The relationship between SSC and PLO Physics

No	SSC 13 - Physics	PLO	Module
1	They have sound knowledge of classical physics (mechanics, electrodynamics, thermody-namics, oscillations, waves and optics) and are familiar with the fundamentals of quantum, atomic and molecular, nuclear, elementary particle and solid state physics.	**PLO-10**: Students are able to evaluate theoretical concepts and fundamental principles of classical and modern physics for solving problems in a physical system. **PLO-11**: Students able to apply fundamental concepts and principles of physics and technology in specific fields of expertise, such as theoretical physics, materials physics, electronics and instrumentation physics, medical physics, geophysics, and physical oceanography.	• 220704602W008 Modern Physics • 220704602W009 Thermodynamics • 220704602W027 Waves and Optics • 220704602W014 Classical Mechanics I • 220704602W025 Classical Mechanics II • 220704602W017 Electricity and Magnetism I • 220704602W021 Electricity and Magnetism II • 220704603W019 Quantum Physics • 220704602W030 Solid State Physics • 220704602W018 Nuclear Physics • 220704602W028 Statistical Physics
2	They are familiar with important mathematical methods used in physics and can use these to solve physics problems.	**PLO-07**: Students are able to apply scientific methods mathematically to produce physical models. **PLO-12**: Students able to analyze and apply mathematical concepts and computational techniques to model, simulate, and solve problems in complex physical systems independently and responsibly.	• 220704603W012 Mathematical Physics I • 220704603W020 Mathematical Physics II • 220704602W016 Numerical Method • 220704602W028 Statistical Physics • 220704602W026 Computational Physics
3	They have an extensive understanding of the fundamental principles of physics, their inherent relation and mathematical formulation and, based on this, have	**PLO-07**: Students are able to apply scientific methods mathematically to produce physical models.	• 220704602W026 Computational Physics • 220704602W019 Quantum Physics • 220704602W012 Mathematical Physics I • 220704602W020 Mathematical Physics II

	acquired methods suitable for theoretical analysis, modelling and simulation of relevant processes.	**PLO-09**: Students are able to produce scientific physics papers and disseminate them, regarding the potential interdisciplinary applications in terms of science, technology, and the management of tropical rainforests and their environment. **PLO-12**: Students able to analyze and apply mathematical concepts and computational techniques to model, simulate, and solve problems in complex physical systems independently and responsibly.	• 220704602W030 Solid State Physics
4	They have applied their knowledge to physics problems in an exemplary manner and studied some areas in greater depth, thereby acquiring a first basis for problem solving competence.	**PLO-05**: Students are able to apply scientific principles, methods, and ethics in the form of theses and scientific papers, to implement science and technology. **PLO-09**: Students are able to analyze various physical problems to find alternative solutions both analytically and computationally for scientific research.	• 220704602W013 Experiment Physics I • 220704601W011 Electronics Lab I • 220704601W024 Electronics Lab II • 220704606W033 Undergraduate Physics Thesis • 220704602W032 Scientific Writing and Research Methodology
5	They have a basic capacity to comprehend physics problems. This will in general however not yet facilitate a deeper understanding of current research areas.	**PLO-04:** Students have the capability of applying logical, critical, systematic and innovative thinking for decision-making in their work, in terms of implementing science and technology **PLO-05**: Students are able to apply scientific principles, methods, and ethics in the form of theses and scientific papers, to implement science and technology.	• 220704602W032 Scientific Writing and Research Methodology • 220704602W033 Undergraduate Physics Thesis • 220704602W031 Entrepreneurship

6	They are therefore in a position to independently classify physics-based and to some extent also interdisciplinary problems that require a target-oriented and logic-based approach, and to analyse and/or solve them by using natural scientific and mathematical methods	**PLO-06**: Students have the capability of working independently, expanding, and maintaining a network to contribute to society. **PLO-11**: Students able to apply fundamental concepts and principles of physics and technology in specific fields of expertise, such as theoretical physics, materials physics, electronics and instrumentation physics, medical physics, geophysics, and physical oceanography. **PLO-13**: Students are able to adapt in applying his/her field of expertise in depth related to humid tropical forests and their environment.	• 220704603P048 Introduction to Geophysics • 220704602P022 Appropriate Technology I • 220704602W015 Tropical Environmental Physics • 220704603P081 Internship Program • 220704603P037 Physics of Instrumentation
7	They are familiar with basic principles of experimentation, are able to use modern physics measurement methods, and are in a position to assess the significance of results correctly	**PLO-09**: Students are able to produce scientific physics papers and disseminate them, regarding the potential interdisciplinary applications in terms of science, technology, and the management of tropical rainforests and their environment. **PLO-10**: Students are able to evaluate theoretical concepts and fundamental principles of classical and modern physics for solving problems in a physical system.	• 220704601W002 Physics Lab I • 220704601W006 Physics Lab II • 220704602W013 Experiment Physics I • 220704601W011 Electronics Lab I • 220704601W024 Electronics Lab II
8	They have generally also acquired an overview knowledge in selected other natural science subjects or technical disciplines	**PLO-02**: Students are able to have a responsible, honest attitude, and independently being able to think critically, creatively, innovatively, with	• 210700602W003 Chemistry • 210700602W002 Biology • 220704602W010 Electronics I • 220704602W023 Electronics II • 220704603P058 Digital System

		an entrepreneurial spirit, and acting professionally in their work. **PLO-11**: Students able to apply fundamental concepts and principles of physics and technology in specific fields of expertise, such as theoretical physics, materials physics, electronics and instrumentation physics, medical physics, geophysics, and physical oceanography.	
9	They are able to apply their knowledge to different fields and act responsibly in their professional activity. They are moreover able to recognise new trends in their subject area and integrate the relevant methodology – if necessary after appropriate qualification – into their further work.	**PLO-02**: Students are able to have a responsible, honest attitude, and independently being able to think critically, creatively, innovatively, with an entrepreneurial spirit, and acting professionally in their work. **PLO-06**: Students have the capability of working independently, expanding, and maintaining a network to contribute to society.	• MU000603W007 Community Development Program • 220704602W033 Undergraduate Physics Thesis • 220704602P081 Internship Program
10	They are able to continuously and independently extend and deepen the knowledge acquired in the Bachelor's degree programme. They are familiar with suitable learning strategies (lifelong learning) for this; they are in particular qualified for a consecutive Master's degree programme in principle.	**PLO-06**: Students have the capability of working independently, expanding, and maintaining a network to contribute to society. **PLO-09**: Students are able to produce scientific physics papers and disseminate them, regarding the potential interdisciplinary applications in terms of science, technology, and the management of tropical rainforests and their environment.	• 220704602W032 Scientific Writing and Research Methodology • 220704602W033 Undergraduate Physics Thesis • 220704602P081 Internship Program

		PLO-10: Students are able to evaluate theoretical concepts and fundamental principles of classical and modern physics for solving problems in a physical system.	
11	They have gained initial experience with regard to generic qualifications (e.g. time management, study and work techniques, willingness to cooperate, capacity for teamwork, communication and presentation skills,, communication and presentation techniques,programming skills) in their degree programme, and are able to develop these skills further.	**PLO-06**: Students have the capability of working independently, expanding, and maintaining a network to contribute to society. **PLO-08**:Students are able to analyze various physical problems to find alternative solutions both analytically and computationally for scientific research.	• Scientific Writing and Research Methodology • Entrepreneurship • Ethics • English
12	They are familiar with the basic elements of the relevant specialised English.	**PLO-06**: Students have the capability of working independently, expanding, and maintaining a network to contribute to society. **PLO-08**: Students are able to analyze various physical problems to find alternative solutions both analytically and computationally for scientific research.	• 220704602W003 English • 220704602W032 Scientific Writing and Research Methodology
13	They are able to solve a simple scientific problem and to present their results orally (talk/presentation) and in writing (demonstrated in a Bachelor's thesis)	**PLO-06**: Students have the capability of working independently, expanding, and maintaining a network to contribute to society. **PLO-09**: Students are able to produce scientific physics papers and disseminate them, regarding the potential interdisciplinary applications in terms of science, technology, and the	• 220704602W032 Scientific Writing and Research Methodology • 220704602W033 Undergraduate Physics Thesis

		management of tropical rainforests and their environment. **PLO-10**: Students are able to evaluate theoretical concepts and fundamental principles of classical and modern physics for solving problems in a physical system.	
14	They know the rules of good scientific practice.	**PLO-09**: Students are able to produce scientific physics papers and disseminate them, regarding the potential interdisciplinary applications in terms of science, technology, and the management of tropical rainforests and their environment.	• MU0000602W007 Pancasila • MU0000602W001 Religion • 220704602W032 Scientific Writing and Research Methodology