room 0.608-0.607-0.609

Alignment between ISE courses and software used:

Software name	Courses using the software
Minitab	ISE 230, ISE 343, ISE 342, ISE 471, ISE 472
Microsoft -Project	ISE 210, ISE 471, ISE 472
Microsoft Excel	ISE 240, ISE 250, ISE 322, ISE 342, ISE 471, ISE 472, ISE 321, ISE 220, ISE 341
Rockwell Arena	ISE 444, ISE 471, ISE 472
SolidWorks	ISE 201
Python-PyCharm	ISE 452, ISE 471, ISE 472
Visio	ISE 352, ISE 471, ISE 472



10. General Laboratory Rules

- NO Food OR Drink is permitted in the lab
- It is not allowed to use laboratory equipment except for its intended purpose
- It is not allowed to change the computer settings associated with the device
- Do not use CDs or plugging flash memory in the computer
- Do not install any software in the computer
- No phones or I-pods may be used while in the lab. Distractions can cause accidents. These items will be confiscated and may require all students to turn them OFF before any work can continue.
- Before you leave the computer lab, please:
 - Save your work
 - Submit your work to the lab faculty member (if necessary)
 - Leave your area clean and tidy for next student

Any failure to follow these lab rules may result in the loss of your lab privileges.

Appearance and protective clothing

- Abaya is not allowed
- A lab coat must be worn
- Be aware of the dangers of long hair, long sleeves, and long loose clothing and long
- Jewelry should be used in a limited manner
- Closed soles must be worn

Protection from mechanical devices

- Do not touch, clean or repair machines while they are spinning, and even when they are stopped, you must make sure that they do not spin automatically
- Wear special gloves when working on high-voltage machinery to protect against the risk of electrocution
- Use earplugs made of plastic, rubber, or noise-protective helmets
- The lab responsible must ensure the safety of the devices after the student finishes her work and close them
- The lab responsible must make sure that the power is turned off and the water switch is turned off, before the last person leaves the lab



Chemical protection

- Gloves must be worn when handling chemicals
- Gloves must be washed before removing them from the hand
- Gloves must be used for a certain period and be sure to replace them
- Eye goggles must be worn
- In the event of dangerous chemical operations, a protective head and neck must be worn
- Contact lenses should not be used when dealing with fumes and gases
- These materials must be treated as chemical waste and disposed of in special containers according to the instructions of the College
- Glasses used in chemical processes should not be used to prepare any type of food
- Water sources or water purified from ions should not be used for drinking
- The pipette must be used when handling solutions and the pipette must not be used by mouth
- All laboratory equipment must be properly cleaned, dried and put away at the end of the lab session. This includes goggles, general lab areas, and sinks

In the event of an emergency

Know the location and proper use of the emergency safety materials such as

- the fire blankets
- eyewash station, and
- the fire extinguisher.
- emergency exit

The Lab responsible must be notified immediately of any accident, even if minor.