Module Handbook

Module Name:	Nuclear and Particle Physics
Module Level:	Bachelor
Abbreviation, if applicable:	FI4004
Sub-heading, if applicable:	
Courses included in the module, if applicable:	
Semester/term:	Fourth Years
Module coordinator(s):	
Lecturer(s):	
Language:	Bahasa Indonesia
Classification within the curriculum:	~~General Studies~~ / Major Subject / ~~Elective Studies~~
Teaching format / class hours per week during the semester:	3 hours lectures
Workload:	3 hours lectures, 6 hours individual study, 16 weeks per semester, and total 144 hours a semester
Credit Points:	3
Requirements:	Quantum Physics, Electricity and Magnetism
Learning goals:	**Knowledge:** 1. Students able to describe difference between proton-electron model and proton neutron model of nucleus 2. Students able to describe radioactivities, their characteristics, and appropriate detectors for them and utilize quantum theory to explain these phenomena 3. Student able to describe about some standard nuclear models (including nuclear shell model, collective model, Fermi gas model, optical model, Modified Hartree Fock model, and other microscopic models) 4. Student able to describe nuclear forces based on quantum mechanics 5. Students able to describe nuclear reaction theory based on Quantum Mechanics including direct reaction, compound nuclear reaction, and some recent developments **6.** Students able to describe about fundamental particles in physics and their interactions **Skill:** 1. Students able to analyze the difference between proton-electron model and proton neutron model of nucleus, and illustrate characteristics of nuclear masses and nuclear size 2. Students able to analyze, and solve problems about radioactivities, their characteristics, and appropriate detectors for them 3. Student able to analyze, and solve problems about some standard nuclear models (including nuclear shell model, collective model, Fermi gas model, optical model, Modified Hartree Fock model, and other microscopic models) 4. Student able to analyze nuclear forces based on quantum mechanics 5. Students able to analyze, and solve problems about nuclear reaction theory based on Quantum Mechanics including direct reaction, compound nuclear reaction, and some recent developments 6. Students able to illustrate and analyze about nuclear fission and fusion and their applications
Content:	Nuclear model, Radioactivity, Radiation Detector, nuclear reaction, nuclear mass, nuclear size, alpha decay, beta decay, gamma decay, nuclear model, nuclear

	forces, neutron physics, fision reaction, fundamental particles
Study/exam achievements:	Students are considered to be competent and pass if at least get 50% of maximum mark of the exams, homework, quizes
Forms of Media:	Slides and LCD projectors, blackboards
Literature:	1. Krane, K. S., Introductory Nuclear Physics, John Wiley & Sons, 1988. 2. Jelley, N. A., Fundamental of Nuclear Physics, Cambridge, 1990. 3. Cottingham, W. N., Greenwood, D. A., An Introduction to Nuclear Physics, Cambridge Univ. Press, 1986. 4. Y.R. Waghmore, Y. R., Introductory Nuclear Physics, Oxford & IBH Publ.Co., 1981.
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