

Department of Physics

University of Sri Jayewardenepura

2023

STUDENT HANDBOOK

Welcome to the Department of Physics

We invite you to obtain the maximum use of the facilities available for you to achieve your academic goals.



This Handbook includes information on the undergraduate and postgraduate programs conducted by the Department of Physics, University of Sri Jayewardenepura. It also provides information on different areas of expertise, as well as resources and facilities available to the students. It helps you to select course modules and projects to fulfill the requirements for your graduation.

We wish you a very productive and pleasant stay in the University throughout your study period.

- Head and the staff of the Department

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MESSAGE FROM HEAD OF THE DEPARTMENT

Dear Students,

Welcome to the Department of Physics. I am thrilled to serve as the Head of this exciting program that explores the fundamental laws of nature and their applications to the world around us. In this program, you will learn about the principles of physics and have the opportunity to engage in cutting-edge research projects that will expand our understanding of the universe. Our faculty is dedicated to providing a challenging and supportive learning environment and is here to help you succeed. I encourage you to take advantage of all the resources available to you, including the state-of-the-art labs, internships, and extracurricular activities. Your education is a critical investment in your future, and I am confident that your time in our department will prepare you well for a successful career in physics or a related field. Please do not hesitate to reach out to me or any of our faculty members if you have any questions or concerns. We are here to support you and help you achieve your goals.

Sincerely,

Prof. N.G.S. Shantha Gamage,
Head of Department of Physics,
University of Sri Jayewardenepura,
Gangodawila, Nugegoda.

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ABOUT THE DEPARTMENT OF PHYSICS

“Physics is a creative activity of human mind. Studying Physics provides you with a delightful and a rewarding experience that will make you suitable for any future career”

The Department of Physics at the University of Sri Jayewardenepura offers courses that integrate both the foundational knowledge and the recent advances of the field, thereby ensuring students gain knowledge across the breadth of the discipline. Additionally, optional courses are offered in specialized subject areas that enable students to follow the industrial aspects of physics. Not limited to the technical know-how of the field, students are also offered optional courses to help develop their soft skills such as presentation, communication, and organizational skills.

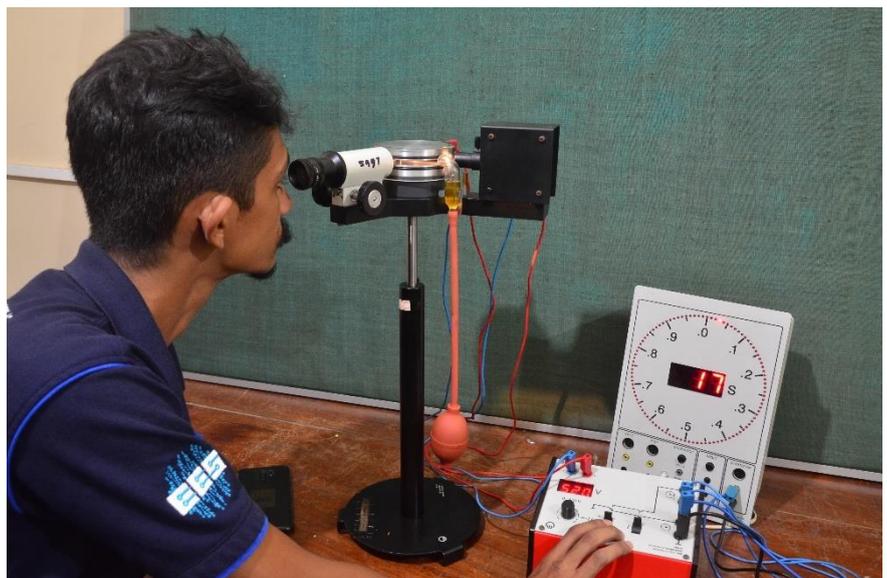
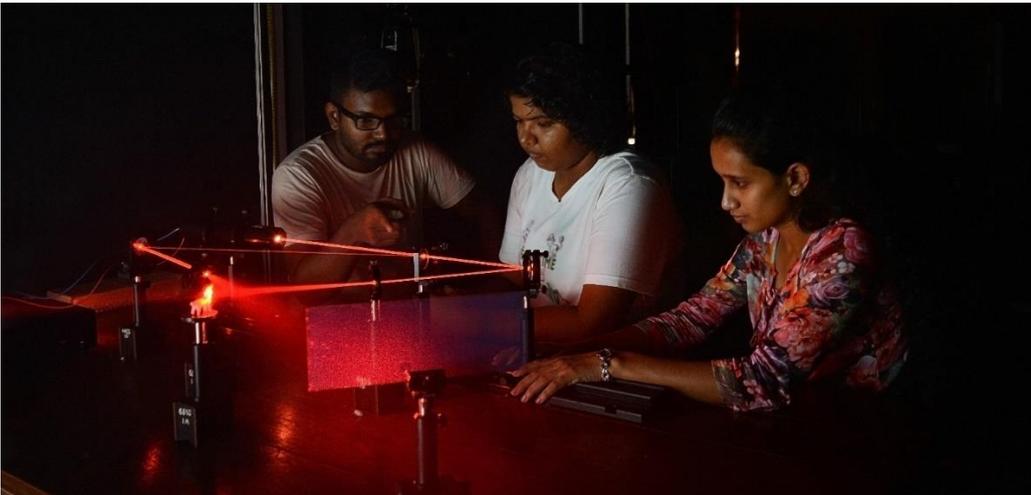
Hands-on learning is offered through the various laboratories in the department. These include an Elementary Laboratory, Optics Laboratory, Electronics Laboratory, Applied Physics Laboratory, Embedded Systems and Robotics Laboratory, Computational Laboratory, and Advanced Physics Laboratory. The department also has a workshop equipped with machinery and instruments.

Honours Degree students are provided with the opportunity to apply their knowledge and gain industrial experience through an Industrial Placement scheme. Previous industrial placements include ITI, Atomic Energy Authority, ACCIMT, SLSI, Petroleum Resources Development Agency, and CEA. The final year projects offered for Honours Degree students, strengthen students' research and analytical skills while broadening their expertise in specialized areas in physics. Further, the department of physics facilitates postgraduate-level research (both M.Phil. and Ph.D.) mainly concentrated on Geophysics, Digital electronics, and Condensed matter physics for the advancement of science and technology fields in the country. Moreover, to enforce the physics educational sector with a sound conceptual understanding of the subject and teaching methodologies, we offer M. Sc. Degree in Physics Education for graduates working in academic fields.

WHY STUDY PHYSICS?

Physics is the study of matter, energy, and the interaction between them. It helps understand how the world around us works and has numerous real-world applications in fields such as engineering, technology, medicine, and environmental science. Studying physics develops critical thinking, problem-solving, and analytical skills, and provides a foundation for further studies in science and engineering. It also enhances our understanding of the natural world and the laws that govern it.

Students who major in physics or electronics and embedded systems are prepared to work on cutting-edge scientific and technological ideas in academia, government, or the private sector in a variety of fields such as electronics and embedded systems, material sciences, industrial physics, geophysics, and computational physics. The skills gained in analytical thinking, problem-solving, and experimental skills are valuable in a wide range of careers.



ORGANIZATION OF THE DEPARTMENT

ACADEMIC STAFF MEMBERS

Prof. N. G. S. Shantha Gamage

Head of the Department/

Professor in Physics

B.Sc.(USJ), M.Sc., Ph.D.(Tohoku), CPhys, FIP(SL).

Phone : 0112758358, 0112758383, 0112803977

Email : *head.physics@sjp.ac.lk*, *sng@sjp.ac.lk*



Areas of Specialty & Research Interest:

- Geophysics
- Seismology
- Computational Physics
- Wave Propagation
- Studying Inland & offshore Earthquakes

Prof. A.R. Kumarasinghe

Professor of Physics

B.Sc., M.Phil.(Ruhuna), Ph.D.(Manchester)

Phone: **0112881505**

Email : *argk@sjp.ac.lk*



Areas of Specialty & Research Interests:

- Graphene
- CNT
- Synchrotron Radiation
- Nano solar cells
- Surfaces and Interfaces

Prof. P. K. D. Duleepa P Pitigala

Professor in Physics

B.Sc.; M.Phil. (USJ); M.Sc., Ph.D. (Georgia State)

Phone : 0112758104

Email : dpitigala@sjp.ac.lk



Areas of Specialty & Research Interests:

- Organic/inorganic semiconductor materials and thin films
- Optoelectronic devices solar energy conversion and energy storage; nanostructures and nanomaterials

Dr.D.N.Jayawardane

Senior Lecturer

B.Sc.(USJ), Ph.D.(Cambridge)

Phone : 0112758366

Email : dnj@sjp.ac.lk



Areas of Specialty & Research Interests:

- Electron Microscopy
- Electron-Energy loss spectroscopy

Dr.M.M.P.M.Fernando

Senior Lecturer

B.Sc., Ph.D.(USJ)

Phone: 0112758356

Email: pmadhuranga@sjp.ac.lk

Areas of Specialty & Research Interests:

- Geophysics
- Mathematical and Computational Physics
- Theoretical Physics
- Power Electronics
- AC Theory
- Space Physics
- Physics of Music
- Buddhist Philosophy



Dr. W. K. I. L. Wanniarachchi

Senior Lecturer

B.Sc. (USJ.), M.Sc., Ph.D. (Wayne State)

Phone: 0112758889

Email: iwanni@sjp.ac.lk

Areas of Specialty & Research Interests:

- Embedded Systems
- Machine Vision
- Computational Physics
- Electronic Structure
- Signal Processing



Dr. (Mrs.) M. L. C. Attygalle

Senior Lecturer

B.Sc. (Col.), Ph.D. (Toledo)

Phone: 0112758637

Email: lattygalle@sci.ac.lk

Areas of Specialty & Research Interests:

- Theoretical modeling of photovoltaic junctions
- Condensed matter physics
- Material science
- Theoretical physics



Dr.(Mrs). W. W. P. De Silva

Senior Lecturer

B.Sc (USJ), M.Sc., Ph.D. (Mississippi State)

Phone: 0112758106

Email: wasanthidesilva@sjp.ac.lk

Areas of Specialty & Research Interests:

- Superconductivity
- strongly correlated electron systems
- Computational Physics



Mr. C. H. Mannatunga

Senior Lecturer

B.Sc.(USJ), MPhil.(OUSL)

Phone: 0112758109

Email: *chandimavc@sjp.ac.lk*

Areas of Specialty & Research Interests:

- Electrical power
- Embedded system design



Dr. (Mrs.) S. Kandeepan

Senior Lecturer

B.Sc., M.Sc.(Pera.), M.Sc. & Ph.D.(UWO, Canada)

Phone: 0112758363

Email: *ssivayini@sjp.ac.lk*

Areas of Specialty & Research Interests:

- Computational Neuroscience
- Generalized Ising model
- Blood Oxygen Level Dependent Signals
- Nanomaterials and Nanotechnology



Mr. R. A. D. D. Dharmasiri

Lecturer

B.Sc.(USJ), M.Sc. (UOC)

Phone: 0112758357

Email: *dhanu@sjp.ac.lk*

Areas of Specialty & Research Interests:

- Wireless Sensor networks
- Embedded System Designing
- FPGA – Development.



Mr. K. S. Mannatunga

Lecturer

B.Sc.(USJ), M.Sc. (UOC)

Phone: 0112758363

Email: *ksm@sjp.ac.lk*



Areas of Specialty & Research Interests:

- Embedded System Designing, Open source platform programming,
- FPGA – Development. DSSCS- with P type semiconductors

Mr. Jeevan Jayasuriya

Probationary Lecturer (on study leave)

B.Sc.(USJ), B.Tech. Eng. (OUSL)

Email: *jeevanj@sjp.ac.lk*



Areas of Specialty & Research Interests:

- Control Systems,
- Robotics, Embedded System Design,
- Machine Vision &, Artificial Intelligence

Dr. C. Rasadi Munasinghe

Senior Lecturer on contract

B.Sc. (UOK), M.Sc., Ph.D. (Georgia State)

Phone: 0112758362

Email: *rasadimunasinghe@gmail.com*



Areas of Specialty & Research Interests:

- Atomic Photoionization
- Two-dimensional electron systems
- Graphene
- Condensed matter physics
- Theoretical Physics

Prof. D.A. Tantrigoda

Emeritus Professor

B.Sc.(Cey.), M.Sc., Ph.D.(Durham)

Email: dhammika@tantrigoda.net



Areas of Specialty & Research Interests:

- Geophysics
- Mathematical and Computational Physics
- Physics Education
- Governance and Management of Higher Education

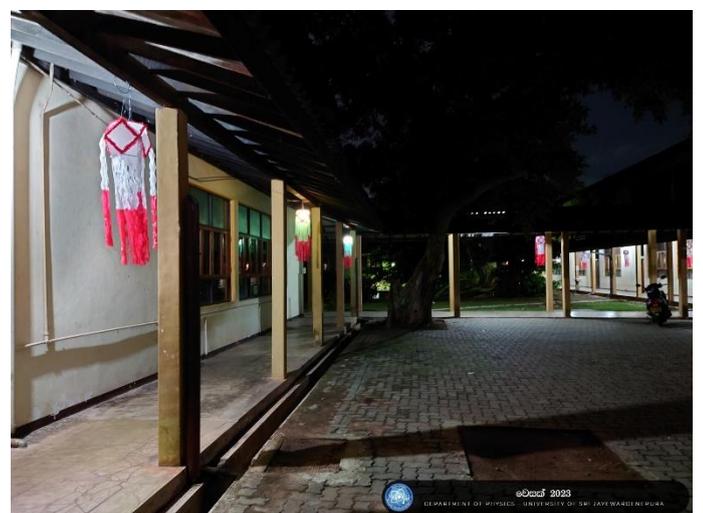
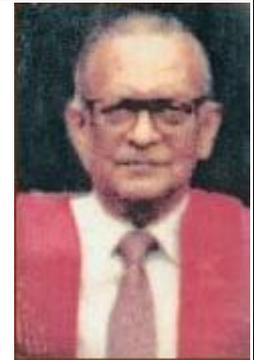
Late Prof. P. C. B. Fernando

Emeritus Professor

B.Sc.(Cey.), M.Sc., Ph.D.(Cambridge)

Served from 1966 to 1995

The founder Professor of the Department of Physics



ACADEMIC SUPPORTING STAFF

Mr.B.H.L.M. Fernando
Mr.G. S. K. Gamage
Mr.W.A.N.L.Perera
Mr.K.A.S.K. Somarathna
Mr.K.K.R.N. Wijayasundara
Ms.K.A.K.L.R.Perera
Ms.G.L.H Ramadasa
Ms.E.M.U.S. De Seram
Ms.R.A.N.K.Ranaweera
Ms.W.A.Wijewickrama
Mr.T.M.B.P.B.Thennakoon
Mr. D.M. Govinna
Ms. S.S Siriwardhana
Mr.B K Wijesundara
Ms.P.C.H.Peiris
Mr.H.M.N.L.B.Herath



NON-ACADEMIC STAFF

Mr. O. K. D. M. Priyantha
Mr. R. W. P. Sanjeewa
Mrs. H. M. R. N. Amarathunga
Mr. U. V. V. P. Balasuriya
Miss. K. A. D. S. L. Jayewardena
Mr. U Weerathunga
Mrs.M.K.R.Perera
Mrs. P.N.C.M. Sikurajapathi
Mr. B.K. Chaminda
Mr. M. K. Gallage
Mr. J. K. D. H. G. Jayanetti
Mr. K. M. B. L. Piyarathne
Mr. R. D. Thushara
Mr. D. M. N. K. Dissanayake
Mr. B. M. C.J. Senevirathna
Mr. I. D. Palpola



PROGRAMME EDUCATIONAL OBJECTIVES (PEOS)

- Understanding the fundamental concepts, laws, and principles of physics.
- Developing critical thinking, problem-solving, and analytical skills.
- Understanding the applications of physics in real-world problems and other fields such as engineering, technology, and medicine.
- Developing the ability to analyze, design, and conduct experiments to test physical theories and laws.
- Developing a strong foundation for further studies in science, engineering, and related fields.
- Enhancing the ability to communicate scientific ideas and results effectively, both in written and verbal forms.
- Developing a deep appreciation for the beauty and elegance of physical laws and the natural world.

PROGRAM LEARNING OUTCOMES (PLOS)

Common PLOs had been developed for the B.Sc. General Degree and B.Sc. (Special) Degree in the Faculty of Applied Sciences since this subject is offered in combination with two others from the Faculty for the General Degree and students are selected at the end of the 2nd year for the special degree. The PLOs thus developed are as follows;

B.Sc. General Degree Programme

Upon successful completion of the B.Sc. degree programme of the USJ, every graduate will be able to,

1. Demonstrate knowledge and understanding of underlying concepts of respective subject areas.
2. Demonstrate competency in practical/technical knowledge and skills for enquiry and application.
3. Enhance clear and coherent communication skills for demonstration of knowledge and skills.
4. Enhance adaptability and emotional intelligence through teamwork which leads to improved leadership qualities, respect for diverse points of view and empathy.
5. Develop cognitive and creative skills to identify, collect, analyze and interpret qualitative and quantitative data.
6. Acquire personal integrity through accountability and assuming responsibility.
7. Demonstrate positive and healthy attitudes and values and engage in lifelong learning for the betterment of society.

B.Sc. Honours (Special) Degree Programme

Upon successful completion of the B.Sc. Honours degree programme of the USJ, a graduate will be able to,

1. Demonstrate advanced knowledge and understanding of underlying concepts of respective subject areas.
2. Acquire high levels of competence in practical/technical knowledge and skills for professional growth.
3. Enhance ability to communicate acquired knowledge, information, ideas and solutions with clarity and coherence.
4. Enhance emotional intelligence through social engagement, networking and teamwork which leads to improved leadership qualities, respect for diverse points of view and empathy and develop strategies to adapt to changing circumstances.
5. Develop cognitive and creative skills in identifying, collecting and critically analyzing data and in solving problems independently.
6. Exercise personal integrity through responsibility and accountability and acquire professional integrity through inculcated entrepreneurial, managerial and time-management skills.
7. Demonstrate positive and healthy attitudes and values and engage in lifelong learning for the betterment of society.



ACADEMIC PROGRAMME

1. B. Sc. General degree and B. Sc. Honours degree in Physics

As mentioned earlier, the subject 'Physics' is offered as one third of General Degree in B. Sc. by the Faculty of Applied Sciences. The duration of the General Degree is three years and those who have selected to follow Honours degree in Physics after the first two academic years based on merit, have total of four years including an industrial training program and a one year research project. The industrial training is intended to provide undergraduates with exposure to applying the theoretical knowledge in practice. The comprehensive research project needs to be submitted as a report and defended in a viva voce examination. The total number of credits required to achieve this is 120, and the minimum credit requirement for each semester is given below.

| | Credits for GPA*** | | Total Credits | |
|---------------------------|--------------------|----------------|----------------|----------------|
| Semester**1 | 04 | | 04 | |
| Semester 2 | 06 | | 06 | |
| Semester 3 | 04 | | 04 | |
| Semester 4 | 06 | | 06 | |
| Total | 20 | | 20 | |
| | General Degree | Honours Degree | General Degree | Honours Degree |
| Semester 5 | 04 | 12 | 04 | 12 |
| Industrial Training | - | 06 | - | 06 |
| Semester 6 | 06 | 18 | 06 | 18 |
| Semester 7 | - | 12 | - | 12 |
| Research Project | - | 08 | - | 08 |
| Semester 8 | - | 18 | - | 18 |
| Total | 10 | 60 | 10 | 60 |
| Final Credit Value | 30 | 80 | 30 | 80 |

* A credit is equivalent to 15 hours of lectures. One credit is considered equivalent to 50 notional learning hours for a course including teaching, laboratory work and field work. In the case of research and industrial training one credit is equivalent to 100 notional hours (The notional learning hours include direct contact hours with teachers and trainers, time spent in self-learning, preparation for assignments, carrying out assignments and assessments)

** A Semester generally consists of twenty-two weeks including fifteen weeks of academic work, four weeks for examinations and two weeks of vacation.

*** GPA stands for Grade Point Average

Curriculum

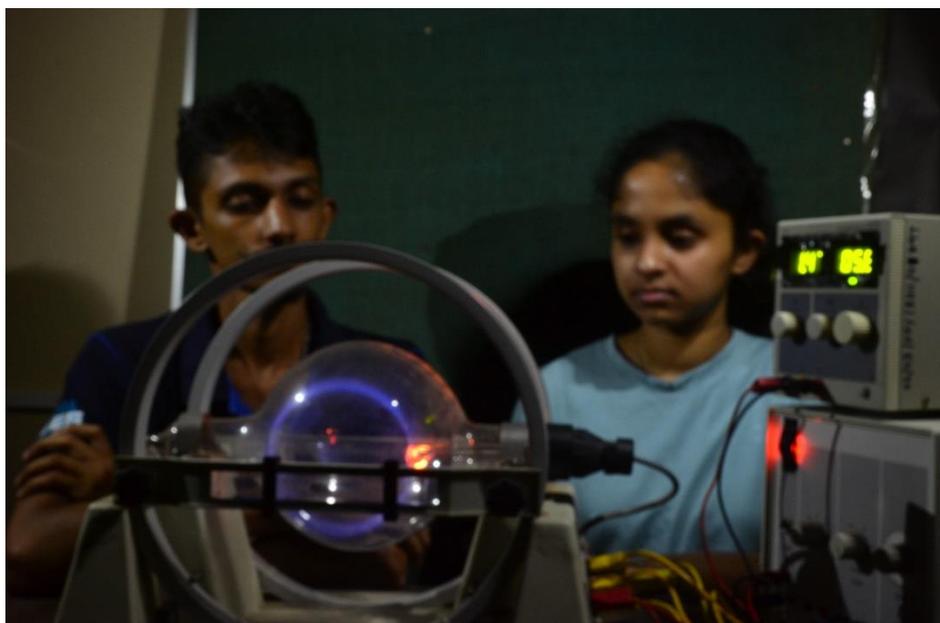
| Module Code | Module Name | Category | Credits (GPA) |
|----------------------------------|---|----------|---------------|
| First Year – Semester I | | | |
| PHY 101 1.0 | Fundamentals of Electronics (Unaudited Unit) | o | 1.0 |
| PHY 102 2.0 | Mathematics for Bio Science Students – Semester I and II (Unaudited Unit) | o | 2.0 |
| PHY 103 2.0 | Mechanics and Properties of Matter | c | 2.0 |
| PHY 104 1.0 | Electricity and Magnetism | c | 1.0 |
| PHY 105 1.0 | Waves and Vibrations | c | 1.0 |
| PHY 106 2.0 | Practical (Elementary) – Semester I and II | a | 2.0 |
| Total for Semester I | | | 4.0 |
| First Year – Semester II | | | |
| PHY 102 2.0 | Mathematics for Bio Science Students – Semester I and II (Unaudited Unit) | o | 2.0 |
| PHY 107 2.0 | Applied Electricity and Basic Electronics | c | 2.0 |
| PHY 108 2.0 | Thermodynamics | c | 2.0 |
| PHY 106 2.0 | Practical (Elementary) – Semester I and II | a | 2.0 |
| Total for Semester II | | | 6.0 |
| Second Year – Semester I | | | |
| PHY 201 2.0 | Optics I | c | 2.0 |
| PHY 202 2.0 | Analogue and Digital Electronics | c,n | 2.0 |
| PHY 203 1.0 | Practical (Optics) – Semester I and II | a | 1.0 |
| PHY 204 1.0 | Practical (Electronics) – Semester I and II | a | 1.0 |
| Total for Semester I | | | 4.0 |
| Second Year – Semester II | | | |
| PHY 205 1.0 | Statistical Physics I | c | 1.0 |
| PHY 206 1.0 | Mathematical Physics I | c | 1.0 |
| PHY 207 1.0 | Special Theory of Relativity | c,n | 1.0 |
| PHY 208 1.0 | Atomic and Nuclear Physics | c | 1.0 |
| PHY 203 1.0 | Practical (Optics) – Semester I and II | a | 1.0 |
| PHY 204 1.0 | Practical (Electronics) – Semester I and II | a | 1.0 |

| | | | |
|--|---|---|-----|
| Total for Semester II | | | 6.0 |
| Third Year – Semester I | | | |
| PHY 301 1.0 | Electromagnetic Theory I | c | 1.0 |
| PHY 302 1.0 | Quantum Mechanics I | c | 1.0 |
| PHY 303 1.0 | Computational Tools for Physics | o | 1.0 |
| PHY 304 2.0 | Group Project – Semester I and II | o | 2.0 |
| PHY 305 1.0 | Geophysics I | s | 1.0 |
| PHY 306 1.0 | Solid State Physics I | o | 1.0 |
| PHY 307 1.0 | Practical (Applied) – Semester I and II | a | 1.0 |
| PHY 308 1.0 | Practical (Computational) – Semester I and II | a | 1.0 |
| Total for Semester I | | | 4.0 |
| Third Year – Semester II | | | |
| PHY 309 1.0 | Introduction to Microprocessors | c | 1.0 |
| PHY 310 1.0 | Space Physics | s | 1.0 |
| PHY 311 1.0 | Computer Hardware & Networking | o | 1.0 |
| PHY 312 1.0 | Industrial Physics | s | 1.0 |
| PHY 313 1.0 | Physics and Environment | s | 1.0 |
| PHY 314 1.0 | Astronomy | o | 1.0 |
| PHY 315 1.0 | Metrology | o | 1.0 |
| PHY 316 1.0 | Paradigms of Physics Sustainability | s | 1.0 |
| PHY 317 1.0 | Reflection Seismology | o | 1.0 |
| PHY 318 1.0 | Nanophysics I | o | 1.0 |
| PHY 319 1.0 | Physics Education | o | 1.0 |
| PHY 320 1.0 | Applied Optics | o | 1.0 |
| PHY 321 1.0 | Medical Physics | o | 1.0 |
| PHY 322 1.0 | Biophysics | o | 1.0 |
| PHY 307 1.0 | Practical (Applied) – Semester I and II | a | 1.0 |
| PHY 308 1.0 | Practical (Computational) – Semester I and II | a | 1.0 |
| Total for Semester II | | | 6.0 |
| B.Sc. Honours Degree Course Units | | | |
| Third Year – Semester I | | | |
| PHY 301 1.0 | Electromagnetic Theory I | c | 1.0 |
| PHY 302 1.0 | Quantum Mechanics | c | 1.0 |

| | | | |
|---------------------------------|---|---|------|
| PHY 303 1.0 | Computational tools of Physics | o | 1.0 |
| PHY 305 1.0 | Geophysics I | c | 1.0 |
| PHY 306 1.0 | Solid State Physics I | c | 1.0 |
| PHY 351 2.0 | Mathematical Physics II | c | 2.0 |
| PHY 353 2.0 | Optics II | o | 2.0 |
| PHY 358 2.0 | Nuclear Physics II | c | 2.0 |
| PHY 359 2.0 | Telecommunication | c | 2.0 |
| PHY 361 2.0 | Seminar | c | 2.0 |
| PHY 307 1.0 | Practical (Applied) -Semester I&II | a | 1.0 |
| PHY 308 1.0 | Practical (Computational)-Semester I&II | a | 1.0 |
| PHY 355 4.0 | Practical (Advanced)-Semester I&II | a | 4.0 |
| Total for Semester I | | | 12.0 |
| Third Year – Semester II | | | |
| PHY 309 1.0 | Introduction to Microprocessors | c | 1.0 |
| PHY 310 1.0 | Space Physics | c | 1.0 |
| PHY 311 1.0 | Computer Hardware & Networking | c | 1.0 |
| PHY 312 1.0 | Industrial Physics | s | 1.0 |
| PHY 313 1.0 | Physics and Environment | s | 1.0 |
| PHY 314 1.0 | Astronomy | o | 1.0 |
| PHY 315 1.0 | Metrology | o | 1.0 |
| PHY 316 1.0 | Paradigms of Physics and Sustainability | s | 1.0 |
| PHY 317 1.0 | Reflection Seismology | o | 1.0 |
| PHY 318 1.0 | Nanophysics I | o | 1.0 |
| PHY 319 1.0 | Physics Education | o | 1.0 |
| PHY 320 1.0 | Applied Optics | o | 1.0 |
| PHY 321 1.0 | Medical Physics | o | 1.0 |
| PHY 322 1.0 | Biophysics | o | 1.0 |
| PHY 323 1.0 | Cosmology | o | 1.0 |
| PHY 356 2.0 | Solid State Physics II | c | 2.0 |
| PHY 357 2.0 | Geophysics II | c | 2.0 |
| PHY 360 2.0 | Workshop Technology | c | 2.0 |
| PHY 307 1.0 | Practical (Applied) -Semester I&II | a | 1.0 |
| PHY 308 1.0 | Practical (Computational)-Semester I&II | a | 1.0 |

| | | | |
|----------------------------------|---|---|------|
| PHY 355 4.0 | Practical (Advanced)-Semester I&II | a | 4.0 |
| Total for Semester II | | | 18.0 |
| Fourth Year – Semester I | | | |
| PHY 452 2.0 | Statistical Physics II | c | 2.0 |
| PHY 453 2.0 | Microprocessor and Computer Interfacing | c | 2.0 |
| PHY 454 8.0 | Project – Semester I&II | c | 8.0 |
| PHY 455 3.0 | Internship | c | 3.0 |
| PHY 457 2.0 | Particle Physics and Instrumentation | c | 2.0 |
| PHY 462 3.0 | Classical Mechanics | c | 3.0 |
| PHY 463 1.0 | Nanophysics II | o | 1.0 |
| Total for Semester I | | | 12.0 |
| Fourth Year – Semester II | | | |
| PHY 451 3.0 | Electromagnetic Theory II | c | 3.0 |
| PHY 456 3.0 | Quantum Mechanics II | c | 3.0 |
| PHY 458 2.0 | Space and Atmospheric Physics | c | 2.0 |
| PHY 459 2.0 | Computational Physics | c | 2.0 |
| PHY 460 1.0 | Mathematical Physics III | o | 1.0 |
| PHY 454 8.0 | Project – Semester I&II | c | 8.0 |
| Total for Semester II | | | 18.0 |

c- Core course unit, a- Compulsory course unit, o- Optional course unit, s- Faculty optional, n- optional for those not doing Physics



2. B. Sc. General degree in Electronics and Embedded Systems

The Electronics & Embedded Systems Course is designed as a three years degree course which will focus on laboratory practical sessions while covering undergraduate level Physics and Mathematics. The developed curriculum of the Electronics & Embedded Systems program is structured to provide the prospective students a solid foundation of theory and practical in Physics, Electronics, Programming and Mathematics during their first two academic years. Therefore, the students to follow this undergraduate subject should select the combination containing Physics, Mathematics, and Electronics & Embedded Systems. The third year of study is emphasized more on application oriented courses thus included course units in embedded electronics, internet-of-things (IoT), robotics, instrumentation, and automation. The students are required to take course units in Electronics & Embedded Systems with a minimum cumulative credit value of 27.0 during the three years.

| | Credits for GPA*** | Total Credits |
|---------------------------|--------------------|---------------|
| Semester**1 | 05 | 05 |
| Semester 2 | 05 | 05 |
| Semester 3 | 05 | 05 |
| Semester 4 | 05 | 05 |
| Semester 5 | 05 | 05 |
| Semester 6 | 05 | 05 |
| Final Credit Value | 30 | |

* A credit is equivalent to 15 hours of lectures. One credit is considered equivalent to 50 notional learning hours for a course including teaching, laboratory work and field work. In the case of research and industrial training one credit is equivalent to 100 notional hours (The notional learning hours include direct contact hours with teachers and trainers, time spent in self-learning, preparation for assignments, carrying out assignments and assessments)

** A Semester generally consists of twenty-two weeks including fifteen weeks of academic work, four weeks for examinations and two weeks of vacation.

*** GPA stands for Grade Point Average

Curriculum

| Module Code | Module Name | Category | Credits (GPA) |
|----------------------------------|--|----------|---------------|
| First Year – Semester I | | | |
| EES 111 2.0 | Fundamentals of C Programming | c | 2.0 |
| EES 112 2.0 | Probability and Statistics | c | 2.0 |
| EES 118 1.0 | Electronics and Embedded Systems Lab | a | 1.0 |
| Total for Semester I | | | 5.0 |
| First Year – Semester II | | | |
| EES 121 2.0 | Embedded Linux Systems | c | 2.0 |
| EES 106 1.0 | Electrical Machines | c | 1.0 |
| EES 123 1.0 | Seminar | c | 1.0 |
| EES 128 1.0 | Circuit Simulations and Design Lab | a | 1.0 |
| Total for Semester II | | | 5.0 |
| Second Year – Semester I | | | |
| EES 201 1.0 | Sensors and Actuators | c | 1.0 |
| EES 209 1.0 | Computer Integrated Control Systems | c | 1.0 |
| EES 211 2.0 | Data Analysis and Modeling | c | 2.0 |
| EES 212 1.0 | Embedded Systems Mini Challenge | a | 1.0 |
| Total for Semester I | | | 5.0 |
| Second Year – Semester II | | | |
| EES 206 2.0 | Advanced Analog and Digital Electronic | c | 2.0 |
| EES 207 2.0 | Data Acquisition and Signal Processing | c | 2.0 |
| EES 208 1.0 | Data Acquisition and Signal Processing Lab | a | 1.0 |
| Total for Semester II | | | 5.0 |
| Third Year – Semester I | | | |
| EES 313 2.0 | Microprocessors and Microcontrollers | c | 2.0 |
| EES 302 1.0 | Circuit Fault Diagnostics | a | 1.0 |
| EES 303 1.0 | Embedded Systems Development Lab | c | 1.0 |
| EES 314 2.0 | Project (Sem 1 & 2) | o | 2.0 |
| Total for Semester I | | | 5.0 |

| Third Year – Semester II | | | |
|------------------------------|---|---|------------|
| EES 304 2.0 | Introduction to Internet of Things and Robotics | o | 2.0 |
| EES 305 1.0 | Internet of Things and Robotics Lab | a | 1.0 |
| EES 308 1.0 | Introduction to Programmable Logic Controllers | o | 1.0 |
| EES 311 1.0 | Mobile Application Development | o | 1.0 |
| EES 315 1.0 | Embedded Database Systems | o | 1.0 |
| EES 316 1.0 | Introduction to Machine Learning | o | 1.0 |
| EES 317 1.0 | Hackathon on Embedded Systems | o | 1.0 |
| Total for Semester II | | | 5.0 |

a- compulsory, **c-** core, **n-** optional for those not doing Electronics & Embedded Systems, **o-** optional for those doing Electronics & Embedded Systems, **s-** optional for all students in the faculty.

Note: Those who are doing Electronics and Embedded Systems as a subject must take PHY 311 1.0 Introduction to Computer Hardware course instead of PHY 309 1.0 Introduction to Microprocessors.



3. B. Sc. Honours degree in Applied Sciences

This four year degree program is for students who have entered the Faculty of Applied Sciences through Physical, Biological, or Polymer Science stream and completed their general degree with a minimum GPA of 2.5 at the end of their third year B.Sc. program. The students will be selected for the relevant fields solely by their GPA calculated with course units offered in five semesters (until third year first semester) of the general degree program.

Curriculum

| Module Code | Module Name | Category | Credits (GPA) |
|--|---|----------|---------------|
| Fourth Year – B. Sc. Honours in Applied Science in Physics | | | |
| ASP 441 2.0 | Physics of Ceramic and Glass | o | 2.0 |
| ASP 442 2.0 | Applied Geophysics | o | 2.0 |
| ASP 443 1.0 | Computational Physics in Advanced Programming | o | 1.0 |
| ASP 444 1.0 | Physics of Agricultural Materials | o | 1.0 |
| ASP 445 1.0 | Philosophy of Science | o | 1.0 |
| ASP 446 1.0 | Fundamentals of Digital Signal Processing | o | 1.0 |
| ASP 447 1.0 | Advanced Nanophysics | o | 1.0 |
| ASP 448 2.0 | Nuclear Physics II | o | 1.0 |
| ASP 449 1.0 | Digital Image Processing | o | 1.0 |
| ASP 486 1.0 | Reflection Seismology | o | 1.0 |
| ASP 487 2.0 | Telecommunication | o | 2.0 |
| | Total | | 14.0 |
| Fourth Year – B. Sc. Honours in Applied Science in Electronics and Embedded Systems | | | |
| ASP 488 1.0 | Device Physics | o | 1.0 |
| ASP 481 2.0 | System on Chip | o | 2.0 |
| ASP 482 2.0 | Embedded Machine Learning | o | 2.0 |
| ASP 483 2.0 | Advanced Programmable Logic Controllers | o | 2.0 |
| ASP 484 2.0 | Image Processing and Embedded Computer Vision | o | 2.0 |
| | Total | | 9.0 |



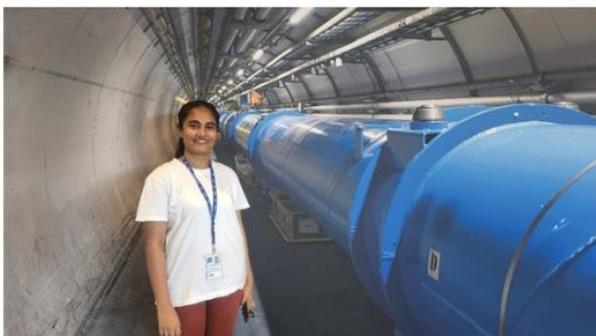
INDUSTRIAL TRAINING

Physics students pursuing a specialized degree participate in internships to gain practical experience in the industry and enhance their professional skills. This program aims to improve their Professional networking, foster teamwork, Industry knowledge, Project completion and report writing. Students engage in internships within both private and government sectors to develop their skills. Upon completion, they present their projects or demonstrate what they have learned during the internship, accompanied by submitting an internship report.



CERN summer Student Programme 2022

A student of our Physics Department of USJ whose name is Ms. H. Nimna Sandali Peiris was selected as the only student from Sri Lanka to participate in the CERN Summer Student programme 2022 which was held in Geneva, Switzerland. She participated in this 8-week internship from 04th July to 26th August 2022 where she did her research with the collaboration of the ATLAS experiment in CERN.



ACADEMIC AWARDS

Professor P. C. B. Fernando Gold Medal



The Prof. P. C. B. Fernando Gold Medal is awarded annually to the graduand who obtains the highest overall Grade Point Average (GPA) with a First Class for the B.Sc. Special Degree in Physics.



Nilusha Perera
Batch 2006/2007



Ravi Wickramathilake
Batch 2007/2008



Vibodha Yasas Sri Bandara
Batch 2008/2009



Neranga Prasadi
Batch 2009/2010



Lahiru Jayasooriya
Batch 2010/2011



Nimantha Perera
Batch 2011/2012



Chamini Pathiraja
Batch 2012/2013



Maheshi Malwathumulla
Batch 2013/2014



Channa Hatharasinghe Batch 2014/2015



Nimna Peiris
Batch 2016/2017

SPECIAL EVENTS

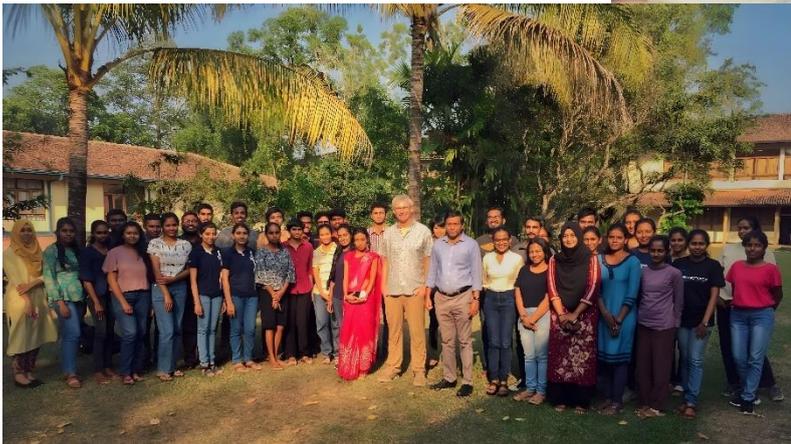
Physics Society

The Physics Society is attached to the Department of Physics and acts as the student society of the department. Physics Society of the University of Sri Jayawardenapura (USJP) was formed in the year 1994 under the able guidance of Professor P. C. B Fernando. Its membership is open to academics and undergraduate community of the USJP who are interested in Physics and allied fields. Aims of establishing this society include promoting of education, research and advancing of knowledge related to Physics and allied fields among its members.

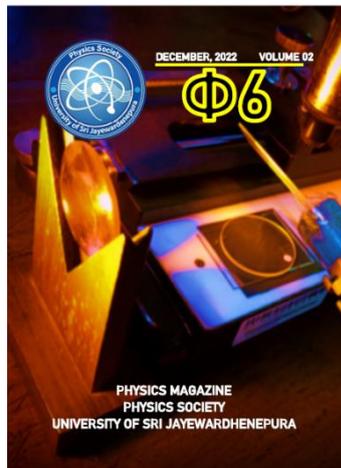
It is instrumental in organizing student-related activities to promote both curricular and extra-curricular events. The society aims to generate practical minds and bring out the best of its members, to suit the current world of physics.

Physics magazine





Society Magazine



The magazine of the Physics Department has been published by the name “ ϕ_6 ” in which articles, new innovations and research findings, student achievements as well as alumni highlights are published.





POSTGRADUATE PROSPECTUS

The Department of Physics offers full programs of graduate study leading to M.Sc., M.Phil., and Ph. D. degrees in physics. These degree programs are designed to provide the student with the broad knowledge and problem solving skills that are needed in order to be a productive physicist in an academic, government, or industrial environments.

- M.Sc. Degree in Physics Education
- M.Phil. and Ph.D

ACADEMIC STANDARDS AND ADMINISTRATIVE PROCEDURES

At the beginning of each semester, the students must:

- Enroll in appropriate subjects through LMS or Google classroom for each semester, according to the credit requirement stipulated in the curriculum. The students have to check;
 - Pre-requisites.
 - Departmental GPA credit requirement of the subject stream.
 - Non-Departmental GPA credit requirement.
 - Non-GPA credit requirement.
- Verify the accuracy of initial student registration details published on the departmental notice board.
- Add/drop subjects within 2 weeks from the commencement of each semester and finalize the subject selection for a particular semester.
- Collect previous semester result sheets from the examinations division website – pes.sci.sjp.ac.lk.

Detailed courses with ILO and PLO mapped

The detailed curriculum shown provides a roadmap for both teachers and students and helps ensure that the course or program is delivered consistently and effectively. It is a comprehensive educational plan that outlines the content, goals, and learning outcomes of the degree program. It includes information on topics to be covered, teaching methods, assessment criteria, and resources required as shown below.

Course or program description: A brief overview of the course or program, including its purpose and objectives.

Learning outcomes: A clear and concise description of what students are expected to know and be able to do by the end of the course or program.

Course content: A detailed outline of the topics and themes to be covered in the course or program, organized by module, unit, or lesson.

Teaching and learning methods: Information on the methods to be used to deliver the course content, such as lectures, discussions, practical work, etc.

Assessment methods: Details on how student learning will be evaluated, such as exams, essays, projects, etc.

Resources: A list of materials, textbooks, and other resources required for the course or program.

Schedule: A timeline for the course or program, including the start and end dates, holidays, and key dates for assessments.

Mapping of ILO with PLOs

The ILOs of the detailed courses are mapped with the PLOs which involves aligning the specific outcomes of each course within the Degree program with the overall outcomes of the Degree program as a whole. This helps ensure that the Degree program is cohesive and prepares students for the desired outcomes, and that individual courses are contributing to the achievement of the program outcomes.

Linking Program Outcomes with ILOs:

Program Learning Outcomes:

B.Sc. (General) Degree Programme

Upon successful completion of the B.Sc. degree programme of the USJ, every graduate will be able to,

1. Demonstrate knowledge and understanding of underlying concepts of respective subject areas
2. Demonstrate competency in practical/technical knowledge and skills for enquiry and application
3. Enhance clear and coherent communication skills for demonstration of knowledge and skills
4. Enhance adaptability and emotional intelligence through teamwork which leads to improved leadership qualities, respect for diverse points of view and empathy.
5. Develop cognitive and creative skills to identify, collect, analyze and interpret qualitative and quantitative data.
6. Acquire personal integrity through accountability and assuming responsibility.
7. Demonstrate positive and healthy attitudes and values and engage in lifelong learning for the betterment of society.

B.Sc. (Honours) Degree Program

Upon successful completion of the B.Sc. Honours degree programme of the USJ, a graduate will be able to,

1. Demonstrate advanced knowledge and understanding of underlying concepts of respective subject areas
2. Acquire high levels of competence in practical/technical knowledge and skills for professional growth
3. Enhance ability to communicate acquired knowledge, information, ideas and solutions with clarity and coherence.
4. Enhance emotional intelligence through social engagement, networking and teamwork which leads to improved leadership qualities, respect for diverse points of view and empathy and develop strategies to adapt to changing circumstances.
5. Develop cognitive and creative skills in identifying, collecting and critically analyzing data and in solving problems independently.
6. Exercise personal integrity through responsibility and accountability and acquire professional integrity through inculcated entrepreneurial, managerial and time-management skills.
7. Demonstrate positive and healthy attitudes and values and engage in lifelong learning for the betterment of society.

For further information

Please Contact

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Faculty of Applied Sciences
University of Sri Jayewardenepura
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Nugegoda
Sri Lanka

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Email : head.physics@sjp.ac.lk