

PREAMBLE

METALLURGICAL ENGINEERING

Manpower development and capacity enhancement in Technical Education System is the big challenge for any educational organization . Needless to say that well trained technical manpower is the backbone of any growing economy in the era of fast industrialization. It has been the endeavor of the Technical Education Department of Govt. of West Bengal to take decisive steps to enhance the capacities of technical institutions with major emphasis on quality and excellence in technical education.

West Bengal State Council of Technical Education, an Autonomous Body, has been established in 1996 as per the guidelines laid down by the ALL INDIA COUNCIL OF TECHNICAL EDUCATION to develop the standard of technical education in West Bengal and to make the standard at par with the standard prevailing at all-India level, to implement the programme of strengthening the technical education and to monitor the performance of affiliated polytechnic.

The students coming out of these institutions find employment in the organized and unorganized sectors both in government and private organizations , goes for higher education for their vertical mobility and they form the backbone of the world of work.

Curriculum Document is a comprehensive plan for developing various curriculum materials and implementing given educational programme to achieve desired educational objectives. While working out the detailed contents and study and evaluation scheme, the following important elements have been kept in mind :

- i) Major employment opportunities of the diploma holders.
- ii) Modified competency profile of the diploma holders with a view to meet the changing needs due to technological advancement and requirements of various employment sectors.
- iii) Vertical and horizontal mobility of diploma pass outs for their professional growth.
- iv) Futuristic growth and approach in the trade .
- v) Ability to compete all India basis examination (for government job / PSU / private sector) .
- vi) Capacity building for vertical mobility of the students.

The document is an outcome of the feedback received from industry of different categories viz. small, medium and large scale which offer wage employment for the diploma pass outs. In every stage of planning and designing of this curriculum, suggestions and advice of experts representing industry, institutions of higher learning, research organizations etc. were sought and incorporated as per the requirement of curriculum. The document contains the study and evaluation scheme and detailed subject/course contents to enable the West Bengal Polytechnics to implement revised curriculum and to achieve the desired objectives and guide line of All India Council of Technical Education (AICTE) .

Salient Features of the Curriculum for Diploma in Metallurgical Engineering :

- Name of the Programme : Diploma in Metallurgical Engineering
- Duration of the Programme : Three years (06 Semesters)
- Entry Qualification : Madhyamik or equivalent level pass out / 10+2 WBSCVET pass out for direct entry in 3rd. Semester .
- Intake : As approved by AICTE
- Pattern of the Programme : Semester Pattern

The distribution of marks in Six Semesters for the Theoretical and Practical papers will be as follows :

Semester	T H E O R E T I C A L	P R A C T I C A L	T O T A L
1	550	250	800
2	450	350	800
3	400	400	800
4	400	500	900
5	500	350	850
6	500	350	850
TOTAL			5000

The rationale of the subject contents for the stream Diploma in Metallurgical Engineering have been introduced as per the requirement of life skills & technological skill as categorized in the following table.

(a) Life Skills	(b) Technological Skills Diploma engineers should possess following intellectual and motor skills in order to satisfactorily perform duties assigned to them :	
	Intellectual Skills	Motor Skills
1. Search information from various sources .	1. Basics of Metallurgy , its importance and relevance .	1. Handling of Metallurgical Microscope.
2. Develop communication ability	2. Properties of metals and alloys.	2. Sample preparation for metallography.
3. Develop Presentation skill	3. Extraction and refining processes of important metals.	3. Handling of all metal testing equipments.
4. Work as a member of a team/group and as leader.	4. Physical Metallurgy of Pliant carbon and alloy steel & Metallography .	4. Foundry and casting practices.
5. Collect field data .	5. Metal processing : Rolling, Forging, Welding ,Casting , Corrosion prevention , surface hardening..	5. Handling of Heat treatment furnaces and practices.
6. Develop Learning to learn .	6. Physical Metallurgy of important Non – Ferrous Metals & alloys.	6. Practices on metallurgical soft wares .
7. Write report for given task / work / project .	7. Ferro – alloys & Sponge Iron .	
8. Develop computer proficiency	8. Environment & Energy	
9. Develop observation skills .	9. Heat Treatment .	
10. Managerial skill & Entrepreneurship.		

The schedule of class hours are as follows:

FULL WORKING DAY						
1st Period	2nd Period	3rd Period	Recess	4th Period	5th Period	6th Period
10:30	11:30	12:30	13:30	13:50	14:50	15:50
—	—	—	—	—	—	—
11:30	12:30	13:30	13:50	14:50	15:50	1650

SATURDAY		
1st Period	2nd Period	3rd Period
10:30	11:30	12:30
—	—	—
11:30	12:30	13:30

WEEKLY PERIOD SCHEDULE

Details of Evaluation system : divided in two segments – A. Theoretical subjects and B. Practical subjects.

- A. Theoretical subject : Every theoretical subject having 100 marks of two parts :
1. Internal assessment part bearing 30 marks .
 2. External assessment part bearing 70 marks.

Internal assessment part : comprised of two parts namely -

- a. CT (class test) – bearing 20 marks. Two class test are to be conducted on 20 marks. Average of two will be regarded as the marks for CT.
 - b. TA (Teachers' s assessment) – it also consists of two parts namely Attendance - 4 marks and quizzes – 6 marks
- B. Practical subjects : Evaluation of by continuous internal assessment and external assessment at the end of semester .

Remarks / Observations :

1. Laboratory manuals be prepared as per the revised curriculum for each semester.
2. Orientation programs be organized for the teachers of concerned subjects to ensure proper and uniform implementation of the curriculum.
3. Question Bank be made available to the students at the beginning of the each semester. Workshops be planned, well in advance, to design the question bank based on educational principles. Question banking software may be used for the purpose.
4. Objective type questions may be set up by using OMR sheet , which may be evaluated through computerized and question may be set up using soft wares . Such system of evaluation would be beneficial for the students to have practice for competitive examinations. .

Member of the syllabus Sub - Committee for diploma in Metallurgical Engineering

Sl.No.	Name & Designation	Sub Committee
1.	Sri Soumen Kumar Bandyopadhyay , Officer In Charge , EIJE , Howrah	Chairman
2.	Sri Tapas Kumar De HOD & Lect. In Metallurgy ; EIJE , Howrah	Convener
3.	Sri Sutanu Kumar Mondal , HOD & Lect . in Metallurgy ; Purulia Polytechnic , Purulia	Member
4.	Sri Amlan Ghara , HOD, Lect. In Metallurgy ; ICV Polytechnic , Jhargram	Member
5.	Sri B.K.Khan , Lecturer in Metallurgy , Asansol Polytechnic , Howrah	Member
6.	Dr. P.S.Banerjee Adjunct Professor , BESU , Shibpur , Howrah	Expert Member
7.	Dr. S.Chakraborty Ex – Senior Vice President , Usha Martin Limited	Expert Member
8.	Sri Arnab Chowdhury Plant Head , Kiswok Industries Ltd., Howrah	Expert Member
9..	Sri Bidyut Chakraborty , General Manager , Arc Vac Ltd. , Hooghly .	Expert Member
10.	Sri Anuja Sankar Ray , Director – Technology , Arc Vac Ltd. , Hooghly .	Expert Member
11.	Dr. Jana Bhattacharya , Senior Scientific Officer , Grade – II , CQA (Metal) , Ichapur .	Expert Member

=====

METALLURGICAL ENGINEERING

CURRICULAR STRUCTURE FOR **PART – 2 (2nd. YEAR)** OF THE FULL-TIME DIPLOMA COURSES IN ENGINEERING & TECHNOLOGY

WEST BENGAL STATE COUNCIL OF TECHNICAL EDUCATION											
TEACHING AND EXAMINATION SCHEME FOR DIPLOMA IN ENGINEERING COURSES											
DURATION OF COURSE: 6 SEMESTERS											
SEMESTER: THIRD											
BRANCH: METALLURGICAL ENGINEERING											
SR. NO.	SUBJECT	CREDITS	PERIODS			EVALUATION SCHEME					
			L	TU	PR	INTERNAL			ESE	PR	Total Marks
						TA	CT	Total			
1	FUNDAMENTALS OF ELECTRONICS	3	2	-	2	5	10	15	35	50	100
2	FUNDAMENTALS OF METALLURGY	4	4	-	3	10	20	30	70	50	150
3	METALLURGICAL THERMODYNAMICS	4	4	-	-	10	20	30	70	-	100
4	MECHANICAL TESTING OF METALS	4	4	-	4	10	20	30	70	10	200
5	MECHANICAL ENGINEERING	3	2	-	2	5	10	15	35	50	100
6	WORKSHOP PRACTICE	4	-	-	3	-	-	-	-	100	100
7	PROFESSIONAL PRACTICE - I	3	-	-	3	-	-	-	-	50	50
Total:		25	16	0	17	35	70	105	245	400	800
STUDENT CONTACT HOURS PER WEEK: 33 hrs , DURATION : 15 WEEKS / SEMESTER											
Theory and Practical Period of 60 Minutes each.											
L- Lecture, TU- Tutorials, PR- Practical, TA- Teachers Assessment, CT- Class Test, ESE- End Semester Exam.											

WEST BENGAL STATE COUNCIL OF TECHNICAL EDUCATION											
TEACHING AND EXAMINATION SCHEME FOR DIPLOMA IN ENGINEERING COURSES											
DURATION OF COURSE: 6 SEMESTERS											
SEMESTER : FOURTH											
BRANCH : METALLURGICAL ENGINEERING											
SR. NO.	SUBJECT	CREDITS	PERIODS			EVALUATION SCHEME					
			L	TU	PR	INTERNAL SCHEME			ESE	PR	Total Marks
						TA	CT	Total			
1	IRON MAKING PROCESS	4	3	-	1	10	20	30	70	50	150
2	PHYSICAL METALLURGY	4	3	-	3	10	20	30	70	100	200
3	METAL WORKING	4	3	-	2	10	20	30	70	50	150
4	FUEL, FURNACE & REFRACTORY	3	3	-	2	10	20	30	70	50	150
5	ELECTRICAL ENGINEERING	3	2	-	2	5	10	15	35	50	100
6	COMPUTER PROGRAMMING	3	1	-	2	-	-	-	-	50	50
7	DEVELOPMENT OF LIFE SKILL – II	2	1	-	2	-	-	-	-	50	50
8	PROFESSIONAL PRACTICE - II	2	1	-	2	-	-	-	-	50	50
Total :		25	17	-	16	45	90	135	315	500	900
STUDENT CONTACT HOURS PER WEEK: 33 hrs ; DURATION : 15 WEEKS / SEMESTER											
Theory and Practical Period of 60 Minutes each.											
L- Lecture, TU- Tutorials, PR- Practical, TA- Teachers Assessment, CT- Class Test, ESE- End Semester Exam.											

TOTAL MARKS IN PART – II = 800 + 900 = 1700

**CURRICULAR STRUCTURE FOR PART – 3 (3RD. YEAR) OF THE FULL-TIME
DIPLOMA COURSES IN ENGINEERING & TECHNOLOGY**

WEST BENGAL STATE COUNCIL OF TECHNICAL EDUCATION											
TEACHING AND EXAMINATION SCHEME FOR DIPLOMA IN ENGINEERING COURSES											
DURATION OF COURSE: 6 SEMESTERS											
SEMESTER : FIFTH											
BRANCH : METALLURGICAL ENGINEERING											
SR. NO.	SUBJECT	CREDITS	PERIODS			EVALUATION SCHEME					
			L	TU	PR	INTERNAL			ESE	PR	Total Marks
						TA	CT	Total			
1	STEEL MAKING PROCESS	4	4	-	2	10	20	30	70	50	150
2	FOUNDRY TECHNOLOGY	4	4	-	4	10	20	30	70	100	200
3	METAL PROCESSING	3	4	-	2	10	20	30	70	50	150
4	ELECTIVE – I : ALLOY STEEL & CAST IRON	4	4	-	-	10	20	30	70	-	100
5	ENERGY & ENVIRONMENT CONTROL	3	3	-	-	10	20	30	70	-	100
6	COMPUTER AIDED DRAFTING	3	-	-	2	-	-	-	-	50	50
7	INDUSTRIAL PROJECT & ENTREPRENEURSHIP DEVELOPMENT	2	-	-	2	-	-	-	-	50	50
8	PROFESSIONAL PRACTICE - III	2	-	-	2	-	-	-	-	50	50
Total:		25	19	-	14	50	100	150	350	350	850
STUDENT CONTACT HOURS PER WEEK : 33 hrs ; DURATION : 15 WEEKS / SEMESTER											
Theory and Practical Period of 60 Minutes each.											
L- Lecture, TU- Tutorials, PR- Practical, TA- Teachers Assessment, CT- Class Test, ESE- End Semester Exam.											

WEST BENGAL STATE COUNCIL OF TECHNICAL EDUCATION											
TEACHING AND EXAMINATION SCHEME FOR DIPLOMA IN ENGINEERING COURSES											
DURATION OF COURSE: 6 SEMESTERS											
SEMESTER : SIXTH											
BRANCH : METALLURGICAL ENGINEERING											
SR. NO.	SUBJECT	CREDITS	PERIODS			EVALUATION SCHEME					
			L	TU	PR	INTERNAL SCHEME			ESE	PR	Total Marks
						TA	CT	Total			
1	ADVANCE ENGINEERING MATERIALS & CORROSION METALLURGY	3	4	-	-	10	20	30	70	-	100
2	HEAT TREATMENT TECHNOLOGY	4	4	-	4	10	20	30	70	100	200
3	ELECTIVE – II : FERRO ALLOYS & DRI	3	4	-	-	10	20	30	70	-	100
4	NON - FERROUS METALLURGY	3	4	-	-	10	20	30	70	-	100
5	INDUSTRIAL MANAGEMENT	3	4	-	-	10	20	30	70	-	100
6	PROJECT WORK & SEMINAR	4	-	-	6	-	-	-	-	100	100
7	PROFESSIONAL PRACTICE - IV	2	-	-	3	-	-	-	-	50	50
8	GENERAL VIVA VOCE	3	-	-	-	-	-	-	-	100	100
T		25	20	-	13	50	100	150	350	350	850
STUDENT CONTACT HOURS PER WEEK : 33 hrs ; DURATION : 15 WEEKS / SEMESTER											
Theory and Practical Period of 60 Minutes each.											
L- Lecture, TU- Tutorials, PR- Practical, TA- Teachers Assessment, CT- Class Test, ESE- End Semester Exam.											

TOTAL MARKS IN PART – II = 850 + 850 = 1700