

NATIONAL INSTITUTE OF TECHNOLOGY MANIPUR

Minutes of the 33rd Senate Meeting



Day: Tuesday

Date: 23/07/2024

Time: 4.00 PM

(Via Composite Mode)

MINUTES OF THE 33rd SENATE MEETING HELD ON 23rd of July , 2024

The 33rd Senate Meeting of National Institute of Technology Manipur was held on 23rd of July, 2024 at 4.00 PM via Composite Mode.

The following members attended the meeting

❖ Prof. D V L N Somayajulu Director, NIT Manipur	:	Ex-officio Chairman
❖ Dr. Debasish Bhattacharya NIT Agartala (Via Video Conference)	:	Nominated Member
❖ Dr. L. Herojit Singh Dean (AA), NIT Manipur	:	Member
❖ Prof. Rajesh Kumar Bhushan Mechanical Engineering Department	:	Member
❖ Prof. P. Albino Kumar CE Dept, NIT Manipur	:	Member
❖ Dr. Kh. Johnson Singh HoD, CSE, NIT Manipur	:	Member
❖ Prof. Bakimchandra Oinam HoD, Civil, NIT Manipur	:	Member
❖ Dr. Benjamin A. Shimray HoD, EE, NIT Manipur	:	Member
❖ Prof. A. Dinamani Singh HoD, ECE, NIT Manipur	:	Member
❖ Dr. Anil Kumar Birru HoD, Mechanical Engg., NIT Manipur	:	Member
❖ Prof. Ch. Barchand Singh HoD, HSS Dept., NIT Manipur	:	Member
❖ Dr. Ibetombi Soibam HoD, Physics Deptt., NIT Manipur	:	Member
❖ Dr. Th. David Singh HoD, Chemistry Deptt., NIT Manipur	:	Member
❖ Dr. S. Surendra Singh HoD, Mathematics, NIT Manipur	:	Member
❖ Prof. Kh. Tomba Singh Registrar, NIT Manipur	:	Secretary



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ITEM NO. 33.1: Confirmation of the minutes of the 32nd Senate meeting held on 09/02/2024 via Composite mode

The Senate confirmed the minutes of the 32nd Senate meeting held on 09/02/2024 via Composite mode.

ITEM NO. 33.2: Action taken on the decision of the 32nd Senate Meeting held on 09/02/2024 via Composite mode

The actions taken on various decisions of the 32nd meeting of the Senate are as follows:

Sl. No	Item No.	Agenda	Decision Taken	Action Taken	Remarks
1	32.3	To consider and approve Dr. Angom Devadatta Mani, Asst. Professor, Department of Basic Sciences(Physics), Manipur Technical University as Co-supervisor of Laishram Neeraj Singh (23409001) who is under the supervision Dr. Ibetombi Soibam, Associate Professor, Physics Department, NIT Manipur	The Senate approved Dr. Angom Devadatta Mani, Asst. Professor, Department of Basic Sciences (Physics), Manipur Technical University to be the co-supervisor of Mr. Laishram Neeraj Singh (23409001) who is under the supervision of Dr. Ibetombi Soibam, Associate Professor, Physics Department, NIT Manipur.	Notified vide No.NITM.3/(3-Acad)/Notice/2 023/358, Dated: 03/04/2024	Noted
2	32.4	To discuss and consider Dr. Khelchandra Thongam, Associate Professor, CSE to be the external co-guide of Ms. Takhellambam Sylvia enrolled in PhD-CSE (P/T) programme in ASET, Amity University, Uttar Pradesh	The Senate approved Dr. Khelchandra Thongam, Associate Professor, CSE, NIT Manipur to be the external co-guide of Ms. Takhellambam Sylvia who is enrolled in PhD-CSE (P/T) programme in ASET, Amity University, Uttar Pradesh. The Senate approved that the allocation of seat for the outside/external PhD scholar shall be 0.5 each for which the faculty member of NIT Manipur is the co-supervisor. The Senate also approved that the allocation of seat for the outside/external co-supervisor	Notified vide No.NITM.3/(3-Acad)/Notice/2 023/359, Dated: 03/04/2024 & Notified vide No.NITM.3/(3-Acad)/Notice/2 023/3370, Dated: 04/04/2024	Noted

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			however shall be considered 1 count for the faculty member of NIT Manipur who is the main supervisor.		
3	32.5	To consider and approve Dr. Biraj Shougaijam, Asst. Professor, Department of Electronics and Communication Engineering, Manipur Technical University (MTU) as Co-supervisor of Bimoljit Chanam (23405002) who is under the supervision of Prof. Aheibam Dinamani Singh, NIT Manipur	The Senate approved Dr. Biraj Shougaijam, Asst. Professor, Department of Electronics and Communication Engineering, Manipur Technical University (MTU) as Co-supervisor of Bimoljit Chanam (23405002) who is under the supervision of Prof. Aheibam Dinamani Singh, NIT Manipur.	Notified vide No.NITM.3/(3-Acad)/Notice/2 023/360, Dated: 03/04/2024	Noted
4	32.6	To consider and approve for the extension of PhD programme period for Mr. Maisnam Bipinchandra Singh (16PCE003), PhD scholar, Civil Engineering Department	Mr. Maisnam Bipinchandra Singh (16PCE003) is a PhD student of the Civil Engineering Department working under the supervision of Dr. Ngangbam Romeji and Dr. Thiyam Tamphasana Devi. The student registered for PhD on 21/01/2016. He has crossed the limit of 8 years (for Regular) in PhD programme on 20/01/2024. The concerned DC meeting held on 09/01/2024 has highlighted that the PhD work is Lab-based as well as field monitoring work. Due COVID-19 pandemic since 2020 and personal health issues, the student was not able to carry out any work related to his PhD. The student has participated in 2 (two) International conferences and published 1(one) paper in Scopus indexed journal as per his last progress report dated 30/11/2023. The student has also submitted a research paper in SCIE indexed journal which is under review. Based upon the DC recommendation, the DPPC meeting held on 11/01/2024 has	Notified vide No.NITM.3/(3-Acad)/Notice/2 023/369, Dated: 04/04/2024	

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			recommended to the IPPC and the Senate for extension of Mr. Maisnam Bipinchandra Singh's PhD completion by 6 months (i.e till June 2024) from his current ongoing XVI semester. In view of the above and after threadbare discussion, the Senate approved for extension for one more year i.e upto 19/01/2025 on the case to case basis.		
5	32.7	To consider and approve Memorandum of Understanding under INUP-i2i program between IIT Guwahati and National Institute of Technology Manipur	The Indian Nanoelectronics Users Program (INUP) at Indian Institute of Technology Guwahati (IITG) is sponsored by Ministry of Electronics and Information Technology (MeitY), Government of India and Office of Principal Scientific Advisor (PSA). It is an integral part for establishing a Center of Excellence in Nanoelectronics (CEN). The INUP center at IITG has state of the facilities of nanoelectronics. These facilities are open to academic researchers from the country. The researchers and students of NIT Manipur will be benefitted if collaborated with INUP of IITG. To grant access to such facilities to such High End facilities, the INUP center of IITG needs an MOU with NIT Manipur. The Senate approved the proposed Memorandum of Understanding between INUP-i2i centre of IIT Guwahati and National Institute of Technology Manipur.	Notified vide No.NITM.3/(3-Acad)/Notice/2023/366, Dated: 04/04/2024	Noted
6	32.8	To ratify the Academic Calendar for the Academic year 2024-2025 (January to December 2024)	The Senate ratified the Academic Calendar for the Academic year 2024-2025 (January to December 2024).	Noted	

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7	32.9	To consider and approve for extension of 6 months for PhD thesis submission of Mr. Ngasepam Bhogenjit Singh (15PCH003) of Chemistry Department	Mr. Ngasepam Bhogenjit Singh (15PCH003) is a PhD scholar under the supervision of Dr. Th. David Singh, Associate Professor, Chemistry Department. He registered for the PhD programme in Chemistry Department on 07/01/2015 in Part-Time mode. He has completed 9 years (maximum time limit for Part-time PhD) on 06/01/2024. The concerned DC meeting held on 09/01/2024 commented that Mr. Ngasepam Bhogenjit Singh could not submit the Thesis due to lack of staff in the department and moreover allocation of heavy practical schedule for both B.Tech and M.Sc to him for the last 2 years. He is the only Technical Assistant in the Department. He has published one SCIE journal in Russian Journal of Inorganic Chemistry. In view of the concerned DC's recommendation and after due appraisal, the Senate approved extension of 6 months - w.e.f 06/01/2024 till 06/07/2024 for PhD thesis submission.	Notified vide No.NITM.3/(3-Acad)/Notice/2023/365, Dated: 04/04/2024	
8	32.10	To discuss regarding the inclusion of Medical /Dental degree for the PhD programme in NIT Manipur	In this regard, a DPPC meeting held on 01/02/2024 reasoned that the integration of Medical Science and Technology can be achieved by allowing candidates from medical/dental background for a PhD programme at the Technological institutes like NIT Manipur. The meeting pointed out that many of the IITs have the medical degree (MBBS/MD) as one of the minimum qualification for admission to the full time/ part time PhD programme. After threadbare discussion and	Notified vide No.NITM.3/(3-Acad)/Notice/2023/364, Dated: 04/04/2024	

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			deliberation, the Senate approved in principle the inclusion of Medical /Dental degree for the PhD programme in NIT Manipur. The Senate directed to design the course work structure for the same and put up in the next Senate meeting.		
9	32.11	To discuss the thesis submission of Reingachan N (17408004), a PhD student in the Department of Mathematics	Reingachan N (17408004) is a PhD student under the supervision of Prof. Chanam Barchand Singh. He registered for the PhD programme on 05/01/2018. Mr. Raingachan N has published 4 Scopus indexed journals and 1 UGC care journal. The concerned supervisor has submitted the PhD thesis on 08/01/2024. After threadbare discussion and deliberation, the Senate directed Mr. Reingachan N to publish at least 2 SCI/SCIE indexed journal paper as first author along with the Supervisor for considering the thesis submission.	Noted	
10	32.12	To consider for wider dissemination of January 2024 semester courses among faculty and students for Enrolments and Credit Transfer through SWAYAM	SWAYAM portal is an initiative under the National Mission on Education through information and Communication Technology (NMEICT) which facilitates hosting of all the courses taught in classrooms from Class 9 th till Post-Graduation helping students to provide quality courses from experienced faculties from premier institutions. The SWAYAM platform offers a diverse range of MOOCs for learners for credit transfer. SWAYAM is offering 1183 courses for January 2024 semester and till date more than 8 lakhs 50 thousand Enrolments have been made. www.swayam.gov.in may be	Notified vide No.NITM.3/(3-Acad)/Notice/2023/373, Dated: 04/04/2024	Noted

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			referred. The matter was appraised and after threadbare discussion, the Senate directed the departmental Heads to appoint coordinators and work out with the students. The Courses selected should pass through the concerned DUPCs and DPPCs. Courses already there in the syllabus should not be chosen from the SWAYAM portal.		
11	32.13	To consider and approve new elective courses for PhD course work which will be in addition to the open elective courses for M.Tech programme in the Department of Civil Engineering	After threadbare discussion and deliberation, the Senate approved new elective courses for PhD course work which will be in addition to the open elective courses for M.Tech programme in the Department of Civil Engineering.	Notified vide No.NITM.3/(3-Acad)/Notice/2023/368, Dated: 04/04/2024	
12	32.14	To consider increasing students' intake in MTech with specialization in Structural Engineering in the Department of Civil Engineering	The DPPC meeting held on 01/02/2024 recommended the increase in number of students' intake from the existing 10 to 20 students. It was noted that in the previous academic year, 50 candidates applied for admission in M.Tech in Structural Engineering (Specialization). Increase in number of students will also increase the Internal Revenue Generation (IRG) of the institute and hence will benefit the Institute in the long run. In view of the DPPC's recommendation and after threadbare discussion and deliberation, the Senate approved the increase in intake of MTech in Structural Engineering (specialization) in line with the same seat matrix as that of other MTech courses including EWS and other category.	Notified vide No.NITM.3/(3-Acad)/Notice/2023/367, Dated: 04/04/2024	
13	32.15	To re-consider and approve Prof. Navin Kumar,	The Senate after threadbare discussion and deliberation on the	Notified vide No.NITM.3/(3-	

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		Department of Mechanical Engineering, IIT Ropar as external co-supervisor of Mr. Ajeesh M Kurup (Enrollment No. 21407002), a PhD scholar in the department of Mechanical Engineering, NIT Manipur	production of NoC from the competent Authority of IIT Ropar re-considered and approved Prof. Navin Kumar, Department of Mechanical Engineering, IIT Ropar as the external co-supervisor of Mr. Ajeesh M Kurup (Enrollment No. 21407002), a PhD scholar who is under the main supervision of Prof. Rajesh Kumar Bhushan of Mechanical Engineering department, NIT Manipur.	Acad)/Notice/2023/357, Dated: 02/04/2024	
14	32.16	To consider and approve to grant Academic leave of 6 months to Mr. Ajeesh M Kurup (Enrollment No. 21407002)	Ajeesh M Kurup (Enrollment No. 21407002), a PhD student, ME Department under Prof. Rajesh Kumar Bhushan, registered for the PhD programme on 12/08/2021 (completed 2 years and 5 months. He has completed his course work and Comprehensive examination. He has given his State of the Art Seminar on 09/08/2023. The concerned DC and DPPC have recommended academic leave of 6 months to carry out experimental works at IIT Ropar. After threadbare discussion and deliberation, the Senate granted Academic leave of 3 (three) months only to Mr. Ajeesh M Kurup (Enrollment No. 21407002) for conducting his research work at IIT Ropar. He has to present the work progress to the concerned DC meeting when he returns from the Academic leave. Attendance register has to be strictly maintained by his external co-supervisor at IIT Ropar for the award of fellowship from the institute.	Notified vide No.NITM.3/(3-Acad)/Notice/2023/356, Dated: 02/04/2024	
15	32.17	Any other items with the permission of the chair 1.To discuss and approve for	1. The Senate meeting has	1. Notified vide	

	fixing the honorarium for the external expert	recommended the honorarium of the external expert (not below the rank of Associate Professor) engaged for upgradation of JRF to SRF / project progress evaluation to Rs. 5000/- subject to approval by the BoG.	No.NITM.3/(3-Acad)/Notice/2023/354, Dated: 30/03/2024	
	2. To consider MoU between All India Institute of Medical Sciences, Bhopal and National Institute of Technology Manipur	2. The 31 st Senate meeting vide its Item No.31.4 resolution referred the matter to the institute legal advisor through Dean (Academic) for its legality and to put up in the next Senate meeting. The legally vetted draft MoU was placed and the Senate after due perusal approved the MoU.	2. Notified vide No.NITM.3/(3-Acad)/Notice/2023/372, Dated: 04/04/2024	

ITEM NO. 33.3: To discuss and approve the proposal of Memorandum of Understanding between National Institute of Technology Manipur and Indian Institute of Management Visakhapatnam

The Senate approved the draft Memorandum of Understanding between National Institute of Technology Manipur and Indian Institute of Management Visakhapatnam. Details and salient features will be highlighted in the next Senate meeting. Team from NIT Manipur is visiting on 29th July, 2024 to IIM, Visakhapatnam for discussion.

ITEM NO. 33.4: To consider and approve the new course structure and Syllabi based on NEP -2020 of B.Tech 1st year (2024 batch onwards) for implementation from July, 2024 session

The Senate approved the new course structure and Syllabi for B.Tech 1st year (2024 batch onwards). The Senate directed to form Board of Studies for each department with external experts preferably one Academic and one Industry experts, for framing the Syllabus of BTech students from 2nd year onwards. Approved new course structure and Syllabi for B.Tech 1st year (2024 batch onwards) are appended at Annexure -1 and Annexure – 2 respectively.

ITEM NO. 33.5: To discuss on the grant of status of Deemed Awarding Bodies (Dual category) to all the interested institutes of National Importance (INIs), including all IITs, NITs, IISERs, NIDs, IIMs, Central




Universities by National Council for Vocational Education and Training (NCVET)

The Senate approved In-principle for sending the Expression of Interest (EoI) to National Council for Vocational Education and Training (NCVET).

ITEM NO. 33.6 To consider and approve Dr. Loukrakpam Merin Singh, Assistant Professor, Electronics and Communication Engineering Department, Manipur Technical University to be the Co-supervisor of Mr. Kiyam Babloo Singh (Enrollment No. 23405003), a PhD scholar in the Department of Electronics and Communication Engineering, NIT Manipur

The Senate approved Dr. Loukrakpam Merin Singh, Assistant Professor, Electronics and Communication Engineering Department, Manipur Technical University to be the Co-supervisor of Mr. Kiyam Babloo Singh (Enrollment No. 23405003), a PhD scholar who is under the supervision of Prof. A. Dinamani Singh, Department of Electronics and Communication Engineering, NIT Manipur.

ITEM NO. 33.7: Ratification items:

a) Dr. Wangkheirakpam Vandana Devi, Assistant Professor, ECE department, NIT Manipur in co-supervising Ms. Preeti (Roll No. 233421103), a PhD scholar in the Department of Applied Sciences, NIT Delhi

The Senate directed the HoD, ECE Department to update the PhD work status of Ms. Preeti (Roll No. 233421103), NIT Delhi.

b) Proposed co-supervisors of PhD students under Dr. Mithun Roy, who is on lien at NIT Manipur and joined NIT Agartala

Dr. Mithun Roy, Associate Professor, Chemistry Department is on lien at NIT Manipur who joined NIT Agartala. Dr. Mithun Roy has assigned additional co-supervisors for the students under his guidance. The DPPC meeting held on 22/04/2024 has recommended co-supervisors of the PhD students under Dr. Mithun Roy which is detailed below:

Sl. No.	Name of the student	Enrolment No.	Department	Main Supervisor	Proposed Co-supervisor
1	Sharmila Wahengbam	20402002	Chemistry	Dr. Mithun Roy	Dr. Chandi Charan Malakar

2.	Abhishek Panwar	20402004	Chemistry	Dr. Mithun Roy	Dr. Chandi Charan Malakar
3.	Rintu Bhowmik	21402003	Chemistry	Dr. Mithun Roy	Dr. Chandi Charan Malakar
4.	Gobinda Bag	21402004	Chemistry	Dr. Mithun Roy	Dr. Th. David Singh
5.	Nongmaithem Amit Singh	23402001	Chemistry	Dr. Mithun Roy	Dr. Nagarajan S.

As Dr. Mithun Roy is on lien, the Senate resolved that Dr. Mithun will be the co-supervisors of Sharmila Wahengbam (20402002), Abhishek Panwar (20402004), Rintu Bhowmik (21402003) and Gobinda Bag (21402004) and the proposed co-supervisors will be the main supervisors (Caretaker). Dr. Nagarajan S. will be allocated as the main supervisor of Nongmaithem Amit Singh (23402001).

The project under Dr. Mithun Roy should assign a Co-PI from the Institute until transferred based on rules of Sponsoring Agency.

- c) **The CE-232–Environmental Engineering Lab. (Practical) exam, 4th Semester of Civil Engineering Department was assessed through Viva and theory**

The Senate ratified.

- d) **Proposal for Capacity Building for Design & Entrepreneurship (CBDE)**

The Senate ratified.

ITEM NO. 33.8: Information Items:

- a) **A report on the completion of final defence Viva of Mr. VVSR Chowdary Kantipudi (Roll No. 1881078) of Kalinga Institute of Industrial Technology, Deemed to be University (KIIT DU), Bhubaneswar who is under the supervision of Dr. Kundan Kumar, Assistant Professor, Electrical Engineering Department, NIT Manipur**

Noted.

- ITEM NO. 33.9: To consider and approve change in category from regular to Part-Time for Ksh. Yaiphabee Devi (Enrollment No. 23403001), a PhD scholar in the Department of computer Science & Engineering**

Kshetrimayum Yaiphabee Devi (Enrollment No. 23403001), a PhD scholar in the Department of Computer Science & Engineering joined the PhD programme on 28/08/2023 under the supervision of Dr. Oinam Bidyapati Chanu, Assistant Professor, Computer Science & Engineering Department, NIT Manipur. She has completed her Course work.

The Senate upon deliberation has not approved the proposal pertaining to Ksh. Yaiphabee Devi (Enrollment No. 23403001) for change in category from regular to Part Time. The Senate also directed to refund 50% of the total Assistantship/fellowship amount received by her at the earliest.

ITEM NO. 33.10: To discuss the matter of seven students (4 PhD and 3 MTech) of Civil Engineering Department who have got job and appointment offers

Sl. No.	Name of the student	Enrollment No.	Programme	Department	Decision of the DPPC
1.	Jitender Kushwaha	23401004	PhD	Civil	Agreed to recommend his request to cancel his PhD candidature as the institute rules
2.	Sapam Ksheroda Devi	22201017	4 th Semester, MTech	Civil	DPPC resolved to allow the students to complete the course as per schedule as only the final major submission remains with the condition that they must bring the NoC from their employer within one month. NoCs have been issued from their concerned employers.
3.	Pradyumna Arambam	22201002	4 th Semester, MTech	Civil	
4.	Thiyam Birbal Luwang	23201025	2 nd Semester, MTech	Civil	Not recommended as the employment offer is contractual and only for one year and they are unlikely to be able to complete their degree
5.	Thounaojam Bidyraj Singh	21401003	PhD	Civil	

6.	Gunadas Singh Keisam	22401004	PhD	Civil	within a short period
7.	Jayalaxmi Ngasepam	23401005	PhD	Civil	

After threadbare discussion and deliberation, the Senate approved and acknowledged the recommendation of the DPPC meeting held on 30/03/2024.

The Senate also directed to recover 50% of the Institute fellowship amount as per the institute rules from the PhD students who are receiving institute Fellowship/Assistantship.

ITEM NO. 33.11: To approve the change of Supervisors of two PhD students of Mechanical Engineering Department who were under the supervision of Prof. Goutam Sutradhar, former Director, NIT Manipur

There are three PhD students of Mechanical Engineering Department who were under the supervision of Prof. Goutam Sutradhar, former Director, NIT Manipur who has joined NIT Jamshedpur as Director.

Sl. No.	Name of the student	Enrollment No.	Department	Supervisor	Co-Supervisor
1.	Mr. Bokka Syam Babu	19407002	ME	Prof. Goutam Sutradhar, former Director, NIT Manipur	Prof. N.C Dey, IEST Shibpur
2.	P. Sunil Kumar	19407003	ME	Prof. Goutam Sutradhar, former Director, NIT Manipur	Dr. Anil Kumar Birru, NIT Manipur
3.	K. Athili	19407001	ME	Prof. Goutam Sutradhar, former Director, NIT Manipur	Dr. Manojit Ghosh, IEST Shibpur

The Senate was apprised that Prof. Goutam Sutradhar has discontinued as the supervisors of the above three PhD students. He has recommended Dr. Anil Kumar Birru to be the supervisors of all the three PhD students.




The matter was discussed and deliberated and recommended Dr. Anil Kumar Birru to be the sole supervisors of all the PhD students without any co-supervisors.

ITEM NO. 33.12: Any other items with the permission of the Chair

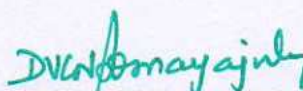
The Senate ratified the nomination of two external Senate members of NIT Manipur

1. Prof. G P Raja Sekhar, Department of Mathematics, IIT Kharagpur
2. Prof. P. Santhi Thilagam, Department of Computer Science & Engineering, NIT Karnataka, Surathkal

The meeting ended with vote of thanks to the Chair.



(Prof. Kh. Tomba Singh)
Registrar,
Secretary, Senate
National Institute of Technology Manipur


(Prof. D V L N Somayajulu)
Director,
Ex-Officio Chairman, Senate
National Institute of Technology Manipur
4/9/2024

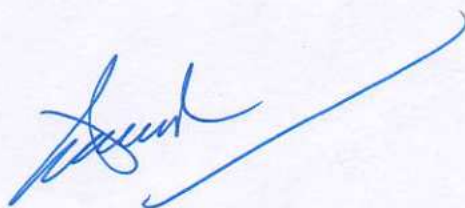
ANNEXURE -1

PROGRAMME STRUCTURE
Semester I

Sl. No.	Course Code	Course Name	Course Category	L	T	P	Credits
1.	CH 1101	Engineering Chemistry	BSC-1	3	0	2	4
2.	ME 1101	Engineering Mechanics	ESC-1	3	1	0	4
3.	MA 1101	Engineering Mathematics-I	BSC-2	3	0	0	3
4.	PH 1101	Engineering Physics	BSC-3	3	0	2	4
5.	HS 1101	Communication Skills	SEC-1	3	0	0	3
6.	ME 1149	Engineering Drawing	ESC-2	0	1	4	3
7.	IC 1191	Induction Programme	VAC-1				0
8.	IC 1192	Extra Academic Activity-I	VAC-2				0
Total				15	2	8	21

Semester II

Sl. No.	Course Code	Course Name	Course Category	L	T	P	Credits
1.	CS 1201	Introduction to Computing	ESC-3	3	0	4	5
2.	EE 1201	Basic Electrical Engineering	ESC-4	3	0	2	4
3.	MA 1201	Engineering Mathematics-II	BSC-4	3	0	0	3
4.	EC 1201	Basic Electronic Circuits	ESC-5	3	0	2	4
5.	CE 1201	Environmental Sustainability	ESC-6	3	0	0	3
6.	ME 1249	Engineering Workshop	ESC-7	0	1	4	3
7.	IC 1291	Extra Academic Activity-II	VAC-3				0
Total				15	1	12	22




Detailed SYLLABI

B.Tech. Semester I & II

Course Name: Engineering Chemistry

Course Code: CH 1101

L	T	P	C
3	0	2	4

Electrochemistry and Corrosion

Cell EMF- its measurement and applications - concentration cell - electrode electrolyte concentration cell - concentration cell with and without transference - Dry corrosion and wet corrosion, mechanisms, types of corrosion, Differential metal corrosion, differential aeration corrosion, intergranular, Passivity, Pitting, Polarization - Chemical conversion coatings and organic coatings- Paints, enamels.

Phase rule

Definition of terms-phase - components- degree of freedom - derivation of Gibbs phase rule - one component system - H_2O , CO_2 , Sulphur-Two-component system-Eutectic systems-reduced phase rule, Pb-Ag system - Compound Formation with congruent melting - Zn- Mg Alloy system- Copper-nickel alloy system - systems with incongruent melting - Na_2SO_4 - H_2O system and simple three-component systems.

Water

Sources, Hard & soft water, Estimation of hardness by EDTA method, Scale & Sludge- Caustic embrittlement - softening of water, zeolite process & demineralization by ion exchangers, boiler feed water, internal treatment methods-specifications for drinking water, BIS & WHO standards, treatment of water for domestic use, desalination - Reverse osmosis & Electrodialysis.

Refractories:

Definition, objective of using,, classification based on chemical nature, properties of refractories, strength, dimensional stability, chemical inertness, thermal expansion, thermal conductivity, porosity, spalling, electrical conductivity etc., and interrelations between them; selection of good refractory; common refractory bricks-silica, fireclay, high-alumina, magnesite and zirconia bricks, properties and uses.

Spectroscopy

Interaction of electromagnetic radiation with matter, Electronic spectroscopy - Theory of electronic transitions, instrumentation, Beers Lambert law, Woodward FIESER rule, applications. IR spectroscopy - Fundamentals, Instrumentation, and applications, Raman spectroscopy - Fundamentals and applications.

Polymers and Composites

Concept of macromolecules - Tacticity- Classification of Polymers-Types of Polymerization-Mechanism-Ziegler Natta Polymerization - Effect of Polymer structure on properties-Important addition and condensation polymers -synthesis and properties-Molecular mass determination of polymers-Static and dynamic methods, Light scattering-Rubbers-Vulcanization-Synthetic rubbers-Conducting polymers-Composite materials

References & Text Books

1. P.C. Jain, M. Jain, *Engineering Chemistry*, Dhanpat Rai Publishing Company, New Delhi, 2005.
2. P. Atkins, J.D. Paula, *Physical Chemistry*, Oxford University Press, 2002.
3. B.R. Puri, L.R. Sharma, M.S. Pathania, *Principles of Physical Chemistry*, Vishal Publishing Company, 2008
4. F.W. Billmeyer, *Text book of Polymer Science*, 3rd Edition, Wiley. N.Y. 1991.
5. S.S. Darer, S.S. Umare, *A Book of Engineering Chemistry*, S. Chand Publishing, 2011.
6. Sunita Rattan, *A text book of Engineering Chemistry*, SK Kataria and SONS, New Delhi, 2013

CHEMISTRY LAB

LIST OF EXPERIMENTS

1. Estimation of carbonate, non-carbonate and total hardness in the given water sample.
2. Estimation of dissolved oxygen in the given water sample.
3. Mixed acid or bases titration
4. Estimation of Fe^{3+} by spectrophotometer/titration.
5. Conductometric titration
6. Potentiometric titration
7. pH-metric titration
8. Mixed acid or bases titration
12. Demonstration experiments using Advanced Spectroscopic Techniques, (UV-Vis, FTIR, Fluorescence Spectrometer)

Reference Books

1. A text book of Engineering Practical Chemistry, SS Dara, S Chand Publisher, 2010
2. S.K. Bhasin, S. Rani, *Laboratory Manual on Engineering Chemistry*, Dhanpat Rai Publishing Company, New Delhi, 2011.

Course Name: ENGINEERING MECHANICS

Course Code: ME1101

L	T	P	C
3	1	0	4

Basic principles: Equivalent force system; Equations of equilibrium; Free body diagram; Reaction; Static indeterminacy. Structures: Difference between trusses, frames and beams, Assumptions followed in the analysis of structures; 2D truss; Method of joints; Method of section; Frame; Simple beam; types of loading and supports; Shear Force and bending Moment diagram in beams; Relation among load, shear force and bending moment. Friction: Dry friction; Description and applications of friction in wedges, thrust bearing (disk friction), belt, screw, journal bearing (Axle friction); Rolling resistance. Virtual work and Energy method: Virtual Displacement; Principle of virtual work; Applications of virtual work principle to machines; Mechanical efficiency; Work of a force/couple (springs etc.); Potential energy and equilibrium;

stability. Center of Gravity and Moment of Inertia: First and second moment of area; Radius of gyration; Parallel axis theorem; Product of inertia, Rotation of axes and principal moment of inertia; Moment of inertia of simple and composite bodies. Mass moment of inertia. Kinematics of Particles: Rectilinear motion; Curvilinear motion; Use of Cartesian, polar and spherical coordinate system; Relative and constrained motion; Space curvilinear motion. Kinetics of Particles: Force, mass and acceleration; Work and energy; Impulse and momentum; Impact problems; System of particles. Kinematics and Kinetics of Rigid Bodies: Translation; Fixed axis rotational; General plane motion; Coriolis acceleration; Work energy; Power; Potential energy; Impulse-momentum and associated conservation principles; Euler equations of motion and its application.

Text Books:

1. Timoshenko and Young, Engineering Mechanics, 3rd Ed., McGraw Hill Publishers, 2006.
2. R. C. Hibbler, Engineering Mechanics, Vols. I and II, Pearson Press, 2002.

References:

1. J. L. Meriam and L. G. Kraige, Engineering Mechanics, Vol. I – Statics, Vol. II – Dynamics, 5th Ed., John Wiley, 2002.
2. I. H. Shames, Engineering Mechanics: Statics and Dynamics, 4th Ed., PHI, 2002.
3. F. P. Beer and E. R. Johnston, Vector Mechanics for Engineers, Vol. I -Statics, Vol. II – Dynamics, 3rd Ed., Tata McGraw Hill, 2000.

Course Name: Engineering Mathematics-I

Course Code: MA 1101

L	T	P	C
3	0	0	3

Systems of linear equations and their solutions, vector space R^n and its subspaces, spanning set and linear independence, matrices, inverse and determinant, range space and rank, null space and nullity, eigenvalues and eigenvectors; diagonalization of matrices, similarity, inner product, Gram-Schmidt process, vector spaces (over the field of real and complex numbers), linear transformations.

Convergence of sequences and series of real numbers; continuity of functions, differentiability, Rolle's theorem, mean value theorem, Taylor's theorem, power series, Riemann integration, fundamental theorem of calculus, improper integrals, application to length, area, volume, and surface area of revolution.

Text books:

1. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edn., Brooks/Cole, 2005.
2. G. B. Thomas, Jr. and R. L. Finney, Calculus and Analytic Geometry, 9th Edn., Pearson Education India, 1996.

References:

1. G. Strang, Linear Algebra and Its Applications, 4th Edn., Brooks/Cole India, 2006.
2. K. Hoffman and R. Kunze, Linear Algebra, 2nd Edn., Prentice Hall India, 2004.
3. R. G. Bartle and D. R. Sherbert, Introduction to Real Analysis, 3rd Edn., Wiley India, 2005.

4. S. R. Ghorpade and B. V. Limaye, An Introduction to Calculus and Real Analysis, Springer India, 2006.

Course Name: Engineering Physics
Course Code: PH 1101

L	T	P	C
3	0	2	4

1. VECTOR CALCULUS:

Vector Differentiation, Scalar and Vector Fields, Directional Derivatives, Vector Differential Operator, Gradient, Divergence, Curl, Line, Surface & Volume integrals and their applications.

2. ELECTROMAGNETISM:

Laws of Electromagnetic Induction, Self and Mutual induction, Concept of Displacement Current, Difference between Conduction Current and Displacement Current, Eddy Current, Maxwell's Equations, Derivation of Maxwell's Equations, Propagation of Electromagnetic Waves in Free Space and Conductors, Solution of propagation of Plane Electromagnetic Wave in free space and conductors, Concept of Field Energy (Poynting Vector).

3. WAVES AND OSCILLATIONS:

Simple Harmonic Motion; superposition of two linear SHMs, Lissajous figures; Damped Vibration, analogy with electrical circuit; Progressive waves; Forced Vibration, Amplitude and Velocity Resonance, sharpness of resonance and quality factor.

4. OPTICS:

Interference - light due to division of wave front (Young's double slit experiment), light due to division of amplitude (Newton's ring). Diffraction: different types of diffraction, Fraunhofer diffraction at single and double slit; diffraction grating spectra and prism spectra; Basics of polarization.

5. PHYSICS OF ADVANCED MATERIALS:

Conductors: classical free electron theory (Lorentz –Drude theory) – electrical conductivity. Superconductors: definition – Meissner effect – type I & II superconductors – BCS theory (qualitative). Nanomaterials: introduction and properties – synthesis – top-down and bottom-up approach – applications.

REFERENCE:

1. E. Kreyszig, Advanced Engineering Mathematics, Wiley
2. D.J.Griffiths, *Introduction to Electrodynamics*, 3rd edition, Prentice Hall of India (2005)
3. A.Beiser, *Concepts of Modern Physics*, John Wiley (Asia) (2000)
4. Steven H. Simon, *The Oxford solid state basics*. OUP Oxford (2013)
5. S.O. Pillai, *Solid State Physics*. New Age International Publishers (2018)
6. A text book of Optics, Brijlal & Subramaniam, S. Chand Publication

Laboratory:

1. To determine unknown resistance using Carey Foster Bridge
2. To verify inverse square law using photodiode
3. To determine moment of inertia of an irregular sample
4. Non uniform bending method in determination of young's modulus of material
5. Determination of coefficient of viscosity of a liquid
6. Determination of surface tension of water by capillary rise

Course Name: Communication Skills**Course Code: HS 1101**

L	T	P	C
3	0	0	3

1. Soft Skills:	Its Meaning; Difference Between Soft Skills and Hard Skills; Its importance in both Personal and Professional life; Interpersonal Skills and Intrapersonal Skills
2. Interview Tips:	What is Interview? Reasons for Success in Interview, Reasons for its Failure, Commonly Asked Interview Questions; Types of Interview
3. Body Language:	Its Definition; Types of Body Language; Appropriate use of Body language and its Importance
4. Personality Development:	Definition; Different Aspects of Personality; Types of Personality; Its Importance
5. Public Speaking Skills:	Definition; How to develop the Public Speaking Skills; Presentation and the Art of Public Speaking Skills
6. Confidence Building:	What is Confidence; How to develop Confidence from within; Its Importance in Life
7. Group Discussion:	Definition; Its Ideal size; Group Behavior; Developing Leadership Quality; Its Importance.
8. CV and Resume:	Definition, Features of a good Resumé; Difference between a CV and a Resumé
9. Business Letter Writing:	Its Importance; Formal and the Characteristics of a Good Business Letter.

References:

1. A Practical Course in Spoken English. By J.K. Gangal, PHI, New Delhi, 3 rd Edition, 2020.
2. Communication Skills for Engineers By Murali krishna Sunita Mishufi, Pearson, 2 nd Edition.
3. Communication Skills for Engineers and Scientists By Sangeeta Sharma and Binod Mishra.
4. The Art of Public Speaking Skills By Dale Carnegie and J. Berg. Esenwein, 2013. Published by MG. Books, New Delhi.
5. Communication Skills for Professionals. By Nira Konar, PHI Learning Private Ltd., 2009

Name: ENGINEERING DRAWING
Course Code: ME 1149

L	T	P	C
0	1	4	3

Importance of Engineering Drawing; Conventions and standards: ISO; Scales; Loci of points; Curves; Orthographic projections: points, lines, planes and solids; Sections of solids; Isometric projections; Development of surfaces; Multi-view drawing; Intersection of solids.

Text Books:

1. N D Bhatt and V M Panchal, Engineering Drawing, 43rd Ed., Charator Publishing House, 2001.
2. K Venugopal, Engineering Drawing and Graphics, 3rd Ed., New Age International, 1998.

References:

1. M B Shah and B C Rana, Engineering Drawing, 2nd Ed., Pearson Education, 2009.
2. T E French, C J Vierck and R J Foster, Graphic Science and Design, 4th Ed., McGraw Hill, 1984.
3. W J Luzadder and J M Duff, Fundamentals of Engineering Drawing, 11th Ed., PHI, 1995.
4. A.J. Dhananjay, Engineering Drawing, TMH, 2008.

Course Name: Introduction to Computing
Course Code: CS 1201

L	T	P	C
3	0	4	5

- Module I: (Introduction to Computing) -
Fundamentals of computing, number systems and data representation, flowcharts, instructions, programs.

- Module 2 : (Introduction to C)
 - Data concepts in C: Constants, Variables, Expressions, Operators, and operator precedence in C.
 - Statements: Declarations, Input-Output Statements, Compound statements, Selection Statements. Conditions, Logical operators, Precedences. Repetitive statements, while construct, do-while Construct, for construct.
 - Data types, size and values. char, unsigned and signed data types.
 - Arrays. Strings. Multidimensional arrays and matrices.
- Module 3 : (Modular Programming and Example Problems) :
 - Functions: The prototype declaration, Function definition.
 - Function call: Passing arguments to a function, by value, by reference. Scope of variable names. Recursive function calls, Tail recursion. Analysing recursion, Tree of recursion, linear recursion.
 - Sorting problem: Selection Sort, Insertion Sort, Comparison between sorting algorithms. Sorting in multidimensional arrays. Sorting in strings.
 - Search problem: Linear search and binary search. Comparison between search procedures. Recursive and Iterative formulations.
- Module 4 : (More Data Types in C)
 - Pointers: Pointer variables. Declaring and dereferencing pointer variables. Pointer Arithmetic. Examples. Accessing arrays through pointers. Pointer types, Pointers and strings. String operations in C.
 - Structures in C: Motivation, examples, declaration, and use. Operations on structures. Passing structures as function arguments. type defining structures.
 - Self-referential structures. Dynamic Data Structures. Linked Lists. Examples.
 - File input-output in C. Streams. Input, output and error streams. Opening, closing and reading from files. Programming for command line arguments.

Text books:

1. A Kelly and I Pohl, A Book on C, 4th Ed., Pearson Education, 1999.
2. A M Tenenbaum, Y Langsam, and M J Augenstein, Data Structures Using C, Prentice Hall India, 1996.

References:

1. H Schildt, C: The Complete Reference, 4th Ed., Tata Mcgraw Hill, 2000
2. B Kernighan and D Ritchie, The C Programming Language, 4th Ed., Prentice Hall of India, 1988.

Programming Laboratory:

Programming Assignments: one each on the following topics.

- Linux, Editor, Compiler and Debugger
- Assignment statements
- Control Statements
- Loop Statements
- Arrays
- Functions
- Recursion
- File Input Output
- Numerical Methods.

Course Name: Basic Electrical Engineering

Course Code: EE 1201

L	T	P	C
3	0	2	4

Introduction: Definition of active, passive, linear, non-linear, unilateral, bilateral, symmetrical, unsymmetrical network with example. Basic concept of circuit elements and their uses. Sources: current sources and voltage sources, dependent source, independent source, Ohm's Law, Effect of temperature on resistance, KCL & KVL.

Network Theorems: Simplification of electrical circuits, Star delta conversion, Nodal and Mesh analysis, Thevenin Theorem, Norton's Theorem, Superposition Theorem, Maximum power transfer theorem, Reciprocity Theorem (All theorems with independent sources only).

A.C. Fundamentals and R, L, C Circuit: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, different forms of emf equations, phase, phase difference, average value, RMS value, form factor, peak factor. Series and parallel RL, RC, and RLC circuits and their phasor representation. Concept of Impedance and admittance: definition, relation, impedance, and admittance triangle. Complex power: active, reactive and apparent power, power triangle.

Electromechanical Energy conversion: Electromechanical laws: relation between electricity and magnetism, production of emfs (ac & dc), Faraday's law of electromagnetic induction, direction of induced emf, Lenz law, dynamically and statically induced emfs, self-inductances, and mutual inductances.

DC Machines: Principle of Operation, Classification, EMF and Torque equations, Characteristics of Generators and Motors, Speed Control Methods and Starting Techniques.

Single Phase Transformers: Principle of Operation of a Single Phase Transformer, EMF equation, Phasor diagram, Equivalent Circuit, Determination of Equivalent Circuit Parameters, Regulation and Efficiency of a single phase transformer.

Three Phase Induction Motor: Principle of Rotating Magnetic Field, Principle of Operation of 3- ϕ I.M., Torque-Speed Characteristics of 3- ϕ I.M., Starting Methods and Applications of Three Phase Induction Motors.

Text Books:

- 1) V. Del Toro: "Electrical Engineering Fundamentals", 2nd Edition Pearson Publication, 2015
- 2) Mittle V and Arvind Mittle "Basic Electrical Engineering", Tata McGraw-Hill, 2nd Edition, 2017
- 3) Kothari D.P; Nagrath I.J., 'Basic Electrical Engineering', 2nd Edition, Tata McGraw-Hill, 2001.

Course Name: Engineering Mathematics-II

Course Code: MA 1201

L	T	P	C
3	0	0	3

Vector functions of one variable - continuity and differentiability; functions of several variables - continuity, partial derivatives, directional derivatives, gradient, differentiability, chain rule;

tangent planes and normals, maxima and minima, Lagrange multiplier method; repeated and multiple integrals with applications to volume, surface area, moments of inertia, change of variables; vector fields, line and surface integrals; Green's, Gauss and Stokes theorems and their applications.

First-order differential equations - exact differential equations, integrating factors, Bernoulli equations, existence and uniqueness theorem, applications; higher-order linear differential equations - solutions of homogeneous and nonhomogeneous equations, method of variation of parameters, operator method; series solutions of linear differential equations, Legendre equation and Legendre polynomials, Bessel equation and Bessel functions of first and second kinds; systems of first-order equations, phase plane, critical points, stability.

Text Books:

1. G. B. Thomas (Jr.) and R. L. Finney, Calculus and Analytic Geometry, 9th Ed., Pearson Education India, 1996.
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

References:

1. T. M. Apostol, Calculus-Vol.2, 2nd Ed., Wiley India, 2003.
2. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Ed., Wiley India, 2009.
3. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
4. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.

Course Name: Basic Electronic Circuits

Course Code: EC 1201

L	T	P	C
3	0	2	4

Course Contents	UNIT I: Introduction to Electronic Devices: Passive devices, diode, bipolar junction transistor (BJT), metal oxide semiconductor field-effect transistor (MOSFET). Diode: basic structure and operating principle, current-voltage characteristic, large and small signal models, iterative and graphical analysis; Diode Applications: rectifier circuits (half-wave and full-wave rectifiers, rectifiers with capacitor filter), voltage regulator (using Zener diode), clipper (limiter) circuits, clamper circuits	9
	UNIT II: Bipolar Junction Transistor and their Applications: Structure and modes of operation; n-p-n and p-n-p transistor in active mode, DC analysis of both transistor circuits; BJT as an amplifier, small-signal equivalent circuits, single-stage BJT amplifier (common-emitter mode); BJT as a switch; concepts of feedback amplifier Operational Amplifier (Op Amp): ideal op amp; inverting amplifier, effect of finite gain, summing amplifier; non-inverting configuration, voltage follower; op amp applications like integrator and differentiator;	12
	UNIT III: Metal Oxide Semiconductor Field-Effect Transistors and their Applications:	9

	Structure and physical operation of n-type and p-type MOSFET; DC analysis of MOSFET circuits; MOSFET as an amplifier, small-signal equivalent circuits, single-stage MOSFET amplifier (common source mode); MOSFET as a switch;	
	UNIT IV: Digital Electronics Boolean algebra and rules of simplification; combinational circuits like adder, decoder, encoder, multiplexer and demultiplexer; sequential circuits like flip-flops, counters and shift registers	6
Text Books		
1.	Title	Electronic Devices and Circuit Theory
	Author	Robert L. Boylestad,
	Publisher	Prentice Hall
	Edition	7 th Edition
2.	Title	Digital Design
	Author	M. Morris Mano and Michael D Ciletti
	Publisher	Pearson
	Edition	5th Edition
Reference Books		
1.	Title	Microelectronic Circuits
	Author	Adel S Sedra and Kenneth C Smith
	Publisher	Oxford University Press
	Edition	7th Edition

Course Name: Environmental Sustainability
Course Code: CE 1201

L	T	P	C
3	0	0	3

Introduction to Environmental Sustainability. Overview of sustainability and its importance. Sustainable development goals (SDGs). Role of engineers in sustainability. Principles of Sustainable Engineering: Systems thinking in sustainability. Life cycle thinking and assessment. Energy and Sustainability: Energy consumption and its environmental impact. Renewable vs. non-renewable energy sources. Strategies for energy efficiency in engineering. Water Resources Management: Importance of water in sustainable engineering. Water scarcity and its challenges. Sustainable water management practices. Material Use and Sustainability: Impact of material use on the environment. Sustainable material selection. Recycling and reuse of materials.

Pollution and Waste Management: Types and sources of pollution. Waste management strategies. Sustainable practices to reduce pollution and waste. Sustainable Design and Manufacturing: Principles of sustainable design. Eco-design and green manufacturing practices, Case studies in sustainable product design. Environmental Impact Assessment: Introduction to environmental impact assessment (EIA), Methods and tools for EIA, Case studies on EIA in engineering projects. Sustainable Infrastructure and Urban Planning: Concepts of sustainable infrastructure, Urban planning for sustainability, Case studies in sustainable urban development.

Climate Change and Engineering: Understanding climate change and its impact, Role of engineering in mitigating climate change. Adaptation strategies in engineering practices. Sustainable Engineering Ethics and Policy: Ethical considerations in sustainable engineering, Role of policy and regulations in sustainability, Global and local, sustainability policies, Applications and Future Trends in Sustainable Engineering, Emerging trends in sustainable engineering, Applications of sustainable engineering principles, Future challenges and opportunities in sustainability.

TEXT BOOKS:

1. Bhakshi, Bhavik. Sustainable Engineering: Principles and Practice. Cambridge University Press
2. Basak Anindita, Environmental Studies, Pearson Education South Asia.

Course Name: Engineering Workshop

Course Code: ME 1249

L	T	P	C
0	1	4	3

Introduction to wood working, hand tools and machines; Introduction to fitting shop tools, equipment and operations; Introduction to sheet metal work; Introduction to pattern making; Introduction to moulding and foundry practice; Introduction to welding shop tools, equipment and operations; Introduction to machine shop tools, equipment, machines and operations; Introduction to black smithy shop; Simple exercises in wood working, pattern making, fitting, sheet metal work, welding, machining, black smithy and moulding.

Text Books:

1. I. H. Choudhury, Elements of Workshop Technology, Vol. I, Asia Publishing House, 1986.

References:

1. H Gerling, All about Machine Tools, New Age International, 1995.
2. W A J Chapman, Workshop Technology, Oxford IBH, 1975.