Course Specifications of
B131 – Physics (2)

University: Benha University **Faculty: Benha Faculty of Engineering**

Course specifications

Programme(s) on which the course is given: All the three engineering technology programs

Major or minor element of programmes: Major

Department offering the programme: All the engineering technology departments

Department offering the course: Department of Basic Sciences

Academic year / Level: First Year, Second Semester

Date of specification approval: 1/12/2009

A- Basic Information

Title: Physics (2) **Code:** B131

Credit Hours: N.A . **Lecture:** 2/week

Tutorial: 2/week **Practical:** 2/week **Total:** 6/week

B- Professional Information

1 - Overall aims of course

By the end of the course the students will be able to

- Knowing and understanding the concepts of wave motion, waves on strings, sound waves and superposition of waves that leads to interference, standing waves and beats. Explain the Doppler Effect.
- Knowing and understanding the interference of light waves, diffraction of light and polarization of light.
- Knowing and understanding the concepts of heat, work, internal energy in thermodynamic processes, first law, kinetic theory of gases, heat engines and efficiency, refrigerators and heat transfer.
- Problem solving in waves, optics and thermodynamics.
- Carrying out practical work on waves, optics and thermodynamics.

2- Intended learning outcomes of course (ILOs)

a. Knowledge and understanding:

a.1 Define any physical quantity introduced.

a.2 List the types of waves, the cases of Doppler Effect, the different thin film structures for interference of light waves, the thermodynamic processes and the ways of heat transfer.

a.3 Illustrate the propagation of waves and superposition principle by figures and computer animations.

a.4 Evaluate the mathematical expressions of wave functions, velocity, power and intensity. Express mathematically the interference of waves, standing waves and beats, the intensity of interference fringes and diffraction fringes and Malus law.

a.5 Write the first law of thermodynamics, ideal gas law and relations for processes. Express the efficiency of heat engines.

a.6 Describe the various parameters of waves and their superposition. Describe the Doppler Effect. Describe the different thermodynamic processes, heat engines and heat transfer.

a.7 Explain the wave motion, interference and diffraction of light waves and thermodynamic processes

a.8 Discuss the basic concepts of waves, optics and thermodynamics.

b. Intellectual skills

b.1 Analyze the wave motion, superposition of waves, thermodynamic processes, heat conduction and electrical conduction

b.2 Problem solving on transverse wave and sound waves parameters, Doppler Effect, Interference and Diffraction of light, Heat, work and internal energy in thermodynamic processes, efficiency of heat engines.

b.3 Apply the physical concepts to solve engineering problems

b.4 Creative thinking for alternative views for sound waves, thin film interference, thermodynamic processes and heat engines.

c- Professional and practical skills

c.1 Measure the velocity of sound in air, velocity of waves on strings,

c.2 Determine the polarization of light waves experimentally, measure of slit width by diffraction of light and measure the wavelength of light by diffraction grating.

c.3 Measure the specific heat of solids and the coefficient of a thermistor.

c.4 Use of scientific instruments and measuring tools.

d- General and transferable skills

d.1 Practice to work in a group.

d.2 Use computer to analyze the data.

d.3 Write scientific report and discuss the results and make conclusions

d.4 Skills in tackling engineering problems physically.

3- Contents

Topic	No. of Hours	Lecture	Tutorial and Practical
Wave motion, transverse waves on strings	12	4	8
Sound waves, Doppler Effect	12	4	8
Superposition of waves, interference, standing waves beats	12	4	8
Interference of light waves, Young's experiment, thin films	11	4	7
Diffraction of light, single slit diffraction, diffraction grating, polarization of light	12	4	8
Heat work and first law of thermodynamics, heart transfer	12	4	8
Kinetic theory of gases and specific heats	12	3	9
Heat engine, efficiency, Carnot engine	7	3	4
Total	90	30	60

4– Teaching and learning methods

4.1- Lectures

4.2- Class tutorials

4.3- Laboratory work

4.4- Internet search

4.5- Power point

5- Student assessment methods

5.1 Written examinations (Mid-Term and Final) to assess scientific knowledge and understanding

5.2 Assignments and quiz to assess ability to solve problems and analyze results independently.

5.3 Laboratory exam to assess ability to do practical work,

5.4 Oral exam to assess understanding of physical concepts.

Assessment schedule

Practical assessment 1	Week 1
Assessment 1	Week 1
Practical assessment 2 and Report	Week 2
Assessment 2	Week 2
Practical assessment 3	Week 3
Assessment 3	Week 3
Practical assessment 4 and Report	Week 4
Assessment 4	Week 4
Practical assessment 5	Week 5
Assessment 5	Week 5
Quiz1	Week 5
Practical assessment 6 and report	Week 6
Assessment 6	Week 6
Practical assessment 7	Week 7
Assessment 7	Week 7
Practical assessment 8 and report	Week 8
Assessment 8	Week 8
Practical assessment 9	Week 9
Assessment 9	Week 9
Mid-Term Exam	Week 9
Practical assessment 10 and report	Week 10
Assessment 10	Week 10
Practical assessment 11	Week 11
Assessment 11	Week 11
Quiz 2	Week 11
Practical assessment 12 and report	Week 12
Assessment 12	Week 12
Practical assessment 13	Week 13
Assessment 13	Week 13
Practical assessment 14 and Report	Week 14
Assessment 14	Week 14
Laboratory and Oral Exam	Week 15
Final Written Exam	Week 16

Weighting of assessments

Mid-term examination	12 %
Final-term examination	60 %
Oral examination	4 %
Practical examination	20 %
Semester work and quiz	4 %
Total	100 %

Any formative only assessments

6- List of references

6.1- Course notes

- Mahmoud Fathy Hassan, Tarek Abdol-Kader, Ahmed Auob," Engineering Physics II, Lecture notes on Waves, Optics and Thermodynamics", Higher Institute of Technology, Cairo, 2008.

6.2- Essential books (text books)

- R. A. Serway and Jewett, "Physics for Scientists and Engineers",6th edition, Brooks cole, New York, 2003
- David Halliday and Robert Resnick, "Fundamentals of Physics", 7th edition, John Wiley, 2007.

6.3- Recommended books

- F.W,Sears, M.W.Zemansky and H.D. Young, "University Physics", Addison-Wesley Company, 2003.

6.4- Periodicals, Web sites, … etc

- Physics Review
- http://www.iitphysics.org
- http://library.thinkquest.org

7- Facilities required for teaching and learning

- Lecture rooms equipped with teaching board and data show.
- Class rooms for tutorial exercises with teaching board.
- Laboratory rooms with laboratory furniture and supplied with general instruments, measuring devices, supports, optical components, instruments for wave motion and heat and thermodynamic apparatus.
- Computers with the appropriate software.

Course coordinator: Dr. Mahmoud Fathy Hassan

Head of Department: Prof. Dr. Hassan Nasr Ahmed

Date: 1/12 /2009