Detailed Syllabus

Lecture-wise Breakup

Course Code	15B11MA111	**Semester** Odd	**Semester** I **Session** 2018 -2019 **Month from** July 2018- Dec 2018
Course Name	Mathematics-1		
Credits	4	**Contact Hours**	3-1-0
Faculty (Names)	**Coordinator(s)**	Prof. Sanjeev Sharma, Dr. Dinesh Bisht	
	Teacher(s) (Alphabetically)	Dr.Amita Bhagat, Dr.Anuj Bhardwaj, Dr.Anuj Kumar, Dr. Dinesh Bisht, Dr. Lokendra Kumar, Dr. Neha Ahalawat, Dr. Pankaj Kumar Srivastava, Prof. R. C. Mittal, Prof. Sanjeev Sharma, Dr. Sudhakar Chaudhary, Dr.Yogesh Gupta	

COURSE OUTCOMES		**COGNITIVE LEVELS**
After pursuing the above mentioned course, the students will be able to:		
C105.1	explain the concepts of limits, continuity and differentiability of functions of several variables.	Understanding Level (C2)
C105.2	explain the Taylor's series expansion of functions of several variables and apply it in finding maxima and minima of functions.	Applying Level (C3)
C105.3	make use of double and triple integrals to find area and volume of curves and surfaces.	Applying Level (C3)
C105.4	explain the concepts of vector calculus and apply Green's, Stoke's and Gauss divergence theorems in engineering problems.	Applying Level (C3)
C105.5	solve the ordinary differential equations and explain the concepts of Laplace transform for solving engineering problems.	Applying Level (C3)
C105.6	utilize matrix algebra for solving a system of linear equations and explain eigenvalues, eigenvectors, diagonalization and quadratic form.	Applying Level (C3)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Partial differentiation	Chain rule, change of variables, Taylor's series for function of two or more variables, maxima and minima of function of two variables, Jacobians.	7
2.	Double integrals	Change of order and change of variables, Gamma and Beta functions, Applications to areas and volumes, Equations to curves and surfaces, Plots of	7

		some well known curves and surfaces.	
3.	Vector Differentiation	Gradient, divergence and curl, Normal and tangent to a plane surface.	3
4.	Vector Integration	Line integrals, Green's Theorem in a plane, surface integrals, Gauss and Stokes theorems.	7
5.	Differential Equations	Differential Equations with constant coefficients, Cauchy-Euler equations, Equations of the form y''=f(y), simple applications.	6
6.	Laplace Transform	Laplace Transform, inverse Laplace transform, Dirac delta and unit step function, Solution of IVPs.	6
7.	Matrices	Linear dependence and independence of rows, row echelon form, Rank, Gauss elimination method, Eigen values and vectors, symmetric matrices, Reduction to diagonal form Quadratic forms.	6
		Total number of lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz, Assignments, Tutorials)
Total	**100**

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.	**Jain, R. K. &Iyenger, S. R. K.,** Advanced Engineering Mathematics, 3rd Ed., Narosa Publishing House, New Delhi, 2008.
2.	**Prasad, C.,** (a) Mathematics for Engineers (b) Advanced Mathematics for Engineers, Prasad Mudranalaya, 1982.
3.	**Lipschutz, S., Lipsom, M.,** Linear Algebra, 3rd Ed, Schaum Outline Series, 2001.
4.	**Thomas, G. B and Finney, R. L**., Calculus and Analytical Geometry, 9th Ed., Pearson Education Asia (Adisson Wesley), New Delhi, 2000.
5.	**Stewart, J.,** Calculus, Early Trancendentals, 7th Ed., Cengage Learning, 2012.
6.	**Simmons, G. F.,** Differential Equations with Applications and Historical Notes, 2nd Ed. McGraw Hill, 1991.

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B11PH111	**Semester: Odd**	**Semester: I, Session :** 2018 -2019 **Month from: July to December**
Course Name	PHYSICS-1		
Credits	4	**Contact Hours**	4

Faculty (Names)	**Coordinator(s)**	R. K. Dwivedi & Suneet Kumar Awasthi
	Teacher(s) (Alphabetically)	Alok Pratap Singh Chauhan, Anuj Kumar, Anuraj Panwar, Anshu D. Varshney, Bhubesh Chander Joshi, D. K. Rai, Dinesh Tripathi, Himanshu Pandey, Manoj Tripathi, Prashant Chauhan, S. C. Katyal, Vikas Malik

COURSE OUTCOMES		**COGNITIVE LEVELS**
C101.1	Recall the basic principles of physics related to optics, relativity, quantum mechanics, atomic physics and thermodynamics.	Remembering (C1)
C101.2	Illustrate the various physical phenomena with interpretation based on the mathematical expressions involved.	Understanding (C2)
C101.3	Apply the concepts/principles to solve the problems related to wave nature of light, relativity, quantum mechanics and atomic physics.	Applying (C3)
C101.4	Analyze and examine the solution of the problems using physical and mathematical concepts involved.	Analyzing (C4)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Physical Optics	Analytical treatment of interference, Intensity distribution of fringe system, Fresnel's Biprism, Newton's rings, Michelson interferometer, Diffraction (limited to Fraunhoffer class) from Single slit, double slit and Diffraction grating, Polarization, Phenomenological understanding of Birefringence, Principles of use of uni-axial crystals in practical polarizers, compensators and wave plates, Production and analysis of completely polarized light. Optical activity, Polarimeter	15
2.	Relativity	Michelson-Morley experiment, Lorentz transformations, Addition of velocities, Mass variation with velocity, Mass-energy relation.	5
3.	Radiation	Black body radiation, Wein's law, Rayleigh Jeans law, Planck's law of radiation.	3
4.	Quantum Mechanics	Wave-particle duality, Compton scattering, Matter waves, Heisenberg's uncertainty principle, Schrödinger wave equation and its applications to the free particle in a box, potential barrier and Harmonic oscillator.	9
5.	Atomic Structure	Origin of spectral lines, spin and orbital angular momentum, Quantum numbers, Atoms in magnetic field, Zeeman effect.	4
6.	Thermodynamics	Review of the basic laws of thermodynamics, Entropy and Clausius-Cleyperon equation.	4

Total number of Lectures	**40**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 [2 Quiz (10 M), Attendance (10 M) and Cass performance (5 M)]
Total	**100**

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.	A. K. Ghatak, *Optics*, Tata McGraw Hill.
2.	E. Hecht, *Optics*, Pearson Education.
3.	F. A. Jenkins and H. E. White, *Fundamentals of optics*, Tata McGraw Hill.
4.	R. S. Sirohi, *Wave Optics*, Orient and Longman.
5.	Reshnick, *Relativity*, New Age.
6.	A. Beiser, *Concepts of Modern Physics*, Mc Graw Hill International.
7.	Mark W. Zemansky, *Thermodynamics,*Tata McGraw Hill.

Detailed Syllabus

Course Code	15B11CI111	**Semester Odd (specify Odd/Even)**	**Semester I**. **Session** 2018 -2019 Month from July to December
Course Name	Software Development Fundamentals-I		
Credits	4	**Contact Hours**	**3 (L) + 1(T)**

Faculty (Names)	**Coordinator(s)**	Archana Purwar (J62)
	Teacher(s) (Alphabetically)	Adwitiya Sinha, Amanpreet Kaur, Chetna Dabas, Dharamveer Rajput, Gaganmeet Kaur, Parul Agarwal, Sakshi Agarwal , Sonal, Shradha Porwal

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Solve puzzles , formulate flowcharts, algorithms and develop HTML code for building web pages using lists, tables, hyperlinks, and frames	Apply Level (Level 3)
CO2	Show execution of SQL queries using MySQL for database tables and retrieve the data from a single table.	Understanding Level (Level 2)
CO3	Develop python code using the constructs such as lists, tuples, dictionaries, conditions, loops etc. and manipulate the data stored in MySQL database using python script.	Apply Level (Level 3)
CO4	Develop C Code for simple computational problems using the control structures, arrays, and structure.	Apply Level (Level 3)
CO5	Analyze a simple computational problem into functions and develop a complete program.	Analyze Level (Level 4)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction to Scripting Language & Algorithmic Thinking	Introduction to HTML, Tagging v/s Programming, Algorithmic Thinking and Problem Solving, Introductory algorithms and flowcharts	5
2.	Developing simple software applications with scripting and visual languages	Developing simple applications using python; data types (number, string, list), operators, simple input output, operations, control flow (if -else, while)	4
3.	Elementary Database	Introduction to data base system, Single Table applications, basic operations : ADD, DELETE, UPDATE, SELECT, ALTER ,Introduction to primary key	4
4.	C Programming	Syntax and semantics, data types and variables, expressions and assignments, array	15

		and struct, simple I/O, conditional and iterative control structures Programs on unit conversion, approximating the square root of a number, finding the greatest common divisor, average, sum, min, max of a list of numbers, common operations on vector, matrix, polynomial, strings, programs for pattern generation	
5.	Functions in C Programming	Functions and parameter passing (numbers, ,characters, array, structure) , recursion , e.g. factorial, Fibonacci, Scope of variable	8
6.	Data base connectivity using MySQL	Creating Web pages with Database connectivity using MySQL	2
7.	Aspects of numerical computing	Data representation , Understanding precision, accuracy, error, Introduction to Scientific Computation	4
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25
Total	**100**

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.	H. Cooper and H. Mullish, Jaico Publishing House. "Spirit of C", 4th Edition, Jaico Publishing House, 2006
2.	Herbert Schildt. "The Complete Reference C ", 4th Edition, TMH, 2000
3.	Brian W. Kernighan and Dennis M. Ritchie ,"The C Programming Language", 2nd Edition, Prentice-HallIndia, New Delhi, 2002
4.	Peter Norton, "Introduction to Computers", 5th edition, Tata McGraw-Hill, Delhi.,2005.
5	Balaguruswamy, Programming in ANCI C", 2nd Edition, TMH, 2001.
6.	Ashok N. Kamthane , "Programming with ANSI and Turbo C", Pearson Education, Delhi, 2003
7.	Rajaraman V., "Fundamentals of Computer", 3rd Edition, Prentice-Hall India, New Delhi, 2005.
8.	B. A. Forouzan, R. F. Gilberg "Computer Science: A Structured Programming Approach Using C", 2nd Edition, Thomson Press, New Delhi, 2006
9	AviSilberschatz, Henry F. Korth, and S. Sudarshan, "Database System Concepts", 6th edition, McGraw-Hill, 2010.
10.	User manuals supplied by department for SQL and Python

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B11HS112	**Semester**: Odd	**Semester**: I **Session** 2018 -2019 **Month** from July 18 to Dec 18
Course Name	English		
Credits	3	**Contact Hours**	2-1-0
Faculty (Names)	**Coordinator(s)**	Ms Puneet Pannu, Dr Anshu Banwari	
	Teacher(s) (Alphabetically)	Dr Anshu Banwari, Dr Monali Bhattacharya, Dr Nilu Chaudhary, Dr Santosh Dev, Ms Puneet Pannu, Dr. Santoshi Sengupta, Dr Ekta Srivastava	

COURSE OUTCOMES		**COGNITIVE LEVELS**
C114.1	Develop an understanding and appreciate the basic aspects of English as a communication tool.	Understand (C2)
C114.2	Apply the acquired skills in delivering effective presentations	Apply (C3)
C114.3	Demonstrate an understanding of different forms of literature and rhetorical devices	Understand (C2)
C114.4	Examine literature as reflection of individual and society	Analyse (C4)
C114.5	Compose different forms of professional writing	Create (C6)
C114.6	Apply Phonetics through theory and practice for better pronunciation	Apply (C3)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	English as a Communication Tool	Basic aspects of English ·LSRW: Listening, Speaking, Reading, Writing Non Verbal Communication: Body Language, Voice Modulation, Posture Gambits Phonetics: Pronunciation, Stress, Rhythm, Intonation	10
2.	Language through Literature	**Short Stories** ·Too Bad by Isaac Asimov ·The Castaway by Rabindranath Tagore **Poems** ·The Highwayman by Alfred Noyes ·Where the mind is without fear by Rabindranath Tagore ·"If" by Rudyard Kipling ·Ode to Clothes by Pablo Nerruda	10

		One act Play ·Refund by Fritz Karinthy **Famous Speech** ·Swami Vivekanand's Chicago Speech	
3.	Professional Application/Writing	Textual Organization ·Letter Writing ·Circulars ·Notices ·Agenda ·Minutes ·Report Writing	8
		Total number of Lectures	**28**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment, Creative Project, Test, Oral Questions)
Total	**100**

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.	**C.L.Bovee, J.V.Thill, M.Chaturvedi**, *Business Communication Today*,9th Ed, Pearson Education, copyright@ Dorling Kinderslay (India) Pvt Ltd,2009
2.	**Kelly M. Quintanilla and S.T.Wahl**, *Business and Professional Communication*, Sage Publications Pvt India Ltd,2011
3.	**S. Kumar and Pushp Lata,** *Communication Skills*, Oxford University Press,1st, Ed. 2011
4.	**R.K Bansal, and J.B Harrison**, *Spoken English for India*, Orient Longman
5	**Alfred Noyes,** *"The Highwayman",* Oxford University Press, USA, Sep 1999
6	**Rabindranath Tagore,** *"Where the Mind is without Fear"***,** BK Classics
7	**Rudyard Kipling***, "If",* If Handbook, Creative Editions, 2014
8	**Pablo Neruda,** *"Ode To Clothes"* Late & Posthumous Poems
9	**Isaac Asimov,** *"Too Bad"***,** Robot Visions, ROC Books, New York, NY, USA, 1991
10	**RabindraNath Tagore, "***The Castaway***",** Selected Short Stories, Introduction & translated by William Radice", Penguin Classics
11	**Fritz Karinthy,** "*The Refund*", A Play in One Act adapted by Percival Wilde, French's Acting Edition, London
12	**Swami Vivekananda & Sankar Srinivasan, "** Sisters & Brothers of America: Speech at World Parliament of Religions, Chicago, 1893", Creative Space Independent Publishing Platform, 2015

Detailed Syllabus
Lab-wise Breakup

Course Code	15B17PH171	**Semester** Odd	**Semester** I **Session** 2018 -2019 **Month from:** July - December
Course Name	Physics Lab-1		
Credits	01	**Contact Hours**	02

Faculty (Names)	**Coordinator(s)**	Himanshu Pandey and Anshu D. Varshney
	Teacher(s) (Alphabetically)	Alok Pratap Singh Chauhan, Amit Verma, Anuj Kumar, Anuraj Panwar, Anshu D. Varshney, Bhubesh Chander Joshi, D. K. Rai, Dinesh Tripathi, Manoj Kumar, Manoj Tripathi, N. K. Sharma, Navendu Goswami, Prashant Chauhan, S. C. Katyal, Sandeep Chhoker, Swati Rawal, Vikas Malik, Vivek Sajal

COURSE OUTCOMES		**COGNITIVE LEVELS**
C170.1	Recall optics and modern physics principles behind the experiments.	Remembering (C1)
C170.2	Explain the experimental setup and the principles involved behind the experiments performed.	Understanding (C2)
C170.3	Plan the experiment and set the apparatus and take measurements.	Applying (C3)
C170.4	Analyze the data obtained and calculate the error.	Analyzing (C4)
C170.5	Interpret and justify the results.	Evaluating (C5)

Module No.	**Title of the Module**	**List of Experiments**	**CO**
1.	Optics	**1.** To determine the wavelength of sodium light with the help of Newton's rings setup **2.** To determine the wavelength of sodium light with the help of Fresnel's Bi-prism **3.** To find the specific rotation of cane- sugar solution by a polarimeter at room temperature, using half-shade / Bi-quartz device. **4.** To determine the dispersive power of the material of a prism with the help of a spectrometer. **5.** To determine the wavelength of prominent spectral lines of mercury light by a plane transmission grating using normal incidence method	1-5
2.	Modern Physics	**6.** To study the Photoelectric effect and determine the value of Planck's constant. **7.** Determination of Planck's constant by measuring radiation in a fixed spectral range.	1-5
3.	Electricity and Magnetism	**8.** To verify Stefan's law by electrical method. **9.** To determine the resistance per unit length of Carey Foster's bridge wire and specific resistance of the material of the given wire using Carey Foster's bridge. **10.** To study the variation of magnetic field with distance, along the axis of Helmholtz galvanometer, and to estimate the radius of the coil.	1-5
Evaluation Criteria			

Components	Maximum Marks
Mid Term Viva (V1)	20
End Term Viva (V2)	20
D2D	60
Total	**100**

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.	Dey and Dutta, *Practical Physics*, Kalyani Publication.
2.	Experiment hand-outs.

Detailed Syllabus

Course Code	15B17CI171	**Semester Odd (specify Odd/Even)**	**Semester** 1st **Session** 2018 - 2019 Month from July to December
Course Name	Software Development Fundamentals 1 Lab		
Credits	2	**Contact Hours**	4

Faculty (Names)	**Coordinator(s)**	Dr. Chetna Dabas and Sarishty Gupta
	Teacher(s) (Alphabetically)	Amanpreet Kaur, Amarjeet Prajapati, Ankit Vidyarthi, Ankita Verma, Ankita Wadhwa, Aparajita Nanda, Archana Purwar, Arpita Jadhav, Bharat Gupta, Chetna Dabas, Deepti Singh, Dharamveer Rajpoot, Kavita Pandey, K. Rajalakshmi, Mradula Sharma, Nisha Chaurasia, Niyati Aggarwal, Parul Aggarwal, Prashant Kaushik, Purtee Kohli, Rohit Pal Singh, Sakshi Aggarwal, Sarishty Gupta, Shardha Porwal, Sherry Garg, Shikha Jain, Somya Jain, Sonal, Vikas Hassija

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Design HTML code for building web pages using lists, tables, hyperlinks, and frames.	Apply Level (C3)
CO2	Develop python programs for constructs such as lists, tuples, dictionaries, conditions, and loops using Python 3.6.	Apply Level (C3)
CO3	Design simple SQL queries using MySQL to create database tables and retrieve the data from a single table.	Apply Level (C3)
CO4	Develop C programs for datatypes, expressions, conditional structure, and iterative control structure and pattern generation using Code Blocks and Virtual Lab.	Apply Level (C3)
CO5	Design C programs for array, structure, and functions using Code Blocks and Virtual Lab.	Apply Level (C3)

Module No.	**Title of the Module**	**List of Experiments**	**CO**
1.	Introduction to HTML	Experiments to create web pages using tags, lists, tables, frames, forms.	1
2.	Python	Experiments to develop python programs using data types (number, string, list), operators, simple input output operations, control flow (if -else, while)	2
3.	MySQL	Experiments to create MySQL queries using operations like ADD, DELETE,UPDATE, SELECT	3
4.	C Programming (Part-1)	Experiments to develop C programs using datatypes, expressions, conditional structure (if-else), and iterative control structure (do-while, while, for).	4

5.	C Programming (Part-2)	Experiments to develop C programs using for array, structure, and functions.	5

Evaluation Criteria

Components	**Maximum Marks**
Evaluation 1	15
Lab Test 1	20
Evaluation 2	20
Evaluation 3	15
Lab Test 2	20
TA	10
Total	**100**

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.	H. Cooper and H. Mullish, Jaico Publishing House. "Spirit of C", 4th Edition, Jaico Publishing House, 2006
2.	Herbert Schildt. "The Complete Reference C ", 4th Edition, TMH, 2000
3.	Brian W. Kernighan and Dennis M. Ritchie ,"The C Programming Language", 2nd Edition, Prentice-Hall India, New Delhi, 2002
4.	Peter Norton, "Introduction to Computers", 5th edition, Tata McGraw-Hill, Delhi., 2005.
5.	Balaguruswamy, Programming in ANCI C", 2nd Edition, TMH, 2001.
6.	Ashok N. Kamthane , "Programming with ANSI and Turbo C", Pearson Education, Delhi, 2003
7.	B. A. Forouzan, R. F. Gilberg "Computer Science: A Structured Programming Approach Using C", 2nd Edition, Thomson Press, New Delhi, 2006.
8.	https://www.w3schools.com/html/
9.	https://www.w3schools.com/sql/
10.	https://www.w3schools.com/python/
11.	User manuals supplied by department for HTML, SQL and Python

Detailed Syllabus
Lab-wise Breakup

Course Code	18B15GE112	**Semester : Odd**	**Semester I Session** 2018 -2019 **Month from August**
Course Name	WORKSHOP		
Credits	1.5	**Contact Hours**	3

Faculty (Names)	**Coordinator(s)**	Nitesh Kumar
	Teacher(s) (Alphabetically)	Chandan kumar Madhu Jhariya Nitesh Kumar Vimal Saini

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Learn the basic of manufacturing environment and various safety measures associated with it.	Remembering (Level I)
CO2	Apply the appropriate tools to fabricate joints utilizing work-bench tools.	Applying (Level III)
CO3	Create various prototypes in the carpentry trade, fitting trade, welding trade and tin smithy trade.	Creating (Level VI)
CO4	Demonstrate the working principle of lathe, shaper and milling machines and able to fabricate the prototypes of desired shape and accuracies.	Understanding, (Level II)

Module No.	**Title of the Module**	**List of Experiments**	**CO**
1.	Carpentry	Preparation of T joint as per the given specification. Preparation of Dovetail joint as per given specification.	CO2,CO3
2.	Welding Shop	To study Gas welding and Arc welding equipment. To make Butt joint and Lap joint.	CO2,CO3
3.	Sheet Metal Shop	To Prepare a Square tray using GI sheet. To Prepare a funnel using GI sheet.	CO2,CO3
4.	Fitting Shop	To Prepare V groove fit as per given specifications. To Prepare Square fit as per given specifications.	CO2,CO3
5.	Machine Shop	To Perform Turning, facing and grooving operation on Lathe. To perform Slotting operation on Shaper Machine. To perform face milling operation on Milling Machine.	CO4

Evaluation Criteria

Components	**Maximum Marks**
Mid Term Exam	20
End Term Exam	20
TA	60 (Experimental Work (30) + File Work (20) + Attendance (10)) **Total 100**

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.	Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai
2.	Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology",4th edition, Pearson Education India Edition, 2002.
3.	Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata Mc GrawHill House, 2017.
4.	John K.C., Mechanical Workshop Practice, 2nd Edition, PHI, 2010
5.	Roy A. Lindberg, "Processes and Materials of Manufacture", 4th edition, Prentice Hall India, 1998
6.	Gowri P.Hariharan and A. Suresh Babu," Manufacturing Technology – I" Pearson Education, 2008
7.	Raghuwanshi B.S., Workshop Technology Vol. I & II, Dhanpath Rai & Sons.