

JAYPEE INSTITUTE OF INFORMATION  
TECHNOLOGY

M.Sc. MICROBIOLOGY  
(I SEMESTER)

2023-2024

**Detailed Syllabus**  
**Lecture-wise Breakup**

<b>Course Code</b>	15B1NBT832	<b>Semester</b> Odd (specify Odd/Even)	<b>Semester B Tech</b> VII/ Integrated VII/M Sc ( Micro) I/ MSc (Env Biotech) I <b>Session</b> 2023-2024 <b>Month</b> July to December
<b>Course Name</b>	Biostatistics and Its applications		
<b>Credits</b>	4	<b>Contact Hours</b>	4

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Shalini Mani
	<b>Teacher(s) (Alphabetically)</b>	Shalini Mani

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
<b>C430-3.1</b>	Explain the various statistical methods to design biological studies and data representation.	Understanding (Level 2)
<b>C430-3.2</b>	Apply different statistical methods and approaches to study the significance of a study.	Apply (Level 3)
<b>C430-3.3</b>	Examine the relationship between different parameters of a study.	Analyze (Level 4)
<b>C430-3.4</b>	Choose appropriate statistical methods, tools and resources including prediction, validation and evaluation of the biological studies.	Evaluate (Level 5)

<b>Module No.</b>	<b>Title of the Module</b>	<b>Topics in the Module</b>	<b>No. of Lectures for the module</b>
1.	Introduction	Application and use of Biostatistics as a science, scope.	<b>1</b>
2.	Study design in various fields of research	general principles of study design and its implications for valid inference	<b>1</b>
3.	Sampling theory	Sampling scheme, simple/ systematic/ stratified/ cluster sampling, Sources of data collection	<b>2</b>
4.	Data presentation	Graphical, tabular, Mathematical, finding the central tendency, measure of variations	<b>3</b>
5.	Overview of different statistical methods used in the field of biological sciences.	Hypothesis testing, T-test, Chi square test, ANOVA, Sign Test, Wilcoxon Signed Rank Test, Wilcoxon Rank Sum Test, odds ratio, Binomial/normal/Poisson distribution of probabilities, determination of power of study and sample size calculation, regression analysis, correlation analysis,	<b>13</b>

6.	Analysis of data source	Assess data sources and data quality for the purpose of selecting appropriate data for specific research questions	<b>3</b>
7.	Selection of statistical methods	Identifying the appropriate statistical methods to be applied in a given research setting, applying the selected methods and analysis.	<b>4</b>
8.	Application of Biostatistical analysis.	Designing various studies of medical/ health/ Microbial/Agricultural/Genetics/Pharmaceutical science related studies. Data analysis using different methods Result interpretation	<b>7</b>
9.	Case studies	Based on various research studies and systematic reviews.	<b>4</b>
10.	SPSS, Stats at the bench	Introduction to SPSS, Entering data in SPSS editor. Solving the compatibility issues with different types of files. SPSS and working with <b>descriptive statistics</b> .	<b>4</b>
<b>Total number of Lectures</b>			<b>42</b>

<b>Evaluation Criteria</b>	
<b>Components</b>	<b>Maximum Marks</b>
T1	20
T2	20
End Semester Examination	35
TA	25 (assignment, class test, quiz)
<b>Total</b>	<b>100</b>

<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. ( Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
<b>1.</b>	Pranab Kumar Banerjee, Introduction to Biostatistics (4 <sup>th</sup> Edition), S Chand and Company, 2015.
<b>2.</b>	Veer Bala Rastogi, Biostatistics (3 <sup>rd</sup> Edition), Medtech, 2015
<b>3.</b>	S. Kartikeyan, R. M. Chaturvedi, R. M. Bhosale, Comprehensive textbook of biostatistics and research methodology(1 <sup>st</sup> Edition), Bhalani Publishing House, 2016
<b>4.</b>	B Antonisamy Prasanna Premkumar Solomon Christopher, Principles and Practice of Biostatistics, Elsevier India, 2017
<b>5.</b>	Susan Holmes, Wolfgang Huber, Modern statistics for Modern Biology. Cambridge University Press, 2019

**Detailed Syllabus**  
**Lecture-wise Breakup**

<b>Course Code</b>	<b>19M21BT113</b>	<b>Semester</b> Odd	<b>Semester</b> M.Sc. Microbiology I <b>Session</b> 2023 -2024 <b>Month from</b> July-December
<b>Course Name</b>	<b>Biomolecules</b>		
<b>Credits</b>	4	<b>Contact Hours</b>	4

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dr. Reema Gabrani
	<b>Teacher(s) (Alphabetically)</b>	Dr. Reema Gabrani, Dr. Shalini Mani

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
<b>C113.1</b>	Explain the biomolecules structure and function	Understand Level (C2)
<b>C113.2</b>	Analyze bioenergetics and metabolic pathways for physiological and pathological conditions	Analyze Level (C4)
<b>C113.3</b>	Apply the concepts of enzymes, hormones and signaling	Applying Level (C3)
<b>C113.4</b>	Illustrate the basics in genomics and proteomics	Understand Level (C2)

<b>Module No.</b>	<b>Title of the Module</b>	<b>Topics in the Module</b>	<b>No. of Lectures for the module</b>
<b>1.</b>	Carbohydrates and Bioenergetics	Chemical composition and bonding; Carbohydrates: Classification, basic chemical structure; General reactions of the functional groups; Physiological significance; Metabolism of carbohydrate: Glycolysis, TCA, gluconeogenesis, PPP, ATP role; Respiratory chain and oxidative phosphorylation	11
<b>2.</b>	Lipids	Classification, structure and function of major lipid subclasses; chylomicrons, LDL, HDL, and VLDL; Pathological changes in lipid levels. Formation of micelles, monolayers, bilayer, liposomes; biosynthesis of fatty acids and ketogenesis	7
<b>3.</b>	Proteins	Amino acids: Classification, Properties, Protein Structure: primary, secondary, tertiary and quaternary structure; separation techniques; biosynthesis of non-essential amino acids and catabolism of protein and amino acids in born errors of metabolism. Enzymes: kinetics, functions	7
<b>4.</b>	Nucleotides	Nucleic acid structure, Nucleotides and nucleosides; metabolism of purines and pyrimidines	6
<b>5.</b>	Hormones	Characteristics of hormones/ signalling molecules; function, signal transduction	6

<b>6.</b>	Introduction to Genomics and proteomics	DNA sequence analysis methods; gene disease association; Introduction and scope of proteomics	5
<b>Total number of Lectures</b>			<b>42</b>

<b>Evaluation Criteria</b>	
<b>Components</b>	<b>Maximum Marks</b>
T1	20
T2	20
End Semester Examination	35
TA	25 (Presentation, Assignments)
<b>Total</b>	<b>100</b>

<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. ( Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
<b>1.</b>	JM Berg, L Stryer, J Tymoczko, G Gatto, “Biochemistry”, 9 <sup>th</sup> Ed. San Francisco, 2019 WH Freeman
<b>2.</b>	Ijsbrand Kramer, “Signal transduction”, Academic Press, 2015 Harper
<b>3.</b>	VW Rodwell, D Bender, K M Botham, P J Kennelly, P A Weil, “Harper’s Illustrated Biochemistry”, 31 <sup>st</sup> Ed. McGraw-Hill Lange 2018
<b>4.</b>	Jeremy M. Berg , “Biochemistry” 8 <sup>th</sup> Ed. W. H. Freeman 2015
<b>5.</b>	DL Nelson and MM Cox, “Lehninger Principles of Biochemistry”, 7 <sup>th</sup> Ed. WH Freeman 2017

**Detailed Syllabus**  
**1. Lab-wise Breakup**

<b>Course Code</b>	19M25BT111	<b>Semester Odd</b> (specify Odd/Even)	<b>Semester I Session 2023-24</b> <b>Month from July-December</b>
<b>Course Name</b>	<b>Microbiology Lab-I</b>		
<b>Credits</b>	4	<b>Contact Hours</b>	8

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dr. Pooja Choudhary
	<b>Teacher(s) (Alphabetically)</b>	Dr. Garima Mathur, Prof. Indira P. Sarethy, Dr. Chakresh Jain, Dr. Pooja Choudhary

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
<b>CO1</b>	Understand various culture media, their applications and methods of sterilization	<b>Understand (Level C2)</b>
<b>CO2</b>	Apply standard microbiological techniques for isolation, culturing and enumeration of microorganisms	<b>Apply (Level C3)</b>
<b>CO3</b>	Make use of different methods for microbial identification and characterization	<b>Apply (Level C3)</b>
<b>CO4</b>	Compare methods of DNA isolation from microorganisms	<b>Analyze (Level C4)</b>

**NEW COs**

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
<b>CO1</b>	Understand various culture media, their applications and methods of sterilization	<b>Understand (Level C2)</b>
<b>CO2</b>	Apply standard microbiological techniques for isolation, culturing and enumeration of microorganisms	<b>Apply (Level C3)</b>
<b>CO3</b>	Apply different methods for microbial identification and characterization	<b>Apply (Level C3)</b>
<b>CO4</b>	Analyze purity of isolated DNA from microorganisms	<b>Analyze (Level C4)</b>

**CO-PO-PSO Mapping**

<b>COs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PSO1</b>
<b>C170.1</b>	2	2	1	2
<b>C170.2</b>	2	2	1	2
<b>C170.3</b>	2	2	2	2
<b>C170.4</b>	2	3	2	2

Module No.	Title of the Module	List of Experiments	Hours
1.	Isolation of microorganisms from different sources	Media preparation & sterilization – Bacteria; Media preparation & sterilization – fungi; Preparation of agar plates and slants; Culturing microorganisms on agar media by streaking / stab / point inoculation; Serial dilution of microbial culture; Estimation of microbial growth by colony counting	Week 1 – Week 3
2.	Characterization of Microorganisms	Microbial diversity – characterization of bacteria & fungi; IMVIC Test; Computational tool for strain identification	Week 4 – Week 6
3.	Microbial Growth	Effect of substrate / culture conditions on microbial growth; To study diauxic growth in bacteria; Data presentation & Analysis	Week 7 – Week 9
4.	Molecular Biology	Isolation of DNA from bacteria; Isolation of bacteria from fungi; Agarose Gel Electrophoresis	Week 10– Week 12
		<b>Total</b>	<b>12</b>
<b>Project Based Learning: Identify various computation tools for characterization of microorganisms.</b>			
<b>Evaluation Criteria</b>			
<b>Components</b>		<b>Maximum Marks</b>	
Mid-Term Viva		20	
Day-to-Day (Lab record, attendance, performance)		60	
Final Viva		20	
<b>Total</b>		<b>100</b>	

<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	<a href="https://microbeonline.com/imvic-tests-principle-procedure-and-results/">https://microbeonline.com/imvic-tests-principle-procedure-and-results/</a>
2.	Vashist Hemraj , Sharma Diksha, Gupta Avneet (2013), A review on commonly used biochemical test for bacteria Innovare Journal of Life Science, Vol 1: Issue 1, 1-7
3.	Manual of Microbiology : Tools and Techniques- Kanika Sharma ISBN 10: 8180520889 / ISBN 13: 9788180520884

**Course Name & Code: Microbial Genetics & Molecular Biology (19M21BT115), NBA Code: C112**

**Detailed Syllabus**

<b>Course Code</b>	<b>19M21BT115 C112</b>	<b>Semester: Even</b>	<b>Semester: I Session: 2023-24 Month from: July to December</b>
<b>Course Name</b>	Microbial Genetics & Molecular Biology		
<b>Credits</b>	3-1	<b>Contact Hours</b>	4

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dr Sonam Chawla
	<b>Teacher(s) (Alphabetically)</b>	Dr Sonam Chawla, Dr Vibha Gupta

<b>S. No.</b>	<b>DESCRIPTION</b>	<b>COGNITIVE LEVEL (BLOOM's TAXONOMY)</b>
CO112.1	Explain fundamental principles of molecular biology	Understanding Level (C2)
CO112.2	Apply knowledge of microbial genome architecture and gene regulation	Apply Level (C3)
CO112.3	Analyse various methods of gene transfer and extrachromosomal inheritance	Analysis Level (C4)
CO112.4	Interpret different aspects of DNA mutations, DNA repair, Linkage & Mapping	Understanding Level (C2)

<b>Module No.</b>	<b>Subtitle of the Module</b>	<b>Topics in the module</b>	<b>No. of Lectures for the module</b>
<b>1.</b>	<b>The nature of Genetic material</b>	Discovery of DNA and experimental evidence, The structure of DNA and RNA; Melting of DNA, Superhelicity, Genome architecture, Chromatin arrangement, nucleosome formation, C value paradox, central dogma	02
<b>2.</b>	<b>DNA replication and repair</b>	DNA replication mechanism, enzymes involved and models of DNA replication, DNA methylation, inhibitors of DNA replication, DNA damage and repair: Molecular basis of spontaneous and induced mutations, types of mutation, Ames test, DNA repair pathways - excision, mismatch, photoreactivation, Double Strand Break Repair	06
<b>3.</b>	<b>DNA transcription</b>	Transcription machinery - various transcription enzymes and cofactors, initiation, elongation and termination, enhancer	07



		sequences and control of transcription, Structure and function of RNA polymerase	
4.	<b>DNA translation</b>	The genetic code and protein structure, Mechanisms of translation - initiation complex, ribosomes and tRNA, factors, elongation and termination, <i>in vitro</i> translation systems, polycistronic/monocistronic synthesis, inhibitors of translation,	06
5.	<b>Methods of gene transfer in Bacteria</b>	Transformation - natural transformation systems, mechanism, chemical-mediated and electro-transformation; Conjugation - nature of donor strains and compatibility, interrupted mating and temporal mapping, F plasmid, Hfr transfer, horizontal gene transfer	04
6.	<b>Plasmids &amp; Movable genetic elements</b>	Plasmid types, detection, replication, partitioning, copy-number control, properties of some known plasmids, Extrachromosomal inheritance	04
7.	<b>Genetic control mechanism in prokaryotes</b>	Operons, lac system, trp system for negative & positive gene regulation, lambda phage, complex operons	06
8.	<b>Viral genome &amp; Methods of gene transfer in Viruses</b>	Introduction to viral genetics, viral life cycles and phage replication, Transduction - Generalized and specialized transduction; gene mapping by specialized transduction	04
9.	<b>Linkage and gene Mapping</b>	Recombination (homo and heterologous), linkage symbolism, single and double cross overs, linkage maps, genetic analysis, Recombination as a molecular biology tool.	03
<b>Total number of Lectures</b>			<b>42</b>
<b>Evaluation Criteria</b>			
<b>Components</b>		<b>Maximum Marks</b>	
T1		20	
T2		20	
End Semester Examination		35	
TA		25	
<b>Total</b>		<b>100</b>	

<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. ( Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	Lewin's Genes XII by Jocelyn E. Krebs, Elliott S. Goldstein and Stephen T. Kilpatrick Jones and Bartlett Publishers, Sudbury, Massachusetts, 2018.
2.	Molecular Biology of the Gene by J.D. Watson, T.A. Baker, S.P. Bell, A. Gann, M. Levin, R. Losick, 7th edition, Benjamin Cummings, San Francisco, USA, 2013.
3.	Molecular Biology of the Cell by B. Alberts, A. Johnson, J. Lewis, M. Raff, K. Roberts, P. Walter, 6th edition, Garland Science, New York and London, 2017.
4.	Lehninger Principles of Biochemistry Seventh Edition – David L. Nelson; Michael M. Cox, 2017
5.	An Introduction to Genetic Analysis by Suzuki DT, Griffiths AJF, Miller JH and Lewontin RC, WH freeman and Company, New York

Project based learning: Students in groups will present applications of microbial mutations and horizontal gene transfer on human health, environment preservation

<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	M. J. Pelczar, E. C. S. Chan and N. R. Krieg. <i>Microbiology: Concepts and Applications</i> . India: Tata McGraw Hill, 1993.

2.	M. T. Madigan, J. M. Martinko and J. Parker. <i>Brock Biology of Microorganisms</i> , 10 <sup>th</sup> Edition. New Jersey, USA: Prentice Hall, 2003.
3.	G. J. Tortora, B. R. Funke and C. L. Case. <i>Microbiology: An Introduction</i> , 8 <sup>th</sup> Edition. San Francisco, USA: Pearson/Benjamin Cummings, 2004.
4.	J. Black. <i>Microbiology: Principles and Applications</i> . New Jersey, USA: Prentice Hall, 2004.
5.	L. M. Prescott, J. P. Harley and D. A. Klein. <i>Microbiology</i> , 6 <sup>th</sup> edition. New York, USA: McGraw Hill, 2005.
6.	E. W. Nester. <i>Microbiology Study Guide</i> . New York, USA: McGraw Hill, 2004.

**Detailed Syllabus**  
**Lecture-wise Breakup**

<b>Course Code</b>	19M11BT111	<b>Semester:</b> Odd	<b>Semester:</b> 1 <sup>st</sup> <b>Session :</b> 2022 -2023 <b>Month from:</b> July to December
<b>Course Name</b>	Microbial physiology and diversity		
<b>Credits</b>	4	<b>Contact Hours</b>	3-1-0

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	
	<b>Teacher(s) (Alphabetically)</b>	Dr. Rajnish Prakash Singh (CC)

<b>Sl. No.</b>	<b>DESCRIPTION</b>	<b>COGNITIVE LEVEL (BLOOM's TAXONOMY)</b>
C110.1	Understand diversity amongst archaea, eubacteria and other microorganisms	Understanding level (Level 2)
C110.2	Understand ecological diversity, habitat interaction and microbial relationship.	Understanding level (Level 2)
C110.3	Apply concepts of microbial nutrition, growth requirements and associated physiological mechanisms leading to microorganism survival	Applying level (Level 3)
C110.4	Analyze the different modes of metabolism in microorganisms.	Analyzing level (Level 4)

<b>Module No.</b>	<b>Title of the Module</b>	<b>Topics in the Module</b>	<b>No. of Lectures for the module</b>
1.	<b>Microbial taxonomy and evolution of diversity</b>	Phylogenetic and genotypic classification, Classic and molecular characteristics, Phylogenetic trees	2
2.	<b>The Archae (Extremophiles and their diversity)</b>	Introduction to Archaeal Taxonomy and Metabolism, <b>Phylum Crenarchaeota:</b> Habitat and energy metabolism, cold dwelling microbes (artic and antartic regions), hyperthermophiles. <b>Phylum Euryarchaeota:</b> extremely halophilicarchea, taxonomy and physiology of halophilicarchea. Methanogens – diversity and physiology. <b>Thermoplasmatales</b> –thermoplasma, <b>Hyperthermophilic euryarcheota:</b> Thermococcales and Methanopyrus.	4
3.	<b>Gram negative and positive eubacteria</b>	Diversity, characteristic features and significance : Spirochaetes - aerobic / microaerophilic motile, helical / vibriod - non motile gram negative curved bacteria - gram negative and positive rod and cocci - gram negative straight, curved & helical rods - sulfur	5

		reducing bacteria - rickettsias and chlamydias – mycoplasmas - endosymbionts. Mycobacteria – Nocardioformis. Anoxygenic phototrophic bacteria – oxygenic photosynthetic bacteria – aerobic chemolithotrophic bacteria – budding and appendaged bacteria – sheathed bacteria – non photosynthetic bacteria - Myxobacteria – archeobacteria.	
4.	<b>Diversity of other microorganisms</b>	Distribution, importance, structure and characteristics of the fungal divisions, slime molds, the algal divisions, protozoans, general properties of viruses, their structures and classification, bacteriophages	7
5.	<b>Microbial Diversity of various habitats</b>	Microorganisms in nature ecosystem, Ecological groups of Microorganisms, Microbial population interactions, Human-Microbe Interactions, The soil habitat, Water as a Microbial Habitat, Microflora of air, Microflora of foodstuff	5
6.	<b>Microbial nutrition and growth</b>	Nutritional requirements of Microorganisms- Autotrophs, Heterotrophs ,Chemotrophs, Copiotrophs and Oligotrophs. Transport Mechanisms - Diffusion- Facilitated Diffusion, Active transport- Group translocation. Different phases of growth - Growth curve - Generation time - Factors influencing microbial growth - Temperature, pH, Pressure, Salt concentration, Nutrients - synchronous growth and continuous cultivation. Diauxic growth, Sporulation - Endospore formation in bacteria. Chemotherapeutic agents as growth inhibitors	5
7.	<b>Bacterial photosynthesis</b>	Photosynthetic microorganisms, photosynthetic pigments, and generation of reducing power by cyclic and non-cyclic photophosphorylation, electron transport chain in photosynthetic bacteria. Carbon dioxide fixation pathways.	5
8.	<b>Bacterial Respiration</b>	Bacterial aerobic respiration, components of electron transport chain, free energy changes and electron transport, oxidative phosphorylation and theories of ATP formation, inhibition of electron transport chain. Electron transport chain in some heterotrophic and chemolithotrophic bacteria. Bacterial anaerobic respiration: Introduction. Nitrate, carbonate and sulfate as electron acceptors. Electron transport chains in some anaerobic bacteria. Catalase, super oxide dismutase, mechanism of oxygen toxicity.	5
9.	<b>Bacterial Chemolithotrophy</b>	Physiological groups of chemolithotrophs, ammonia oxidation by members of Genus Nitroso group, nitrite oxidation by Nitro group of genera. Oxidation of molecular hydrogen by <i>Hydrogenomonas</i> species. Ferrous and sulfur/sulfide oxidation by <i>Thiobacillus</i> species.	4
<b>Total number of Lectures</b>			<b>42</b>

**Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. ( Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)**

1.	Microbial Diversity by Colwd , D. 1999, Academic Press.
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2.	Prescott L M, J P Harley and D A Klein (2005). Microbiology. Sixth edition, International edition, McGraw Hill.
3.	Advances in Applied Microbiology. Vol. 10. Edited by Wayne W. Umbreit and D. Pearlman. Academic Press.
4.	Brocks Biology of Microorganisms. 8th Edition. (International Edition - 1997) by Michael T. Madigan, John M. Martinko. Jack Parker. Prentice Hall International Inc.
5.	Microbial Ecology. Fundamentals and Applications by. Ronald M. Atlas and Richard Bartha. 2nd and 4th Edition. The Benjamin Cummins Publication Co. Inc.
6.	David white. The physiology and biochemistry of prokaryotes. Oxford university press. 4th edition (2011).

<b>Course Code</b>	19M21HS111	<b>Semester: Odd</b>	<b>Semester: 2023-2024</b>
			<b>Month: July-Dec 2023</b>
<b>Course Name</b>	Presentation and Communication Skills		
<b>Credits</b>	2	<b>Contact Hours</b>	2 (2-0-0)

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dr. Ekta Singh
	<b>Teacher(s) (Alphabetically)</b>	Dr. Ekta Singh

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
<b>C101.1</b>	Develop an understanding and appreciate the basics aspects of communication	Understand(C2)
<b>C101.2</b>	Assess the communication challenges of a diverse, global marketplace	Analyze (C4)
<b>C101.3</b>	Create & compose formal reports	Create (C6)
<b>C101.4</b>	Evaluate the effectiveness of business etiquettes and presentation skills	Evaluate (C5)
<b>C101.5</b>	Apply the acquired skills in delivering effective presentations	Apply (C3)

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Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Communication Process, Grammar, and Vocabulary	Communication: Definition, Model, Channel, Goals Process of Communication: Linear Concept, Shannon-Weaver Model, the Two-Way Process Communication Traits: Communication Apprehension, Style, Argumentativeness and Verbal Aggressiveness <ul style="list-style-type: none"> <li>· Grammar: denotative and connotative words, subject-verb agreement</li> <li>· Techniques of Vocabulary Building</li> </ul>	7
2.	Intercultural Communication	<ul style="list-style-type: none"> <li>· Recognizing cultural diverse world</li> <li>· Developing Cultural Intelligence: High-Context Cultures and Low-Context Cultures</li> <li>· Time as a cultural factor: Monochronic and Polychronic Time</li> <li>· Challenges of Intercultural Communication</li> <li>· Developing Cultural for Adapting.</li> </ul>	6

3.	Business Etiquettes, and Presentation Skills	<ul style="list-style-type: none"> <li>· Ekman’s classification of communicative movements</li> <li>· Face Facts, Positive Gestures, Negative Gestures, Lateral Gestures</li> <li>· Preparing and Delivering a Presentation</li> </ul> <p>Using Audio-Visual Aids: Presentation Support</p> <p>Sample Presentations</p>	6				
4.	Communication for Conflict Management	<ul style="list-style-type: none"> <li>• Negotiation, Mediation, and Conciliation</li> <li>• Stages in the Negotiation Process</li> <li>• Strategies of Conciliation</li> <li>• Solving Deadlocks</li> <li>• Reaching an Agreement</li> </ul>	5				
5.	Technical Communication	<ul style="list-style-type: none"> <li>• Characteristics of a Report</li> <li>• Types of Report</li> <li>• 5 W’s and 1 H of a Report</li> <li>• Structure, Format, Parts of a Report</li> <li>• Referencing, and Documentation</li> </ul>	4				
			<b>2 8</b>				
<p><b>Evaluation Criteria</b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;"><b>Components</b></th> <th style="text-align: center;"><b>Maximum Marks</b></th> </tr> </thead> <tbody> <tr> <td style="height: 100px;"></td> <td></td> </tr> </tbody> </table>				<b>Components</b>	<b>Maximum Marks</b>		
<b>Components</b>	<b>Maximum Marks</b>						



Mid Term Examination	30
(Presentation)	40
	30 (Assignment/Participation)
End Semester Examination	<b>100</b>
TA	
<b>Total</b>	

**Project Based Learning:** Students will be given a project which would require them to work in groups of 5-6 members, identify a TEDTalk and analyse its significance/relevance to the course. While the task of identifying the talk would help them revisit the entire course, analyzing and underlining its significance would help them attain an in depth understanding of the chosen topic. The most important learning however would be to appreciate and understand the importance of team work.

<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. ( Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	C.L.Bovee, J.V.Thill, Business Communication Today, 14th Ed, Global Edition Pearson Education, 2018.
2.	R.C. Sharma and Krishna Mohan, Business Correspondence and Report Writing, Mc GrawHillEducation, 2016
3.	Meenakshi Raman and Sangeeta Sharma, Technical Communication: Principles and Practice, Oxford University Press, 2015.
4.	Anna Koneru, Professional Communication, Mc Graw Hill Education Pvt Ltd., 2017
5.	Murli Krishna, Communication Skills for Engineers, Pearson, 2014
6	Menu Dudeja, Communication Skills for Professionals, Satya Prakashan, 2017.
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