

K.S. Rangasamy College of Arts and Science
(Autonomous)
Tiruchengode - 637 215

Department of Physics (UG)

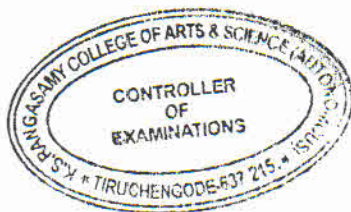
Details of New Courses Introduced


Details of the Courses

1. Fundamentals of Astrophysics
2. Astronomical Techniques
3. Geophysics
4. Career Competency Skills III
5. Career Competency Skills IV



HoD

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CoE

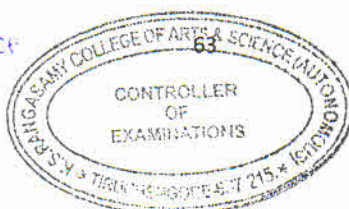
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ADD-ON COURSE OFFERED BY THE DEPARTMENT

18UPHAC301	AC I: FUNDAMENTALS OF ASTROPHYSICS	SEMESTER - III	
Course Objectives: The course aims <ul style="list-style-type: none"> To enhance the basic knowledge in astrophysics and astronomical developments. 			
Non-Credit			Total Hours: 25
UNIT	CONTENTS	Hrs.	CO
I	Introductory Astronomy: History of Astronomy: Overview of the major constituents of the Universe: Solar system, Planets - Laws of motion of planets, Inner planets, Outer planets - Black body radiation.	5	CO 1
II	Galactic Astronomy: Milky way - Hubble classification of galaxies - Spiral galaxies, Elliptical galaxies, Irregular galaxies, Dwarf galaxies; Masses of galaxies - Rotation curves of galaxies; Dark matter.	5	CO 2
III	Cosmology: Distances - Direct distances - Trigonometric parallax: Indirect distances -Expansion of the Universe - Hubbles law, red shift: Newtonian cosmology; Microwave Background, Early universe.	5	CO 3
IV	Interstellar Medium: Discovery of interstellar gas and dust - Galactic distribution of ISM - Phases of ISM, Pressure equilibrium - Models of the ISM: Thermal stability and equilibrium.	5	CO 4
V	Solar System: The sun - Physical and Orbital data - Photosphere - Chromo sphere - Corona - Solar prominences - Sunspot - Solar flare - Mass and temperature of the sun - Solar constant- Source of solar energy - Solar wind - Others members of the solar system - Moon Bode's law - Asteroids - Comets - Meteors.	5	CO 5
Text Books			
1. Spitzer, L. 1998. Physical Processes in the Interstellar Medium , John Wiley and Sons, Switzerland. 2. Baidyanath Basu. 2001. An Introduction to Astrophysics , [second Printing], Prentice - Hall of India Private Limited, New Delhi.			

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Reference Books
1. Shu F., 1982. The Physical Universe . Wiley. University of California.
2. Harwit Martin M. 2006. Astrophysical concepts . [Fourth Edition]. America.
3. Rybicki, G. B and Lightman, A. P. 1985. Radiative Processes in Astrophysics . California.
Web References:
1. http://www.nptel.ac.in
2. https://ocw.mit.edu/courses/physics/

COURSE OUTCOMES (CO)

After completion of the course, the student will be able to

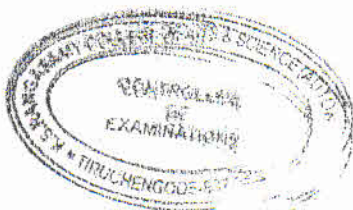
CO 1	Explain fundamental concepts in astrophysics.
CO 2	Know about the main features and formation theories of the various types of observed galaxies, in particular the milkyway.
CO 3	Describe basic cosmological models to predict the age and structure of the universe for various geometries.
CO 4	Explain about interstellar matter in the milkyway and its typical density.
CO 5	Acquire knowledge on features of objects in the solar system.

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	H	H	M	M	L
CO 2	H	H	M	M	M
CO 3	L	L	H	H	M
CO 4	H	H	M	L	H
CO 5	H	M	H	M	L


H-High; M-Medium; L-Low

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18UPHAC401	AC II: ASTRONOMICAL TECHNIQUES	SEMESTER - IV	
Course Objectives: The course aims			
<ul style="list-style-type: none"> To enhance the basic knowledge in astronomical techniques. 			
Non-credit			Total Hours: 25
UNIT	CONTENTS	Hrs.	CO
I	Stellar Evolution and Stars: Birth and death of the star - Chandrasekhar limit - Wide dwarfs - Neutron stars - Black holes - Quasars - Nebulae - Super nova binary stars - Origin of binary stars. Variable stars - Cepheid variables - RV Tauri variables - Flare stars.	5	CO 1
II	Magnitudes, Distance and Spectral Classification of Stars: Magnitude and brightness - Relation - Apparent and absolute magnitude of stars- Luminosities of stars - Measurement of stellar distance - Distance from red shift measurement - HR diagram - Pogson's relation	5	CO 2
III	Detectors: Photo detection (photo electric effect, photo sensitive elements), Photo multiplier tube, detectors at different wavelength and their properties (CCD, CMOS, ICCD, L3CCD, Photon - counting system), spectral response, Noise, Background, signal to noise ratio, sensitivity, Quantum efficiency.	5	CO 3
IV	Telescopic Techniques: Different telescope designs (Refracting and reflecting telescope) - Astrometry, Photometry, imaging spectroscopy - Calibration polarimetry - High resolution technique - Atmospheric effects on optical imaging - Aperture synthesis with single telescope.	5	CO 4
V	High Resolution Techniques: Atmospheric effects on optical imaging, speckle interferometry, aperture synthesis with single telescope, image reconstruction techniques, adaptive optics - Michelson stellar interferometry and intensity interferometry, long baseline optical interferometry.	5	CO 5
Text Books			
<ol style="list-style-type: none"> 1. <i>Baidyanath Basu</i>. 2001. An Introduction to Astrophysics, [Second Printing], Prentice - Hall of India private limited, New Delhi. 2. <i>Bradley, W.C. and Ostlie Dale, A.</i> 2006. An Introduction to Modern Astrophysics. [Second Edition], USA. 			


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Reference Books	
1.	Smart, W.M. 1977. Spherical Astronomy , [Sixth Edition], Cambridge University Press, California.
2.	Shu, F. 1982. The Physical Universe . Wiley. University of California.
Web References:	
1.	http://www.nptel.ac.in
2.	https://ocw.mit.edu/courses/physics/

COURSE OUTCOMES (CO)

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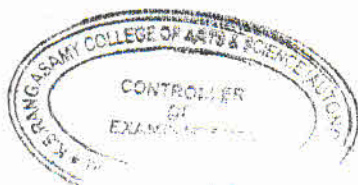
CO 1	Know about the stellar evolution, including red giants, supernovas, neutron stars, white dwarfs and black holes, using evidence and presently accepted theories.
CO 2	Know fundamental theories that explain star properties, distance and magnitudes and evolution of the universe and planetary systems.
CO 3	Demonstrate the detection of stars and planets through modern astrophysical observation.
CO 4	Explain astronomical features and observations obtained via telescopic observations and data prediction.
CO 5	Predict the phases of neighboring planets based on their relative positions and the location using high resolution telescopic techniques.

MAPPING

PSO \ CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	H	H	M	M	M
CO 2	H	H	M	M	M
CO 3	M	L	H	H	M
CO 4	H	H	M	M	H
CO 5	H	M	H	M	L


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18UPHEL502	ELECTIVE I: GEOPHYSICS	SEMESTER - V	
Course Objectives: The course aims <ul style="list-style-type: none"> To develop knowledge about Earth in terms of its physical properties such as gravity, magnetic field, surface wave, earthquakes and structure of Earth. 			
Credits: 4		Total Hours: 45	
UNIT	CONTENTS	Hrs.	CO
I	Introduction and Seismology: Introduction - P waves - S waves - velocities - Time distance curves and the location of epicenters - Effect of boundaries - Major discontinuities and resulting phase of seismic waves - Derivation of properties from the velocities.	9	CO 1
II	Surface Waves and Seismometry: Rayleigh waves and Love waves - Study of Earth by surface waves - Horizontal seismograph and seismography equation - Strain seismograph.	9	CO 2
III	Earthquakes and Gravity: Focus - Magnitude - Frequency - Detection and prediction - Gravity - Potential (Laplace's equation and Poisson's equation) - Absolute and relative measurements of gravity - Hammond Faller method - Worden gravimeter.	9	CO 3
IV	Geomagnetism: Fundamental equations - Measurements: Gauss-Saturation induction magnetometers - Theories of Earth's magnetism - Dynamo theories. Internal structure of the Earth: Variation of mechanical properties with depth - Materials and equation of state of the interior of the earth.	9	CO 4
V	Geochronology: Radioactivity of the Earth - Radioactive dating of rocks and minerals geological time scale - Age of the Earth - Geothermal Physics: Flow of heat to the surface of the Earth - Sources of heat within the Earth - Process of heat transport - Internal temperature of the Earth.	9	CO 5
Text Book			
1. William Lowrie, 2007. Fundamentals of Geophysics. [Second Edition]. Cambridge University Press, Cambridge, New York.			
Reference Books			
1. Cook, A. H., 1973. Physics of the Earth and Planets. 1 st Edition, McMillan Press,			


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London.

2. Telford, W.M., Geldart, L.P., Sheriff, R.E. 1990. **Applied Geophysics**. 2nd Edition, Cambridge University Press, Cambridge, New York.
3. Garland, G.D., 1979. **Introduction to Geophysics**. 11th Edition, W.B. Saunder Company, London.

Web References:

1. <http://www.nptel.ac.in>
2. <https://ocw.mit.edu/courses/physics/>

COURSE OUTCOMES (CO)


After completion of the course, the student will be able to

CO 1	Understand the quantitative aspects of Seismology.
CO 2	Ability to interpret surface waves on the Earth.
CO 3	Determine earthquake gravity parameters.
CO 4	Understand the geomagnetic field and the principle.
CO 5	Understand the Geochronology and Geothermal Physics

MAPPING

CO \ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	H	M	M	M	L
CO 2	H	H	M	M	L
CO 3	M	M	H	H	M
CO 4	H	H	M	L	H
CO 5	M	M	L	L	L

H-High; M-Medium; L-Low


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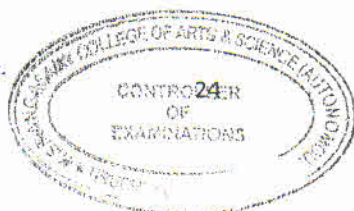
18ULS501	CAREER COMPETENCY SKILLS - III	SEMESTER - V	
Course Objectives: The course aims			
<ul style="list-style-type: none"> To impart knowledge on the logical reasoning. To enhance employability skills and to develop career competency. 			
Credits: -			Total Hours: 15
UNIT	CONTENTS	Hrs.	CO
I	Verbal Reasoning: Number Series Completion - Alpha Series Completion - Blood Relation - Distance and Direction - Analogy - Inequality - Classification.	3	CO 1
II	Non-Verbal Reasoning: Series Completion - Analogy and Classification - Completion of Incompletion Pattern.	3	CO 2
III	Non-Verbal Reasoning: Mirror Image and Water Image - Statement and Arguments - Cubes and Dices.	3	CO 3
IV	Reasoning: Puzzle Arrangement - Syllogism - Input and Output.	3	CO 4
V	Verbal Reasoning: Linear Arrangement - Circular Arrangement - Matrix Arrangement.	3	CO 5
Text Book			
1. Aggarwal R.S, 2017. Test of Reasoning, S Chand and Company Limited, New Delhi.			
Reference Book			
1. Gajendra Kumar, Abhishek Banerjee, Verbal & Non-Verbal Reasoning For Competitive Exams, Disha publication, New Delhi.			

COURSE OUTCOMES (CO)

After completion of the course, the student will be able to

CO 1	Understand the core concepts of Verbal Reasoning.
CO 2	Formulate Non Verbal Reasoning with shortcuts.
CO 3	Find Mirror Image, Cubes and Dices.
CO 4	Obtain the knowledge on shortcuts to solve Puzzles.
CO 5	Solve Linear Arrangement and Matrices with shortcuts.


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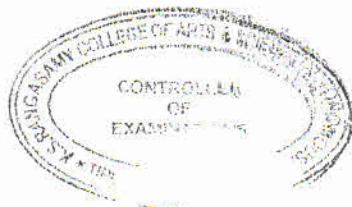
18ULS601	CAREER COMPETENCY SKILLS - IV	SEMESTER - VI	
Course Objectives: The course aims			
<ul style="list-style-type: none"> To understand the basic needs of Communication. To utilize the communication skills for achieving at the time of Interview. 			
Credits: -			Total Hours: 15
UNIT	CONTENTS	Hrs.	CO
I	Basic Grammar - English usage - Reading and Writing (Level -2) Direct and Indirect Speech	3	CO 1
II	Spotting Errors - Parts of speech and Punctuation	3	CO 2
III	Role Play - Just a Minute (JAM) - Group Discussion	3	CO 3
IV	Interview Presentation (Self-Introduction) - Critical thinking, problem solving.	3	CO 4
V	Dress Code and Body Language - Leadership	3	CO 5
Text Book			
<ol style="list-style-type: none"> Basic English Grammar for English-Book 1, Learners, Anne Seaton, Y.H.Mew, Saddlepoint Publishers (E-Copy). Basic English Syntax with Exercises, Mark Newson (E-Copy) 			
Reference Book			
1. Agarwal, R.S., Objective General English , S. Chand.			


COURSE OUTCOMES (CO)

After completion of the course, the student will be able to

CO 1	Recall the basic grammar in language.
CO 2	Concentrate on sentence correction.
CO 3	Recognize the differences among facts, opinions and judgments.
CO 4	Develop their personal skills through interview.
CO 5	Appropriately apply their learning and leadership style and strength.


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