DIPLOMA IN ASTRONOMY AND ASTROPHYSICS

Eligibility:

Pass in +2 with physics as one of the subjects

Course Duration:

1 Year – (Non-Semester System)

COURSE : Diploma in Astronomy and Astrophysics		
MEDIUM : English		
COURSE CODE : 3011		
S.NO	**PAPER NAME**	**EXAMINATION CODE**
1	Introduction to Cosmos	**DAAP01**
2	Solar System Studies	**DAAP02**
3	Stellar Astronomy	**DAAP03**
4	Galaxies and Cosmology	**DAAP04**
5	Project	**DAAPPR**

Scheme of Examination:

Theory: Duration – 3 Hrs, Max. Marks – 100, Passing Min.- 35 Marks

DIPLOMA IN ASTRONOMY AND ASTROPHYSICS – COURSE CODE - 3011

S.NO	SUBJECT CODE	COURSE	NATURE	CREDIT	CS
	SEMESTER I				
1	DAAP01	INTRODUCTION TO COSMOS	CORE	4	100
2	DAAP02	SOLAR SYSTEM STUDIES	CORE	4	100
3	DAAP03	STELLAR ASTROMOMY	CORE	4	100
4	DAAP04	GALAXIES AND COSMOLOGY	CORE	4	100
5	DAAPPR	PROJECT		6	100
			Total	22	

INTRODUCTION TO THE COSMOS - DAAP01

Credits:4 Teaching Hours: 12 hrs / week

Unit-1

Topics from Trignometric functions – Angles – Formula for the Length of a Circular arc – Formula for the area of a circular sector – Trignometry – Trignometric functions of Angles – Phythogorean Theorem – Relation between functions of accute angles of a right triangle - Topics from Analytic geometry - Conic sections – Hyperbolas – Logrithimic functions.

Unit - 2

Ideas from Physics – Electromagnetic waves – The Laws of Motion and Gravitataion – Newtons first law of Motion – The Law of Inertia – The Concept of Momentum - Newtons third Law of Motion – The Law of Action and reaction - Circular motion – Satellites in orbits – atoms and Molecules- The Bohr atom – Excitation – Molecules – Atomic Nucleus – Isotopes – Lenses – Image Orientation – Telescopes Radio Asatronomy – Infrared Astronomy- UV Astronomy- X ray and Gamma ray Astronomies.

Unit – 3

Our place in Space – Early models of the Universe – Zones of Earth - Terrestrial Latitudes and Longitudes – Axis and Radius of Earth – Celestial Sphere - Diurnal motion - local meridian- Transits of Celestial Objects – Celestial Coordinate – Horizontal system – Equatorial system - Meridian system – Ecliptic system – Conversion of Coordinates Sidereal time- Circumpolar stars Constellations in the sky Calendars and Time estimation techniques- Indian Calendars – Nakshtra time.

Unit – 4

Measurement of Angles in Sky Distance measurement techniques- Parallax method – Units of distances in Astronomy Astronomical Unit – Light Year Paersec- Radiations from space – Fundamentals of Spectroscopy – Atomic structure and Spectra – Kirchoff's law – Spectral Lines Radiation Process- Synchrotron Blackbody- Doppler Effect- Earth Moon system- Kepler's Law Eclipses of the Sun- The aros Cycle – Eclipses of the Moon Occulataions-Transits.

MADURAI KAMARAJ UNIVERSITY
University with Potential for Excellence
Re Accredited by NAAC with "A++" Grade in the 4rd Cycle
DIRECTORATE OF DISTANCE EDUCATION
www.mkudde.org

SOLAR SYSYTEM STUDIES - DAAP02

Credits:4 Teaching Hours: 12 hrs / week

Unit -1

The Primordial Nebula – Formation of the Sun and the Planets –Planetary properties – Terrestrial Planets – Gas Giants – The Sun – Energy production – Internal structure – The Photosphere – The Chromosphere–The Corona – The Solar Wind – Solar Neutrinos – Sunspots – Solar Eruptions – Solar Cycle.

Unit -2

The Earth – Atmosphere – Magnetosphere – Interior – Tides – The Moon – Origin – Orbital Parameters – Topography – High Lands – Maria –Cratering – The Mercury – The Venus – Atmosphere of Venus – Surface of Venus – The Mars – Topography – Internal Structure – Volcanism –Atmosphere – The Soil – Phobos – Deimos.

Unit-3

The Jupiter – Atmosphere – Great Red Spot – Internal Structure –Kelvin Helmholtz Mechanism – Magnetosphere – Satellites – Characters of Satellite – The Saturn – Atmosphere – Internal Structure – Magnetosphere –Satellites – Characters of Satellites – Roche Limit – Ring System – Uranus and Neptune – Atmosphere – Internal Structure – Magnetosphere – Satellite – Characters of Satellite.

Unit- 4

Pluto and Other Trans Neptunian Objects – Kuiper Belt – Oort Cloud – Origin of Comets – Structure – Physical – Asteroids – Ceres – Kirkwood gaps – Trojan Asteroids – Apollo Asteroids.

MADURAI KAMARAJ UNIVERSITY
University with Potential for Excellence
Re Accredited by NAAC with "A++" Grade in the 4rd Cycle
DIRECTORATE OF DISTANCE EDUCATION
www.mkudde.org

STELLAR ASTRONOMY - DAAP03

Credits:4 Teaching Hours: 12 hrs / week

Unit –1

Stellar Measurements – Distance – Motion – Sizes – Luminosity –Brightness – Magnitudes – Proper motion – Measuring masses in a binary system – temperature – Colour – Classification – The Hertsprung Russell Diagram – Star clusters – Star catalogs – Interstellar matter- Nebulae – Emission Absorption Reflection Nebulae – 21 Cm Radiation – Formation of Low mass stars – Protostars – TTauri stars – Cluster formation.

Unit-2

Stellar Evolution – Main sequence stars – Hellum fusion –Triple Alpha process – Core Hydrogen burning – Hydrogen Shell Burning – Death of Low mass stars – Electron Degeneracy Pressure – Chandrasekhar's limit – Planetary Nebulae – White Dwarf – Black Dwarf – Binary stars – Roche Lobe – Observation of Evolution in Star clusters – Globular clusters – Open clusters.

Unit–3

High Mass Stars – Stellar Explosions – Nova Supernova – Carbon Detonation Supernova – Core Collapse Supernova – Making elements beyond Iron – Helium Capture – s Process – r Process – Supernovae as Distance Indicator – Supernova Remanants – Cycle of Stellar Evolution.

Unit – 4

Neutron stars and black holes – Ultra compression – Formation of low mass and super massive Blackholes – Properties – Pulsars – Xray and Gamma ray Bursters – Event Horizon – Schwarzschild Radius – Warpped Space – Observational Evidence for Blackholes.

MADURAI KAMARAJ UNIVERSITY
University with Potential for Excellence
Re Accredited by NAAC with "A++" Grade in the 4rd Cycle
DIRECTORATE OF DISTANCE EDUCATION
www.mkudde.org

GALAXIES AND COSMOLOGY - DAAP04

Credits:4 Teaching Hours: 12 hrs / week

Unit– 1

The Milky way Galaxy – Structure – Galactic Disc – Bulge – Dynamics – Formation of Galaxy – Spiral Structure – Density waves – Rotation curves – Mass of the Galaxy – Dark matter – Distance Measurement using variable stars – Cepheid – RR Lyrae variables – Normal Galaxies – Hubble's classification – Megellanic clouds – local group – Tully – Fisher relationship – Super clusters.

Unit–2

Hubbles Law – Hubble constant – Active Galaxies and Quasars – Seyfert Galaxies – Radio galaxies – Jets and Lobes quasars as Cosmological probes – Quasar – Evolution – Central Engine of Active Galaxies and Quasars – Super massive Black holes – Radiation process.

Unit–3

Cosmology – Early models of the Universe – O Ibers's Paradox – The Cosmological Constant – Mass energy relation – Particle production – Radiation era – Grand Unified theories – Pair production – Elementary particles – Threshold Temperatures – Matter era – Compton Wavelength – Schwarzschild radius – Planck's Time – Initial Nucleosynthesis – Epoch of Inflation.

Unit–4

Cosmic Microwave background – Plank's radiation curve – Possible Geometries of the Universe – Age of the Universe – Evolution of the Universe – Critical D ensity – Deutrium Abundance