No.	Information on Every Subject	
1.	Unit Name:	Corrosion Engineering I
2.	Unit Code:	Met-51061
3.	Classification:	Engineering Subject
4.	Credit Value:	2.5
5.	Semester/Year Offered:	1/2
6.	Pre – requisite:	
7.	Mode of Delivery:	Lecture, Tutorial, Practical
8.	Assessment System and Breakdown of Marks:	
	Test, Assignment	15%,15%
	Mid – term/Final Examination	70%
9.	Academic Staff Teaching Unit:	Professor
10.	Course outcome of unit: • The cost and the corrosion resistance of the material usually are the most important properties in most engineering application, requiring high chemical resistance. • Understanding and controlling of corrosion will be utilized • Determine (uniform corrosion, galvanic corrosion, crevice corrosion, pitting, intergranular corrosion and selective leaching) their characteristics, mechanisms, and preventive measure.	
11.	Synopsis of unit: Theoretical discussion on corrosion and oxidation of metal and alloys under varying environmental condition, principles of corrosion testing, inhibition, passivation and use of anodic protection.	
12.	Topic Chapter 1.Course Introduction -Corrosion Engineering -Environments -Corrosion Damage -Classification of Corrosion. 2. Corrosion Principles -Corrosion Rate Expressions -Electrochemical Aspects -Environmental Effects -Metallurgical and other aspects 3. Eight forms of Corrosion -Uniform attack -Galvanic or two metal corrosion -pitting -Intergranular corrosion	

	-Selective Leaching
13.	Main references: Corrosion Engineering. Mar G Fontana, Third Edition.
14.	Additional reference: The Science and Engineering of Materials, Six Edition, Donald R. Askeland

List of Practical

Lab	Activity	Contact Hours
1	Topic: Uniform corrosion (with video)	
2	Topic: Crevice corrosion (with video)	
3	Topic: Galvanic cell (with video)	

No.	Information on subject (2019-2020)	
1.	Unit Name:	Humanities and Social Science
2.	Unit Code:	HSS 51011
3.	Classification:	Compulsory Subject
4.	Credit Value:	2
5.	Semester/Year Offered:	1/5
6.	Pre – requisite:	
7.	Mode of Delivery:	Lecture, Tutorial, Assignment, Activity
8.	Assessment System and Breakdown of Marks:	
	Test	40 %
9.	Academic Staff Teaching Unit:	Demonstrator
10.	Course outcome of unit: In this course, students will be able to ❖ Compare and contrast living condition across different societies and identify skill used in social science and different subjects studied in social science ❖ Identify rationalist and empiricist ideas about the nature of knowledge and rule-based and consequential approaches to ethics ❖ Identify cause and effect in human impacts on the environment ❖ Explain about microeconomics and macroeconomics ❖ Recognize different theories and criticisms of development ❖ Explain importance of public health	
11.	Synopsis of unit: The course covers to help to learn more about social science and humanities, to develop useful social science skills while learning and to reflect upon the main ideas.	
12.	Topic Ch1. Social Sciences and Humanities. – What is social science? – What are the humanities? Ch 2. Philosophy and Ethics – Philosophy – Epistemology – Ethics CH 3. The Environment – What is the environment? – Maintaining a balance in nature – Resources – Human impacts on the environment Ch 4. Economics – What is economics? – Microeconomics – Macroeconomics	

	– Economic indicators – Taxes and fiscal policy – International trade Ch 5. Development – What Is Development? – A History of Development – Economic Development – Criticisms of 'Economic Development' Models – Measuring Development – Measuring Poverty – Social and Community Development – Sustainable Development and the SDGs – Impacts of Development Ch 6. Public Health – Health – Public Health – Public Health Policy
13.	Main references: Social Science and the Humanities (Mote Oo)
14.	Additional reading materials: Histories of Burma, ASEAN

No	Information of Metal Process Engineering (2019-2020)	
1	Unit name:	Metal Process Engineering
2	Code:	Met- 51024
3	Classification:	Engineering subject
4	SLT Credit value:	2
5	Semester/ Year Offered:	1/5
6	Pre-requisite:	-
7	Mode of delivery:	Lecture, Tutorial, Practical
8	Assessment system and breakdown of marks:	
	Test (Tutorial, lab report)	30%
	Mid-term Examination	70%
9	Academic Staff Teaching Unit:	1
10	Course outcome of unit: In this course, students will be able to - describe the classification of metal forming processes and powder metallurgy and joining processes - identify the techniques for each manufacturing process -solve the problems relative to the forming processes	
11	Synopsis of unit: The course examines the production techniques of metal forming. Particular emphasis is given to the powder metallurgy of metal powder production techniques and production of metal powder products. Chapter 2 includes bulk metal forming, fundamental of metal forming. In chapter 3 describes bulk metal forming processes in metal working such as rolling, forging, extrusion and wire and bar drawing processes. Chapter 4 is sheet metal working processes. Chapter 5 is fundamentals of welding and chapter 6 is welding processes: arc welding, resistance welding, oxygen welding, other fusion welding processes. In chapter 7 will study production planning and control.	
12	Topic: Chapter-1 POWDER METALLURGY - Characterization of Engineering Powders	

- Production of Metallic Powders
- Conventional Pressing and Sintering
- Alternative Pressing and Sintering Techniques
- Materials and Products for Powder Metallurgy
- Design Considerations in Powder Metallurgy

Chapter-2
Metal Forming and Sheet Metalworking

- FUNDAMENTALS OF METAL FORMING
- Overview of Metal Forming
- Material Behavior in Metal Forming
- Temperature in Metal Forming
- Strain Rate Sensitivity
- Friction and Lubrication in Metal Forming

Chapter-3
BULK DEFORMATION PROCESSES IN METALWORKING

- Rolling
- Other Deformation Processes Related to Rolling
- Forging
- Other Deformation Processes Related to Forging
- Extrusion
- Wire and Bar Drawing

Chapter -4
SHEET METALWORKING

- Cutting Operations
- Bending Operations
- Drawing
- Other Sheet-Metal-Forming Operations
- Dies and Presses for Sheet-Metal Processes
- Sheet-Metal Operations Not Performed on Presses
- Bending of Tube Stock

Chapter-5
PRODUCTION PLANNING AND CONTROL

- Aggregate Planning and the Master Production Schedule
- Inventory Control
- Material and Capacity Requirements Planning
- Just-In-Time and Lean Production
- Shop Floor Control

14	Main Reference - Fundamentals of Modern Manufacturing, Mikell P. Groover, 4th Edition
15	Additional references: - Manufacturing Processes, H.N. Gupta, Second Edition

No	Information of Characterization of Materials (2019-2020)	
1	Unit name:	Characterization of Materials
2	Code:	Met- 51051
3	Classification:	Engineering subject
4	Credit value:	3
5	Semester/ Year Offered:	1/5
6	Pre-requisite:	
7	Mode of delivery:	Lecture, Tutorial, Assignment
8	Assessment system and breakdown of marks:	
	Test	30%
	Mid-term/ final Examination	70%
9	Academic staff teaching unit:	1
10	Course outcome of unit: In this course, students will be able to - apply the varieties of microscopic and X-ray spectroscopic techniques. - identify the methodologies and applications various characterization techniques. - use the modern instruments for characterizing materials.	
11	Synopsis of unit: The course describes light microscopy, X-ray diffraction methods (XRD), transmission electron microscopy (TEM), scanning electron microscopy (SEM) and X-rays fluorescence for elementals analysis (XRF), atomic absorption spectroscopy (AAS), thermal analysis and non-destructive testing techniques. How to characterize and determine chemical compositions & to observe internal structure.	

12	Topic: Chapter 1 **Light Microscopy** Optical Principles Image Formation Resolution Effective Magnification Brightness and Contrast Depth of Field Aberrations Instrumentation, Illumination System, Objective Lens and Eyepiece Steps for Optimum Resolution Steps to Improve Depth of Field Specimen Preparation: Sectioning, Cutting, Microtomy, Mounting, Grinding and Polishing, Etching Imaging Modes Bright-Field and Dark-Field Imaging Phase-Contrast Microscopy Polarized-Light Microscopy Nomarski Microscopy Fluorescence Microscopy Confocal Microscopy Working Principles Three-Dimensional Images Chapter 2 **X-Ray Diffraction Methods** X-Ray Radiation Generation of X-Rays X-Ray Absorption Theoretical Background of Diffraction Diffraction Geometry Bragg's Law Reciprocal Lattice Ewald Sphere Diffraction Intensity Structure Extinction X-Ray Diffractometry Instrumentation Samples and Data Acquisition Sample Preparation Acquisition and Treatment of Diffraction Data Preferential Orientation Crystallite Size Residual Stress Applications Crystal-Phase Identification

	Quantitative Measurement Chapter 3 **Transmission Electron Microscopy** Instrumentation Electron Sources Thermionic Emission Gun Field Emission Gun Electromagnetic Lenses Specimen Stage Specimen Preparation Pre-thinning Final Thinning Electrolytic Thinning Ion Milling Ultramicrotomy Image Modes Mass–Density Contrast Diffraction Contrast Phase Contrast Selected-Area Diffraction (SAD) Selected-Area Diffraction Characteristics Single-Crystal Diffraction Identification of Crystal Phases Multicrystal Diffraction Images of Crystal Defects Dislocations Chapter 4 **Scanning Electron Microscopy** Instrumentation Optical Arrangement Signal Detection Detector Probe Size and Current Contrast Formation Electron–Specimen Interactions Topographic Contrast Compositional Contrast Working Distance and Aperture Size Acceleration Voltage and Probe Current Astigmatism Specimen Preparation Preparation for Topographic Examination Charging and Its Prevention Preparation for Microcomposition Examination Electron Backscatter Diffraction Applications of EBSD

	Environmental SEM Chapter 5 **X-Ray Spectroscopy for Elemental Analysis** Features of Characteristic X-Rays Types of Characteristic X-Rays Selection Rules Comparison of K, L, and M Series X-Ray Fluorescence Spectrometry Wavelength Dispersive Spectroscopy Analyzing Crystal Wavelength Dispersive Spectra Energy Dispersive Spectroscopy Detector Energy Dispersive Spectra Advances in Energy Dispersive Spectroscopy XRF Working Atmosphere and Sample Preparation Energy Dispersive Spectroscopy in Electron Microscopes Scanning Modes Qualitative and Quantitative Analysis Qualitative Analysis Quantitative Analysis Quantitative Analysis by X-Ray Fluorescence Chapter 6 **Thermal Analysis** Common Characteristics Thermal Events Enthalpy Change Instrumentation Experimental Parameters Differential Thermal Analysis and Differential Scanning Calorimetry Working Principles Differential Thermal Analysis Differential Scanning Calorimetry Temperature-Modulated Differential Scanning Calorimetry Experimental Aspects Sample Requirements Baseline Determination Effects of Scanning Rate Measurement of Temperature and Enthalpy Change Transition Temperatures Measurement of Enthalpy Change Calibration of Temperature and Enthalpy Change Applications Determination of Heat Capacity Determination of Phase Transformation and Phase Diagrams Applications to Polymers

	Thermogravimetry Instrumentation Experimental Aspects Samples Atmosphere Temperature Calibration Heating Rate Interpretation of Thermogravimetric Curves Types of Curves Temperature Determination Applications Chapter 7 **Atomic Absorption Spectrometry (AAS)** Introduction Basic principle Flame AAS Atomic Absorption Spectrometry with graphite furnace (GFAA) Chapter 8 **Non-destructive testing Methods**
14	Main Reference - Materials Characterization- An introduction to Microscopic and Spectroscopic Methods, Yang Leng, 2nd edition
15	Additional references: - Elements of Physical Metallurgy, Albert G. Guy and John J. HREN, 3rd Edition - Solid State Chemistry and Its Applications

No	Information on subject (2019-2020)	
1	Unit name	Non ferrous and ferrous metallurgy I
2	Code	Met-51016
3	Classification	Engineering subject
4	Credit value	2.5
5	Semester/Year offered	1/5
6	Pre-requisite	Engineering chemistry
7	Mode of delivery	Lecture, Tutorial and Assignment
8	Assessment system and breakdown of marks	
	Test	30%
	Mid-term/ final examination	70%
9	Academic staff teaching unit	
10	Course outcome of unit; In this course, students will be able a. to explain the types of ores, occurrence and extraction methods of these materials b. to understand the mechanism of different types of metallurgical furnaces c. to select the extraction method depending on the type of mineral and concentrate d. to solve the non ferrous metal extraction problems	
11	Synopsis of unit; The course covers about the non ferrous metal. This course contains the extraction method of gold, copper, zinc, lead, tin and silver and the extraction problems concerned with cyanidation and distillation.	
12	Topic 1 Gold 2 Copper 3 Zinc 4 Lead 5 Tin 6 Silver -Problems [cyanidation and distillation]	

13	Main reference; W.H.Dennis: Metallurgy of the non ferrous metals Tarkel Rosenqvist; Principles of extractive metallurgy Allison Butts; Metallurgical problems
14	Addition Reading Material;

No	Information on Every subject	
1	Unit name	Industrial Management I
2	Code	Met-51022
3	Classification	Engineering subject
4	Credit value	2 SLT credit
5	Semester/Year offered	1/5
6	Pre-requisite	HSS-51011
7	Mode of delivery	Lecture, Tutorial and Assignment
8	Assessment system and breakdown of marks	
	Assignment	15%
	Tutorial	15%
	Mid-term/ final examination	70%
9	Academic staff teaching unit	
10	Course outcome of unit; 1. Management graduates will demonstrate an understanding of the functional areas of accounting, marketing, finance, management, and economics. 2. Management graduates will demonstrate an understanding of the legal and social environment of business. 3. Management graduates will demonstrate an ability to use business tools. 4. To understand the motion and time study	
11	Synopsis of unit; Engineering and management are used to much administrative process, organization; occupational career, discipline etc. demonstrate the application of management skill in planning and industrial.	
12	Topic 1. Management 2. Decision Making 3. Operation Research 4. Managerial	

	5. Planning and Location the plant 6. Motion and Time study
13	Main reference; • Production management and control lecture note by U Aung Maw • Production Management and control lecture note by U Mya Tin Oo, BE(Met), M.Sc (UNSW), Lecturer, Department of Metallurgical Engineering and Materials Science, YTU
14	Addition Reading Material; • Management in Industry (2nd Edition 1965) by Claude S.George.JR • Accounting Made Simple (1981) by Joseph.P. Simini • Project Management with CPM, PERT and Precedence Diagramming (3rd Edition 1983) by Moder, Philips & Dowis. • Quantitive Methods (1988) By D Downing & J Clark. • Quantitive Methods in Management (1976) by John E Ullmann.