

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE PROGRAMME IN PHYSICS**  
 SYLLABUS WITH EFFECT FROM 2023-2024

<b>937SEC2: ASTROPHYSICS</b>	
<b>Learning Objective:</b> This course intends to introduce principles of astrophysics describing the science of formation and evolution of stars and interpretation of various heavenly phenomena and provide an understanding of the physical nature of celestial bodies along with the instrumentation and techniques used in astronomical research	
<b>UNITS</b>	<b>COURSE DETAILS</b>
<b>UNIT-I</b>	<b>TELESCOPES:</b> Optical telescopes – magnifying power, brightness, resolving power and f/a ratio – types of reflecting and refracting telescopes – detectors and image processing – radio telescopes – Hubble space telescope.
<b>UNIT-II</b>	<b>SOLAR SYSTEM:</b> Bode’s law of planetary distances – meteors, meteorites, comets, asteroids – Kuiper belt – Oort cloud – detection of gravitational waves – recent advances in astrophysics.
<b>UNIT-III</b>	<b>ECLIPSES:</b> types of eclipses – solar eclipse – total and partial solar eclipse – lunar eclipse – total and partial lunar eclipse – transits. <b>THE SUN:</b> physical and orbital data – solar atmosphere – photosphere – chromosphere – solar corona – prominences – sunspots – 11 year solar cycle – solar flares.
<b>UNIT-IV</b>	<b>STELLAR EVOLUTION:</b> H-R diagram – birth and death of low mass, intermediate mass and massive stars – Chandrasekar limit – white dwarfs – neutron stars – pulsars – black holes – supernovae. <b>GALAXIES:</b> classification of galaxies – galaxy clusters – interactions of galaxies, dark matter and super clusters – evolving universe.
<b>UNIT-V</b>	<b>ACTIVITIES IN ASTROPHYSICS:</b> (i) Basic construction of telescope (ii) Develop models to demonstrate eclipses/planetary motion (iii) Night sky observation (iv) Conduct case study pertaining to any topic in this paper (v) Visit to any one of the National Observatories Any three activities to be done compulsorily.
<b>TEXT BOOKS</b>	1. Baidyanath Basu, (2001). <u>An introduction to Astrophysics</u> , Second printing, Prentice – Hall of India (P) Ltd, New Delhi 2. K.S.Krishnaswamy, (2002), <u>Astrophysics – a modern perspective</u> , New Age International (P) Ltd, New Delhi. 3. Shylaja, B.S. and Madhusudan, H.R., (1999), <u>Eclipse: A Celestial Shadow Play</u> , Orient Black Swan,

**METHOD OF EVALUATION:**

<b>Continuous Internal Assessment</b>	<b>End Semester Examination</b>	<b>Total</b>	<b>Grade</b>
25	75	100	