To make a copy of this Template, use the File menu and select "Make a copy...", or "Download as..." > Microsoft Excel													
		EXAMPLE MAP											
Astronomy 101	Gregory Pijanowski												
Module/Submodule	Learning Outcome(s)	Assessment Approach	OER Provided (Add url)	License	Section of OER Used/Notes								
This is how you structure your course thematically or chronologically, which might be represented in an LMS by modules or folders (eg, Topic A, Week 1).	List learning outcomes included in this module/submodule, identifing something students will know or be able to do after this unit of your course.	An assessment measures a student's knowledge of a task or an ability connected to a learning outcome. This may a quiz, an essay, a group project, etc.	For every unit, identify content either from sources like the Lumen Catalog or other OER sources. Copy the URL into the box below to support the learning outcome you are assessing for this unit.	Record the license of the content provided to the best of your knowledge. Make a note here if you are unsure.	In this column, make notes about what part of the content you are using. If you are using the entire resource at the URL supplied, you can leave this column blank.								
Module 1 - Introduction to Astronomy	Develop understanding of the celestial sphere.	Discussion											
The Sky Above			http://cnx.org/contents/LnN76Opl@10.4:jFCByizp@3/The-Sky-Above	Creative Commons 4.0									
The Birth of Modern Astronomy			http://cnx.org/contents/LnN76Opl@10.4:D6EvmGmR@3/The-Birth-of-Modern-Astronomy	Creative Commons 4.0									
Earth and Sky			http://cnx.org/contents/LnN76Opl@10.4:lTd1b7up@3/Earth-and-Sky	Creative Commons 4.0									
The Seasons			http://cnx.org/contents/LnN76Opl@10.4:H6TrvX3m@3/The-Seasons	Creative Commons 4.0									
Phases and Motions of the Moon			http://cnx.org/contents/LnN76Opl@10.4:T9HQmc8H@3/Phases-and-Motions-of-the-Moon	Creative Commons 4.0									
Eclipses of the Sun and Moon			http://cnx.org/contents/LnN76Opl@10.4:5rlfqA9Y@3/Eclipses-of-the-Sun-and-Moon	Creative Commons 4.0									
Mini-Lecture - Stellarium													
			https://www.youtube.com/watch?v=hQtLH0Fafrl	Standard YouTube License/Supplemental	Stellarium Tutorial Part I - Supplemental	Changed to Supplemental 4/6							
			http://www.stellarium.org/	See http://www.gnu.org/copyleft/gpl.html	Stellarium Download	Added 4/6							
Mini-Lecture - Celestial Coordinates													
			Polaris Azimuth Grid – Gregory Pijanowski										
			Polaris Celestial Grid – Gregory Pijanowski										
			https://www.youtube.com/watch?v=htJAzLMlkU0	Standard YouTube License/Supplemental	Stellarium Tutorial Part II	Changed to supplemental 4/6							
Mini-Lecture - Ancient Astronomy													
			Cairo Sunrise 4000 B.C. – Gregory Pijanowski										
			http://cnx.org/resources/897fd793d2c96e0ef2842a937273fe2be41be5f6/OSC_Astro_02_02_Precession.jpg	Creative Commons 4.0	Precession image	Added 4/6							
			http://www2.astronomicalheritage.net/	Supplemental	UNESCO Astronomy Heritage Webportal	Added 4/6							
			http://www2.astronomicalheritage.net/index.php/about/astronomy-and-world-heritage/world-heritage-list	Supplemental	UNESCO Astronomy Heritage List	Added 4/6							
Discussion - Observing the Night Sky													
Module 2 - Properties of Motion and Light	Develop an understanding of Newton's Laws/EM Spectrum/Basics of Telescopes	Quiz/Written Assignemnt/Discussion											
The Laws of Planetary Motion			http://cnx.org/contents/LnN76Opl@10.4:R1l6B4Ht@3/The-Laws-of-Planetary-Motion	Creative Commons 4.0									
Newton's Great Synthesis			http://cnx.org/contents/LnN76Opl@10.4:jccCTwYm@3/Newtons-Great-Synthesis	Creative Commons 4.0									
Newton's Universal Law of Gravitation			http://cnx.org/contents/LnN76Opl@10.4:tqHjeG5S@3/Newtons-Universal-Law-of-Gravi	Creative Commons 4.0									
The Behavior of Light			http://cnx.org/contents/LnN76Opl@10.4:utu6tFTq@3/The-Behavior-of-Light	Creative Commons 4.0									
The Electromagnetic Spectrum			http://cnx.org/contents/LnN76Opl@10.4:Fe7BqV48@4/The-Electromagnetic-Spectrum	Creative Commons 4.0									
Spectroscopy in Astronomy			http://cnx.org/contents/LnN76Opl@10.4:H5KhlDcK@3/Spectroscopy-in-Astronomy	Creative Commons 4.0									
The Doppler Effect			http://cnx.org/contents/LnN76Opl@10.4:nWRC8nG_@3/The-Doppler-Effect	Creative Commons 4.0									
Telescopes			http://cnx.org/contents/LnN76Opl@10.4:fFRziOzt@3/Telescopes	Creative Commons 4.0									
Telescopes Today			http://cnx.org/contents/LnN76Opl@10.4:y9Hvt5mK@3/Telescopes-Today	Creative Commons 4.0									
Radio Telescopes			http://cnx.org/contents/LnN76Opl@10.4:md8YPKol@4/Radio-Telescopes	Creative Commons 4.0									
Mini-Lecture - Freefall and Weightlessness													
			https://www.flickr.com/photos/usnavy/6754889771/in/photolist-dP3kbh-nY7JZ4-khWUXc-dK3MF1-bhUzoK-bhUzwX-dcgn5n-dNRfns-6LNKc1-yQ1uKW-buhC5N-bybuNS-eEAoiU-ejBViz-bfSzAe/	Photo - US Navy/Public Domain	Freefall photo							

			https://www.nasa.gov/sites/default/files/images/576200main_s84-27017_full.jpg	Photo - NASA/Public Domain	Astronaut photo								
Mini-Lecture - Famous Telescopes													
			https://commons.wikimedia.org/wiki/File:Galileo_galilei,_telescopi_del_1609-10_ca..JPG#mw-jump-to-license	Photo - Sailko/Wiki Commons, Creative Commons 3.0	Galileo's Telescope								
			https://www.flickr.com/photos/rvr/9445952219/in/photolist-foGYva-bEwfX6-iyix9f-opFjzv-cE8dUC-sYtaMb-opLdVG-dueTf-dch5t5-oNaQwp-nHybPH-byMZKv-9tEKWf-nMSw6a-eVG2du-9rczu-i6dDAX-cYN9xo-eVuqyR-oGabE8-aayb2q-opGjwX-ccXqCj-83HLKf-6bxNiT-eYprjz-dQ7hmv-XP2mW-pWXmq9-GqB2W6-nVDzpp-ch8V6C-dDhVpL-5qh2TT-XJdNP-aqZSAj-nVEvc2-hP154g-tRUTjv-8iYtgh-bKFLYa-5PPeE8-nPkiXd-o4jy96-5E87Xj-owft4G-cE8eYG-fVmh5m-ouCgTE-ehmyVP	Victor R. Ruiz/Creative Commons 2.0	Paris Observatory								
			https://commons.wikimedia.org/wiki/File:Yerkes_Observatory_Astro4p7.jpg	Yerkes Observatory/Wiki Commons Public Domain	Yerkes Observatory/1921								
			http://www.pigeonroost.net/wp-content/uploads/2016/02/MtWilson.jpeg	Photo-Gregory Pijanowski	Mt. Wilson Observatory								
			https://www.flickr.com/photos/vkurland/2151059158/in/photolist-4h5JWS-4xcwQE-9ubJiZ-5uSKvX-5uWLVS-x6gLj-db696b-dRKE6i-5uXwfC-okm7yC-5uXaxj-5uX3d9-5uSpKt-5uStEe-5dBmPV-5uSuSt-4dtbWq-9RLbbr-uMFBB-5uWPTy-5uWQ1G-j7GMLT-5uSrze-aEZ77y-5uSKVc-5uWSbh-5uWRSq-ahDL1N-5uXuds-5uSDsn-5uSZaK-5uSKfD-5dBmdr-5uX2u9-48DWcU-wSwYy-5uX28L-5uX9kL-5uSvb6-aUoWUZ-a98UWa-CoH13T-krr3MX-Httc-eouhPN-j7J2WL-eouhA1-6VRXXz-6paEPC-5uTdAe	Vadim Kurland/Creative Commons 2.0	Keck Observatory								
			https://www.youtube.com/watch?v=fJmADQkhUeo	Standard YouTube Lincense/Public Domain	Hubble 20th anniversary video	From verified NASA YouTube Channel. NASA licensing at: https://www.nasa.gov/multimedia/guidelines/index.html							
Mini-Lecture - Amateur Astronomy													
Quiz						Added 4/8							
Written Assignment - Research Paper Proposal			http://hubblesite.org/images/gallery	NASA/Public Domain: http://hubblesite.org/about_us/copyright.php		Added 4/7							
Discussion - Telescopes						Added 4/8							
Module 3 - Earth and Moon System	Study of the Earth's interior/atmosphere/magnetic field and Moon's interior/interaction with Earth	Quiz, Written Assignment, Discussion											
The Global Perspective			http://cnx.org/contents/LnN76Opl@10.4:fE-uCDzG@3/The-Global-Perspective	Creative Commons 4.0									
Earth's Crust			http://cnx.org/contents/LnN76Opl@10.4:BkSPyq5s@3/Earths-Crust	Creative Commons 4.0									
Earth's Atmosphere			http://cnx.org/contents/LnN76Opl@10.4:xfppk8Du@3/Earths-Atmosphere	Creative Commons 4.0									
General Properties of the Moon			http://cnx.org/contents/LnN76Opl@10.4:-m9vBC6n@3/General-Properties-of-the-Moon	Creative Commons 4.0									
The Lunar Surface			http://cnx.org/contents/LnN76Opl@10.4:7qS52GtZ@3/The-Lunar-Surface	Creative Commons 4.0									
Impact Craters			http://cnx.org/contents/LnN76Opl@10.4:B8pDv1hY@3/Impact-Craters	Creative Commons 4.0									
The Origin of the Moon			http://cnx.org/contents/LnN76Opl@10.4:8RKRuAeb@3/The-Origin-of-the-Moon	Creative Commons 4.0									
Mini-Lecture - Solstice and Equinox													
			https://www.youtube.com/watch?v=FmCJqykN2J0	Standard YouTube License/CC Attribution	Seasonal Change video - NASA has CC license on YouTube								
Mini-Lecture - Global Warning													
			http://climate.nasa.gov/	NASA/Public Domain	GLOBAL LAND-OCEAN TEMPERATURE INDEX/Data source: NASA's Goddard Institute for Space Studies (GISS). Credit: NASA/GISS								
			http://www.kcvs.ca/martin/astro/au/unit1/33/chp3_3.html	Public Domain/Robert A. Rohde	Milankovitch Cycles								
			https://commons.wikimedia.org/wiki/File:Changes_in_total_solar_irradiance_and_monthly_sun spot_numbers,_1975-2013.png	Public Domain	Changes in total solar irradiance and monthly sunspot numbers								
			http://www.dec.ny.gov/energy/76533.html	NYS Dept of Environmental Conservation/Public Domain	Earth's Greenhouse Effect								
			http://climate.nasa.gov/system/downloadable_items/43_24_g-co2-l.jpg	NASA/Public Domain	Carbon Dioxide Levels								
			https://www.ncdc.noaa.gov/sotc/service/global/map-blended-mntp/201502.gif -	NOAA/Public Domain	Feburary 2015 Global Temperatures								

			https://www.youtube.com/watch?v=JRaylgKublg	Standard YouTube Licence/NASA Public Domain: https://www.nasa.gov/multimedia/guidelines/index.html	Taking Earth's Temperature video								
			https://www.epa.gov/climate-change-science/causes-climate-change	EPA/Public Domain	Human and Natural Influences on Climate								
			https://commons.wikimedia.org/wiki/File:Global_Carbon_Emission_by_Type_to_Y2004.png	Mak Thorpe CC 3.0	Global Carbon Emissions								
Mini - Lecture - The Apollo Program													
			https://www-curator.jsc.nasa.gov/lunar/index.cfm	NASA/Public Domain	NASA Lunar Curator link	Added 4/8							
			https://www-curator.jsc.nasa.gov/lunar/lunar10.cfm	NASA/Public Domain	NASA Top Ten Apollo Discoveries link	Added 4/8							
			https://nssdc.gsfc.nasa.gov/planetary/lunar/moon_landing_map.jpg	NASA/Public Domain	NASA Lunar Landing Map	Added 4/8							
			https://www.nasa.gov/multimedia/imagegallery/image_feature_359a.html	NASA/Public Domain	Apollo 11 launch								
			https://www.nasa.gov/multimedia/imagegallery/image_feature_1249.html	NASA/Public Domain	Earthrise								
			https://www.flickr.com/photos/gsfc/4812251385	NASA/Public Domain	Moon Landing								
			https://www.nasa.gov/centers/marshall/history/saturn_v_instrument_unit_01.html	NASA/Public Domain	Saturn V Computer								
			https://nssdc.gsfc.nasa.gov/imgcat/html/object_page/a15_h_85_11451.html	NASA/Public Domain Image use policy at: https://nssdc.gsfc.nasa.gov/imgcat/imgcat-faq.html	Apollo 15 Hadley Rille	Added 4/11							
			https://www.youtube.com/watch?v=m8P5ujNwEwM	Standard YouTube License/Supplemental	Moon Origin video	Supplemental added 4/8							
Quiz						Added 4/8							
Written Assignment - Moon Mission													
			http://www.oarval.org/MoonMapen.htm	Supplemental	Moon Map	Added 4/8							
			http://cseligman.com/text/moons/moonfar.htm	Supplemental	Moon Map - Far Side	Added 4/8							
			https://lunar.gsfc.nasa.gov/	NASA/Public Domain	NASA LRO Home Page	Added 4/8							
			https://www.nasa.gov/mission_pages/LRO/multimedia/lroimages/LROMoonImages_archive_1.html	NASA/Public Domain	NASA LRO Image Gallery	Added 4/8							
			https://www.youtube.com/watch?v=2iSZMv64wuU	Standard YouTube License/Public Domain	NASA LRO Tour of the Moon	Added 4/8 - NASA has listed as public domain on YouTube							
Discussion - NASA Earth Observatory													
			https://earthobservatory.nasa.gov/?eocn=topnav&eoci=home	NASA/Public Domain	NASA Earth Observatory Home Page	Added 4/8							
			https://earthobservatory.nasa.gov/GlobalMaps/	NASA/Public Domain	NASA Global Maps	Added 4/8							
Module 4 - The Solar System	Planetary interiors/atmospheres/magnetic fields, satellites, asteroids, and comets.	Quizzes, written assignment, discussion											
Formation of the Solar System			http://cnx.org/contents/LnN76Opl@10.4:05YHidE5@3/Formation-of-the-Solar-System	Creative Commons 4.0									
Mercury			http://cnx.org/contents/LnN76Opl@10.4:xP2qaZ5q@3/Mercury	Creative Commons 4.0									
Nearest Planets: An Overview			http://cnx.org/contents/LnN76Opl@10.4:x2ommVk0@3/The-Nearest-Planets-An-Overvie	Creative Commons 4.0	Only Rotation & Basic Properties Section								
The Geology of Venus			http://cnx.org/contents/LnN76Opl@10.4:4QwaFtBs@3/The-Geology-of-Venus	Creative Commons 4.0									
The Massive Atmosphere of Venus			http://cnx.org/contents/LnN76Opl@10.4:QdDEd0Iw@3/The-Massive-Atmosphere-of-Venu	Creative Commons 4.0									
Geology of Mars			http://cnx.org/contents/LnN76Opl@10.4:k8PEmDZz@3/The-Geology-of-Mars	Creative Commons 4.0									
Water and Life on Mars			http://cnx.org/contents/LnN76Opl@10.4:0WO0CZXX@3/Water-and-Life-on-Mars	Creative Commons 4.0									
The Giant Planets			http://cnx.org/contents/LnN76Opl@10.4:E5Z0utOB@3/The-Giant-Planets	Creative Commons 4.0									
The Atmospheres of the Giant Planets			http://cnx.org/contents/LnN76Opl@10.4:ghX5zgox@3/Atmospheres-of-the-Giant-Plane	Creative Commons 4.0									
Searching for Life Beyond Earth			http://cnx.org/contents/LnN76Opl@10.4:vkRqaoqY@3/Searching-for-Life-beyond-Eart	Creative Commons 4.0	Life on Mars, Life in Outer Solar Syatem only.								
Planetary Rings			http://cnx.org/contents/LnN76Opl@10.4:i4p4QrP9@3/Planetary-Rings	Creative Commons 4.0									
Asteroids			http://cnx.org/contents/LnN76Opl@10.4:chtGdUPl@3/Asteroids	Creative Commons 4.0									
The Long Hair Comets			http://cnx.org/contents/LnN76Opl@10.4:Ctw9hZlc@3/The-Long-Haired-Comets	Creative Commons 4.0									
Mini-Lecture - Space Exploration - The Inner Planets													

			https://www.youtube.com/watch?v=ha8GPZsMl8Y	Standard YouTube License/NASA Public Domain/Verified JPL YouTube Channel	Opportunity rover video								
			http://messenger.jhuapl.edu/	Supplemental	Messenger Mission website	Added 4/10							
			http://messenger.jhuapl.edu/Explore/Images.html#highlights-collection	Supplemental	Messenger Highlights	Added 4/10							
			http://sci.esa.int/bepicolombo/	Supplemental	ESA BepiColumbo Mission	Added 4/10							
			http://www.esa.int/Our_Activities/Space_Science/Venus_Express	Supplemental	Venus Express	Added 4/10							
			https://mars.nasa.gov/	NASA/Public Domain	NASA Mars Exploration Program	Added 4/10							
			https://mars.jpl.nasa.gov/odyssey/	NASA/Public Domain	Mars Odyssey	Added 4/10							
			https://mars.jpl.nasa.gov/mro/	NASA/Public Domain	Mars Reconnaissance Orbiter	Added 4/10							
			https://mars.nasa.gov/mer/home/	NASA/Public Domain	Mars Rovers	Added 4/10							
			https://mars.jpl.nasa.gov/msl/	NASA/Public Domain	Mars Curiosoty Rover	Added 4/10							
Mini-Lecture - Stellarium - The Planets													
			https://www.youtube.com/watch?v=gPUZFOjwce4	Standard YouTube License/Supplemental	Stellarium Tutorial - Part III	Video changed to supplemental on 4/10							
Mini-Lecture - Research Paper Guidelines					This is assignment based, may stay behind Blackboard rather than be public.								
			http://owl.excelsior.edu/research-and-citations/documenting/apa-style/	Creative Commons 4.0	APA Guidelines	Added 4/10							
			http://owl.excelsior.edu/plagiarism/	Creative Commons 4.0	Avoiding Plagiarism	Added 4/10							
Mini-Lecture - Space Exploration - The Outer Planets													
			http://dawn.jpl.nasa.gov/	NASA/Public Domain	NASA Dawn Mission	Added 4/10							
			https://saturn.jpl.nasa.gov/	NASA/Public Domain	NASA Cassini Mission	Added 4/10							
			https://www.missionjuno.swri.edu/	Supplemental	NASA Juno Mission	Added 4/10							
			http://voyager.jpl.nasa.gov/	NASA/Public Domain	NASA Voyager Mission	Added 4/10							
			http://pluto.jhuapl.edu/	Supplemental	New Horizons Mission	Added 4/10							
			https://www.jpl.nasa.gov/index.php	NASA/Public Domain	NASA Jet Propulsion Laboratory	Added 4/10							
			https://solarsystem.nasa.gov/	NASA/Public Domain	NASA Solar System Exploration website	Added 4/10							
			http://hubblesite.org/news/82-solar-system	NASA/Public Domain	NASA Hubble Solar System Archive	Added 4/10							
			http://www.esa.int/ESA	Supplemental	European Space Agency	Added 4/10							
			http://www.esa.int/Our_Activities/Space_Science	Supplemental	ESA Space Sciences	Added 4/10							
			https://www.youtube.com/watch?v=ITPizr7Pqgg	Standard YouTube License/Supplemental/Public Domain	Juno Mission video	NASA has listed video as public domain on YouTube							
Mini-Lecture - Pluto													
			http://www.astro.cornell.edu/~jlm/images/pluto_announcement.gif	Supplemental	Pluto Discovery Announcement	Added 4/10							
			http://solarsystem.nasa.gov/images/slideshow/pluto_blink.gif	NASA/Public Domain	Pluto Discovery Plates								
			https://commons.wikimedia.org/wiki/File:Charon_Discovery.jpg	US Navy Observatory/Public Domain	Charon Discovery Plate								
			http://pluto.jhuapl.edu/News-Center/News-Article.php?page=20150828	NASA/Johns Hopkins University Applied Physics Laboratory/Southwest Research Institute/Alex Parker-public domain	New Horizons/Kuiper Belt								
			http://pluto.jhuapl.edu/	Supplemental	NASA New Horizons	Added 4/10							
			https://www.youtube.com/watch?v=NEdvyrKokX4	Standard YouTube License/NASA Public Domain	Pluto Flyby video								
Mini-Lecture - Halley's Comet													
			https://commons.wikimedia.org/wiki/File:Bayeux_Tapestry_32-33_comet_Halley_Harold.jpg	Public Domain/CC 1.0	Bayeux Tapestry								
			https://commons.wikimedia.org/wiki/File:Giotto_-_Scrovegni_-_-18-_-_Adoration_of_the_Magi.jpg	Public Domain/CC 1.0	Adoration of the Magi								
			http://www.newtonsapple.org.uk/wp-content/uploads/2014/05/Comet-Hally-by-Samuel-Scott.jpg	Public Domain/CC 1.0	Halley's Comet image - 1759								
			http://www.space.com/images/i/000/009/408/original/p29159.jpg?interpolation=lanczos-none&downsize=660:*	Public Domain/CC 1.0	Halley's Comet from Mt. Wilson Observatory-1910								
			http://query.nytimes.com/mem/archive-free/pdf?res=9F01E3D61539E433A2575AC1A9639C946196D6CF	Supplemental	NY Times Halley's Comet May 19, 1910	Added 4/10							
			https://www.youtube.com/watch?v=oiRghs0SiR4	Standard YouTube License/Supplemental	Twenty years of Giotto	Changed to supplemental 4/10							
				Creative Commons 4.0									
Quiz 1													
Quiz 2													
Written Assignment													
			Stellarium Inner Solar System image 11/15/17 - Gregory Pijanowski	Public Domain		Added 4/10							

			Stellarium Inner Solar System image 12/15/17 - Gregory Pijanowski	Public Domain		Added 4/10							
Discussion													
			https://photojournal.jpl.nasa.gov/Help/ImageGallery.html	NASA/Public Domain	JPL Image Gallery	Added 4/10							
Module 5 - The Sun	Internal Structure of the Sun/Nuclear Energy Source/Solar cycle/Space Weather	Quiz, Discussion											
The Structure and Composition of the Sun			http://cnx.org/contents/LnN76Opl@10.4:l0SebFYS@4/The-Structure-and-Composition-	Creative Commons 4.0									
The Solar Cycle			http://cnx.org/contents/LnN76Opl@10.4:9KiWnbvv@3/The-Solar-Cycle	Creative Commons 4.0									
Solar Activity above the Photosphere			http://cnx.org/contents/LnN76Opl@10.4:ogyBuycc@3/Solar-Activity-above-the-Photo	Creative Commons 4.0									
Sources of Sunshine: Thermal and Gravitational Energy			http://cnx.org/contents/LnN76Opl@10.4:CsZG-zyz@3/Sources-of-Sunshine-Thermal-an	Creative Commons 4.0									
Mass, Energy, and the Theory of Relativity			http://cnx.org/contents/LnN76Opl@10.4:SMLcREDa@3/Mass-Energy-and-the-Theory-of-	Creative Commons 4.0									
The Solar Interior: Theory			http://cnx.org/contents/LnN76Opl@10.4:gl_QUGNa@3/The-Solar-Interior-Theory	Creative Commons 4.0									
Mini-Lecture - Observing the Sun													
			http://cnx.org/resources/d79d0534acbb1c0d8aed6f3bcac8636df94e0104/OSC_Astro_15_01_Upward.jpg	Creative Commons 4.0	Solar Temperature Profile	Added 4/11							
			https://www.flickr.com/photos/astroporn/7306263360/in/photolist-c8CvxW-EQXrnL-rr4h96-wLr3yT-yXqdb8-rrFbeM-nPJPTb-nuMxuM-8kFyWH-nJzdsA-dW1dHz-aYTgg4-dDHk1J-7S5R2Z-fVKsw-9NEfYQ-9NGKrb-6WVShD-JH4aFk-2yj2LZ-96WH2E-nMS9cf-6Gb5S8-9NEwpU-FURpHx-d3wRf1-P9B9J-9Nv8dj-H5DfGA-HLSyaE-iBFuS-dNQA1i-pBzS6M-c8CyM9-9nYxMw-4ZkPWb-di5KYH-dWofEW-c43pQf-9HR3SN-9f7Xhq-Jacqmi-dfrazv-3pqku-fhwfzs-4HxxMh-pCwRck-yAQEzC-heybst-9WXsf6	Adam Evans/CC 2.0	Hydrogen Alpha Filter								
			http://sdo.gsfc.nasa.gov/assets/img/latest/latest_1024_HMIIC.jpg	NASA/Public Domain	HMI Intensitygram								
			http://sdo.gsfc.nasa.gov/assets/img/latest/latest_1024_HMIB.jpg	NASA/Public Domain	SDO Magnetogram								
			https://www.youtube.com/watch?v=Y48zPbqCbOQ	Standard YouTube LicenseNASA/Public Domain/SDO Image Use Policy at https://sdo.gsfc.nasa.gov/data/rules.php	Swirling Plasma Video								
			https://www.youtube.com/watch?v=vy2v1JbboA8	NASA/Public Domain	Coronal Loops Video								
			http://sdo.gsfc.nasa.gov/assets/img/latest/latest_1024_0193.jpg	NASA/Public Domain	SDO 193 Image								
			http://xrt.cfa.harvard.edu/xpow/20140725.html	NASA/Public Domain	X-ray/solar cycle image								
Mini-Lecture - Space Weather													
			http://helios.gsfc.nasa.gov/parker.gif	NASA/Public Domain	Parker Spiral								
			http://pwg.gsfc.nasa.gov/istp/outreach/images/Gusts/mag8.gif	NASA/Public Domain	Magnetosphere								
			https://www.nasa.gov/images/content/591184main_20110917-aurora-orig_full.jpg	NASA/Public Domain	Aurora/ISS								
			https://www.youtube.com/watch?v=cLLq6plMjU0	Standard YouTube License/Public Domain	Comparing CME's	NASA has video as public domain on YouTube							
			https://www.youtube.com/watch?v=0vY4nDPrEKg	Standard YouTube License/Public Domain	Magnetic Reconnection	NASA has video as public domain on YouTube							
			https://mms.gsfc.nasa.gov/index.html	NASA/Public Domain	NASA MMS Mission	Added 4/11							
			http://www.swpc.noaa.gov/	NOAA/Public Domain - http://www.weather.gov/disclaimer	NOAA Space Weather Prediction Center	Added 4/11							
Discussion													
			https://sdo.gsfc.nasa.gov/	NASA/Public Domain SDO image use policy at https://sdo.gsfc.nasa.gov/data/rules.php	SDO Home Page	Added 4/11							
			https://www.youtube.com/user/SDOmission2009/featured	NASA/Public Domain	SDO YouTube Channel	Added 4/11							
			https://sdo.gsfc.nasa.gov/data/	NASA/Public Domain	SDO The Sun Now Page	Added 4/11							
Quiz						Added 4/11							
Module/Submodule	Learning Outcome(s)	Assessment Approach	OER Provided (Add url)	License	Section of OER Used/Notes								
This is how you structure your course thematically or chronologically, which might be represented in an LMS by modules or folders (eg, Topic A, Week 1).	List learning outcomes included in this module/submodule, identifing something students will know or be able to do after this unit of your course.	An assessment measures a student's knowledge of a task or an ability connected to a learning outcome. This may a quiz, an essay, a group project, etc.	For every unit, identify content either from sources like the Lumen Catalog or other OER sources. Copy the URL into the box below to support the learning outcome you are assessing for this unit.	Record the license of the content provided to the best of your knowledge. Make a note here if you are unsure.	In this column, make notes about what part of the content you are using. If you are using the entire resource at the URL supplied, you can leave this column blank.								

Module 6 - Stellar Properties	Stellar interiors, H-R Diagram, Stellar evolution, black holes	Quiz, Written Assignment, Discussion											
The Brightness of Stars			https://cnx.org/contents/LnN76Opl@10.4:wuMB6ADX@3/The-Brightness-of-Stars	Creative Commons 4.0									
Colors of Stars			https://cnx.org/contents/LnN76Opl@10.4:rgOzKDDn@3/Colors-of-Stars	Creative Commons 4.0									
The Spectra of Stars			https://cnx.org/contents/LnN76Opl@10.4:0SYWN25y@3/The-Spectra-of-Stars-and-Brown	Creative Commons 4.0	Cut Anne Cannon bio								
Using Spectra to Measure Stellar Radius			https://cnx.org/contents/LnN76Opl@10.4:FnqgpXUw@3/Using-Spectra-to-Measure-Stell	Creative Commons 4.0	Cut philantrophy section								
Measuring Stellar Masses			https://cnx.org/contents/LnN76Opl@10.4:frkEkVIG@3/Measuring-Stellar-Masses	Creative Commons 4.0									
The H-R Diagram			https://cnx.org/contents/LnN76Opl@10.4:EVgehrPG@5/The-HR-Diagram	Creative Commons 4.0	Cut Norris bio								
Star Formation			https://cnx.org/contents/LnN76Opl@10.4:0FZFaC5_@3/Star-Formation	Creative Commons 4.0									
The H-R Diagram and Study of Stellar Evolution			https://cnx.org/contents/LnN76Opl@10.4:yAuFXru5@4/The-HR-Diagram-and-the-Study-o	Creative Commons 4.0									
Evolution from Main Sequence to Red Giants			https://cnx.org/contents/LnN76Opl@10.4:im49RUTc@4/Evolution-from-the-Main-Sequen	Creative Commons 4.0									
Star Clusters			https://cnx.org/contents/LnN76Opl@10.4:IshEbK-l@3/Star-Clusters	Creative Commons 4.0									
The Death of Low-Mass Stars			https://cnx.org/contents/LnN76Opl@10.4:kV4_uzDo@3/The-Death-of-Low-Mass-Stars	Creative Commons 4.0	Cut Chandra bio								
Evolution of Massive Stars: An Explosive Finish			https://cnx.org/contents/LnN76Opl@10.4:7KoamNaW@3/Evolution-of-Massive-Stars-An-	Creative Commons 4.0									
Pulsars and the Discovery of Neutron Stars			https://cnx.org/contents/LnN76Opl@10.4:v-2IbQIC@3/Pulsars-and-the-Discovery-of-N	Creative Commons 4.0									
Black Holes			https://cnx.org/contents/LnN76Opl@10.4:Nm5VnVCq@3/Black-Holes	Creative Commons 4.0									
Mini-Lecture - Properties of Stars													
Mini-Lecture - Wien's Law - A Review													
			https://cnx.org/resources/4bcd191af930a31161bea60dfecd58d2dcc1c799/OSC_Astro_05_02_Illustrate.jpg	Creative Commons 4.0	Temperature vs color image								
Mini-Lecture - Hipparcos/Gaia													
			https://en.wikipedia.org/wiki/Hipparcos#/media/File:Hipparcos-testing-estec.jpg	Michael Perryman/CC 3.0	Hipparcos during testing image								
			http://sci.esa.int/science-e-media/img/be/real_hr.jpg	ESA/Public Domain	H-R Diagram, ESA image use policy: http://www.esa.int/spaceinimages/ESA_Multimedia/Copyright_Notice_Images								
			https://www.cosmos.esa.int/web/hipparcos	Supplemental/ESA	ESA Hipparcos homepage	Added 4/11							
			https://www.cosmos.esa.int/web/hipparcos/examples-part-a	Supplemental/ESA	Hipparcos light curves	Added 4/11							
			https://www.cosmos.esa.int/web/hipparcos/poster	Supplemental/ESA	Hipparcos mission poster	Added 4/11							
			http://sci.esa.int/gaia/	Supplemental/ESA	Gaia homepage	Added 4/11							
Quiz													
Written Assignment													
			https://commons.wikimedia.org/wiki/File:HRDiagram.png	CC 2.5 Richard Powell	H-R Diagram	Added 4/11							
Discussion													
			http://images.nrao.edu/	CC 3.0 NRAO image use policy: http://images.nrao.edu/image_use.shtml	NRAO Image Gallary	Added 4/11							
			https://public.nrao.edu/radio-astronomy/	CC 3.0 NRAO image use policy: http://images.nrao.edu/image_use.shtml	NRAO Learn About Radio Astronomy	Added 4/11							
			http://www.spitzer.caltech.edu/search/image_set/20?by_type=astronomical&tabs=hidden	NASA/Public Domain http://www.spitzer.caltech.edu/info/18-Image-Use-Policy	Spitzer Image Gallery	Added 4/11							
			http://www.spitzer.caltech.edu/mission	Supplemental	About Spitzer	Added 4/11							
			http://chandra.harvard.edu/photo/category.html	NASA/Public Domain http://chandra.harvard.edu/photo/image_use.html	Chandra Image Gallery	Added 4/11							
			http://chandra.harvard.edu/about/index.html	Supplemental	About Chandra	Added 4/11							
Module 7 - Galaxies	Develope understanding of the structure, origin, and evolution of galaxies	Quiz, Discussion											
The Architecture of the Galaxy			https://cnx.org/contents/LnN76Opl@10.4:gMCMuLDK/The-Architecture-of-the-Galaxy	Creative Commons 4.0									
Spiral Structure			https://cnx.org/contents/LnN76Opl@10.4:5a4wvb6g@3/Spiral-Structure	Creative Commons 4.0									
The Mass of the Galaxy			https://cnx.org/contents/LnN76Opl@10.4:NjfmkgRV@3/The-Mass-of-the-Galaxy	Creative Commons 4.0									
The Center of the Galaxy			https://cnx.org/contents/LnN76Opl@10.4:W-oyGU7T@3/The-Center-of-the-Galaxy	Creative Commons 4.0	Cut Ghez bio								
Stellar Populations of the Galaxy			https://cnx.org/contents/LnN76Opl@10.4:QtZ47vTr@3/Stellar-Populations-in-the-Gal	Creative Commons 4.0									

The Discovery of Galaxies			https://cnx.org/contents/LnN76OpI@10.4:cge_A_Qx@3/The-Discovery-of-Galaxies	Creative Commons 4.0									
Types of Galaxies			https://cnx.org/contents/LnN76OpI@10.4:lwGwW2LK/Types-of-Galaxies	Creative Commons 4.0									
Properties of Galaxies			https://cnx.org/contents/LnN76OpI@10.4:1G3DS4T6/Properties-of-Galaxies	Creative Commons 4.0									
Quasars			https://cnx.org/contents/LnN76OpI@10.4:l2zR1fo3@3/Quasars	Creative Commons 4.0	Cut out recession speed of quasar example, Earlier Evidence								
Galaxy Mergers and Active Galactic Nuclei			https://cnx.org/contents/LnN76OpI@10.4:BrQ0FoVZ@3/Galaxy-Mergers-and-Active-Gala	Creative Commons 4.0	Cut out Geller bio, Example 28.1, Sloan Survey								
The Distribution of Galaxies in Space			https://cnx.org/contents/LnN76OpI@10.4:CcqyeRJV@4/The-Distribution-of-Galaxies-i	Creative Commons 4.0									
Dark Matter			https://cnx.org/contents/LnN76OpI@10.4:sGNHDkxn/The-Challenge-of-Dark-Matter	Creative Commons 4.0	Cut out dark matter in galaxy clusters								
Mini-Lecture: Structure of a Sprial Galaxy													
			https://www.spacetelescope.org/images/heic0506a/	Public Domain/NASA, ESA, S. Beckwith (STScI), and The Hubble Heritage Team STScI/AURA)	M51/Hubble								
			http://images.nrao.edu/336	NRAO/AUI/CC 3.0	M51/Radio								
			http://www.spitzer.caltech.edu/images/1324-ssc2004-19a2-Spitzer-View-of-the-Spiral-Galaxy-M51-Whirlpool-Galaxy-	NASA/Public Domain	M51/Spitzer								
			http://astronomy2009.nasa.gov/images/observe/apr/LB/04large.jpg	NASA/JPLPublic Domain	M51/GALEX								
			http://chandra.harvard.edu/photo/2007/m51/m51_xray.jpg	NASA/Public Domain	M51/Chandra								
			http://www.jpl.nasa.gov/spaceimages/details.php?id=PIA10200	Public Domain/NASA/CXC; UV: NASA/JPL-Caltech; Optical: NASA/ESA/STScI/AURA; IR: NASA/JPL-Caltech/ Univ. of Ariz	M51/Composite								
Mini Lecture: Astronomy-A Look into the Future													
			https://www.youtube.com/watch?v=w-aKyqyY36I	Standard YouTube License/Supplemenal	GMT	Added 4/19							
			http://www.eso.org/public/videos/eso1018f/	Standard YouTube LicenseESO/H. Carrasco CC 4.0 : http://www.eso.org/public/outreach/copyright/	E-ELT								
			https://www.youtube.com/watch?v=T5HCy7oqgJg	Standard YouTube License/NASA/Public Domain	JWST	Added 4/19							
			http://www.gmto.org/	Supplemental	GMT Homepage	Added 4/13							
			http://www.eso.org/public/teles-instr/e-elt/	Supplemental	ESO Homepage	Added 4/13							
			https://www.jwst.nasa.gov/	Supplemental	JWST Homepage	Added 4/13							
			http://www.tmt.org/	Supplemental	TMT Homepage	Added 4/13							
Quiz													
Discussion													
			https://www.spacetelescope.org/images/viewall/	CC 4.0	Hubble Image Archive	Added 4/12							
Module 8 - Cosmology	Study of the Big Bang, Dark Energy, Inflation	Quiz, Discussion											
The Age of the Universe			https://cnx.org/contents/LnN76OpI@10.4:gaxlEvMn/The-Age-of-the-Universe	Creative Commons 4.0									
A Model of the Universe			https://cnx.org/contents/LnN76OpI@10.4:3wodX7JB@3/A-Model-of-the-Universe	Creative Commons 4.0									
The Beginning of the Universe			https://cnx.org/contents/LnN76OpI@10.4:qhZa6WaB@4/The-Beginning-of-the-Universe	Creative Commons 4.0									
The Cosmic Microwave Background			https://cnx.org/contents/LnN76OpI@10.4:LQazOYIw@3/The-Cosmic-Microwave-Backgroun	Creative Commons 4.0									
What is the Universe Really Made Of			https://cnx.org/contents/LnN76OpI@10.4:aiQnHGyf@3/What-Is-the-Universe-Really-Ma	Creative Commons 4.0	Composition section only								
The Inflationary Universe			https://cnx.org/contents/LnN76OpI@10.4:D_efDxPD@3/The-Inflationary-Universe	Creative Commons 4.0									
Mini-Lecture: Relativity													
			https://en.wikipedia.org/wiki/Tests_of_general_relativity#/media/File:Apsidendrehung.png	Rainer Zenz/Public Domain	Mercury Precession								
			https://commons.wikimedia.org/wiki/File:Einstein_patentoffice_full.jpg	Histroical Museum of Berne/Public Domain	Einstein/1905								
			https://www.youtube.com/watch?v=4yyb_RNJWUM	Standard YouTube License/Supplemental	Gravity from Newton to Einstein								
			https://commons.wikimedia.org/wiki/File:1919_eclipse_negative.jpg	Public Domain/F. W. Dyson, A. S. Eddington, and C. Davidson	1919 Eclipse								

			http://sci.esa.int/observational-astronomy/37889-overview/?fbodylongid=1786	ESA/Public Domain	Gravitational Bending	
			http://query.nytimes.com/mem/archive-free/pdf?res=9B0DE3DF1E38EE32A25753C1A9679D946896D6CF	Supplemental	NY Times Lights All Askew in the Heavens, November 10, 1919	Added 4/13
			https://www.ibiblio.org/ebooks/Einstein/Einstein_Relativity.pdf	Supplemental/Public Domain	Relativity: The Special & General Theory	Added 4/13
Mini-Lecture: Astronomy After the Course (Optional)						
			http://kopernikastro.org/	Supplemental	Kopernik Astronomical Society	Added 4/13
			http://www.kopernik.org/	Supplemental	Kopernik Observatory	Added 4/13
			http://www.aaa.org/	Supplemental	Amateur Astronomers Assn of NY	Added 4/13
			http://www.astro.cornell.edu/outreach.html	Supplemental	Cornell Astronomy Outreach	Added 4/13
			http://astro.cornell.edu/events/colloquia.html	Supplemental	Cornell Astronomy Colloquia	Added 4/13
			http://outreach.astro.columbia.edu/index.html	Supplemental	Columbia Astronomy Outreach	Added 4/13
			https://www.perimeterinstitute.ca/	Supplemental	Perimeter Institute	Added 4/13
			https://www.youtube.com/user/NASAexplorer	Supplemental	NASA Goddard YouTube Channel	Added 4/13
			https://www.youtube.com/user/JPLnews	Supplemental	NASA JPL YouTube Channel	Added 4/13
			https://www.youtube.com/user/NatureVideoChannel	Supplemental	Nature YouTube Channel	Added 4/13
			https://www.coursera.org/	Supplemental	Coursera	Added 4/13
			https://www.coursera.org/courses?languages=en&query=astronomy	Supplemental	Coursea Astronomy	Added 4/13
			https://www.zooniverse.org/projects?status=live	Supplemental	Zooniverse	Added 4/13
Research Paper						
Quiz						
Discussion						

Course:

Faculty Developer(s):

Email(s):

OER Sources

Module/Submodule	Learning Outcome(s)	Assessment Approach	OER Provided (Add url)	License	Section of OER Used/Notes
This is how you structure your course thematically or chronologically, which might be represented in an LMS by modules or folders (eg, Topic A, Week 1).	List learning outcomes included in this module/submodule, identifing something students will know or be able to do after this unit of your course.	An assessment measures a student's knowledge of a task or an ability connected to a learning outcome. This may a quiz, an essay, a group project, etc.	For every unit, identify content either from sources like the Lumen Catalog or other OER sources. Copy the URL into the box below to support the learning outcome you are assessing for this unit.	Record the license of the content provided to the best of your knowledge. Make a note here if you are unsure.	In this column, make notes about what part of the content you are using. If you are using the entire resource at the URL supplied, you can leave this column blank.

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Module/Submodule	Learning Outcome(s)	Assessment Approach	OER Provided (Add url)	License	Section of OER Used/Notes
This is how you structure your course thematically or chronologically, which might be represented in an LMS by modules or folders (eg, Topic A, Week 1).	List learning outcomes included in this module/submodule, identifing something students will know or be able to do after this unit of your course.	An assessment measures a student's knowledge of a task or an ability connected to a learning outcome. This may a quiz, an essay, a group project, etc.	For every unit, identify content either from sources like the Lumen Catalog or other OER sources. Copy the URL into the box below to support the learning outcome you are assessing for this unit.	Record the license of the content provided to the best of your knowledge. Make a note here if you are unsure.	In this column, make notes about what part of the content you are using. If you are using the entire resource at the URL supplied, you can leave this column blank.

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Module/Submodule	Learning Outcome(s)	Assessment Approach	OER Provided (Add url)	License	Section of OER Used/Notes

This is how you structure your course thematically or chronologically, which might be represented in an LMS by modules or folders (eg, Topic A, Week 1).	List learning outcomes included in this module/submodule, identifing something students will know or be able to do after this unit of your course.	An assessment measures a student's knowledge of a task or an ability connected to a learning outcome. This may a quiz, an essay, a group project, etc.	For every unit, identify content either from sources like the Lumen Catalog or other OER sources. Copy the URL into the box below to support the learning outcome you are assessing for this unit.	Record the license of the content provided to the best of your knowledge. Make a note here if you are unsure.	In this column, make notes about what part of the content you are using. If you are using the entire resource at the URL supplied, you can leave this column blank.

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Module/Submodule	Learning Outcome(s)	Assessment Approach	OER Provided (Add url)	License	Section of OER Used/Notes
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Module/Submodule	Learning Outcome(s)	Assessment Approach	OER Provided (Add url)	License	Section of OER Used/Notes
This is how you structure your course thematically or chronologically, which might be represented in an LMS by modules or folders (eg, Topic A, Week 1).	List learning outcomes included in this module/submodule, identifing something students will know or be able to do after this unit of your course.	An assessment measures a student's knowledge of a task or an ability connected to a learning outcome. This may a quiz, an essay, a group project, etc.	For every unit, identify content either from sources like the Lumen Catalog or other OER sources. Copy the URL into the box below to support the learning outcome you are assessing for this unit.	Record the license of the content provided to the best of your knowledge. Make a note here if you are unsure.	In this column, make notes about what part of the content you are using. If you are using the entire resource at the URL supplied, you can leave this column blank.

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Module/Submodule	Learning Outcome(s)	Assessment Approach	OER Provided (Add url)	License	Section of OER Used/Notes
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