

NIMS UNIVERSITY, JAIPUR



SYLLABUS

**CERTIFICATE IN HEALTH CARE WASTE
MANAGEMENT**

GENERAL INFORMATION

Name of Trade: Certificate in Health Care Waste Management
Entry Qualification: 10+2 with Physics, Chemistry & Biology
Duration: 6 Months

Examination Scheme

	Theory	Practical
	Univ. Exam	Univ. Exam
Paper-I	100	100
Paper-II	100	

Paper-I: Sources, Hazards and Rules for Hospital Waste

Week	Theory	Practical
1-2	Introduction , Definition of General and Hazardous health care waste, infectious waste, Genotoxic waste, Waste Sharps, Biomedical waste-categories, Categorization and composition of Biomedical waste, Specification of materials. Colour coding, Sources of Health care wastes, Hospital & Health care establishments & other sources.	Waste survey in a Hospital Practice on Categorization of Hospital waste
3	Health Impacts of Biochemical waste. Direct & Indirect hazards. Potential health hazards. Persons at risk. Basic information about-What infection? Infection agents on organizations spread of infection basic information about Hospital acquired infection.	
4	Legislation and policies on health care waste management. Biomedical waste management and Handling Rules, 1998 and its amendment thereafter. CPCB (Central Pollution control Board) guidelines. Some idea on safe disposal of Radioactive Waste Rules, 1995 guidelines of BARC.	
5.	International Scenario World Health Organization guidelines on a) Management of wastes from Hospital waste b) Management of Hospital wastes in developing countries	
6-7	Basic steps in Health Care Waste Management Segregation at the point of generation sharp Decontaminating/Disinfections unit containers for autoclaving sharp waste containers for storage & transportation autoclaving / shredding/incrimination/ bio hazard symbols. Microwave, Hydropulping, plasma torch	Practice (on simulated basis) on Segregation Poly bags collection Bin Autoclaving Incineration Labeling Use, Care & maintenance of Autoclave, Incinerator Microwave Hydro pulping plasma torch

Paper-II: Collection, Handling and Disposal of Hospital Waste

Week	Theory	Practical
8	Collection & Handling of waste	Practice on collection & handling of waste (Simulated) Pre-treatment
9	On site Pre-Treatment of waste	Operation
10	Mechanical Treatment & Chemical Disinfections Store & Off - Site transportation	Practice on : Thermal Chemical Disinfections of (Simulated) waste
11	Treatment-in-site & off-site (common treatment facilities) Liquid waste treatment Different technologies, cost aspects	Demonstration/Practice
12-13	Conventional Treatment Technologies a) Wet thermal technology b) Incineration-different models Alternative Treatment Technologies a) Microwave Technology b) Rotaclave system c) Hydroclave system d) Electro Thermal Reactivation(ETP) e) Treatment Process f) Electron beam Technology g) Plasma Pyrolysis/Gasification systems	Practice on digging Vats, Pits, Trenches Demonstration / Practice on whatever is available
14-15	Treatment of General/Non-infectious wastes a) Composting – Rotating Jumbling system French composting b) Vermi-composting	Demonstrations/Practice on a) Composting b) Vermi Composting
16	Disposal Technologies a) Sharp Disposal pit b) Deep-burial pit c) Secured Land fill	Demonstrations/Practice on Disposal
17	Waste Minimization , Recycling , Re-use	Demonstration in Recycling
18-19	Health & Safety Practices Usage of protective equipment Occupational health programmes & safety practices Emergency measures	Occupational Safety/practices
20	Management of non-clinical support devices, Pretreatment of linen, laundry, central	Practice/Demonstration on pretreatment of linen,

	sterilization unit (CSSD)	laundry, central sterilization
21-22	Estimate of various items of waste management based on no. of wards, no. of beds in each ward, other units like Laboratory, Kitchen- Waste Audit	Practice on waste Audit
23	Hospital Budget allocation for Hospital waste management. Maintenance of Records , Annual Report	Estimating various items of waste management Practice in maintenance of records.
24	Visit to Hospitals & Health Care Units	Visit
25-26	Revision & Class test	

TOOLS & EQUIPMENT REQUIRED

S.No	Items	Quantity
1.	Red Bins with Bio-hazard Symbol(for infectious waste)	2 nos.
2.	Black Bins (for general waste)	2 nos.
3.	Buckets	2 nos.
4.	Blue Bins with Bio-Hazard symbol (for sharp decontamination)	2 nos.
5.	Syringe and Needoe Cutter	16 nos.
6.	Sieved Bucket	6 nos.
7.	Trolleys for internal Transport of general waste	6 nos.
8.	Trolleys for internal Transport of infectious waste with Bio-hazard symbol	6 nos.
9.	Red bags with Bio-hazard symbol	2 nos.
10.	Black Bags	2 nos.
11.	Yellow Bags with Bio-hazard symbol	2 nos.
12.	Blue Bags with Bio-hazards symbol	2 nos.
13.	Autoclavable bags (Red with bio-hazard symbol	2 nos.
14.	Card board boxes	6 nos.
15.	Gloves	16 nos.
16.	Masks	16 nos.
17.	Gumboots	16 nos.
18.	Aprons	16 nos.

REQUIREMENT OF MATERIALS

1. Bags and Bins

The total number of bags and bins that would be required per day may be estimated as per the following Principle:

1. Red Bag - 6 nos.
2. Black Bag - 6 nos.
3. Yellow Bag - 6 nos.
4. Blue Bag - 6 nos.

The consolidated annual/half yearly/quarterly estimate of number of bags and bins of different colour codes may be made from the above principle keeping a suitable buffer.

Autoclave with all accessories no.	1
Autoclavable Bags and Other Consumable for Autoclaving no.	6
Microwave Oven	1 no.
Water softener no.	1
Trolleys for internal segregated transportation no.	6
Bleaching powder	6 kgs.

The material grade and thickness of autoclavable bags has been finalized taking into consideration the high temperature & pressure conditions that these have to withstand. The size and qualitative specification of such bags are given in Table A-I

Each autoclavable bag is expected to accommodate 5 red bags containing bio-medical waste, from which the annual requirements of autoclavable bags have been estimated. After treatment the treated autoclavable bags shall be placed in black bags of similar dimensions before storage in the black chamber of the vat. The requirements of autoclavable bags may thus be estimated.

The other requirements for effective functioning of the autoclave are :

1.	Annual Maintenance contract with the supplier for regular maintenance of Equipment , servicing , providing consumables such as water softener , printer cartridge , paper roll, etc.	
2.	Fuel- High Speed Diesel (HSD) – 3 Litres per cycle (Taking into consideration the power – cut, which compels a new cycle). Considering 4 autoclavable bags per cycle, 2 cycles of operation is envisaged per day requiring 11 litres per day or about 4,015 litres per year. Also a drum or container shall be required for storing the fuel. This is applicable wherever the fuel to run the boiler is HSD (not applicable where operated by electricity).	10 litres
3.	One large size bin (60 litre capacity) for	1 no.

	collecting the treated bags from the autoclave before these are transported to the vat.	
4.	Water softener – for supply of boiler feed water of required quality for the autoclave about 20-25 ml of softener is required per day. Thus 2 cans of 5 litres capacity would be required in a year.	1 no.
5.	Jute Rag – to be placed under the autoclavable bag in the treatment chamber (5 ft × 4 ft in size). Each rag can be used for 2 days.	2 nos.
6.	Electric and water supply connection inside autoclave room.	
7.	Mechanical and electrical tools such as electric tester , Wrench (for opening the chamber), Wire Brush (for cleaning the chamber after each cycle) etc.	2 each
8.	Printer cartridge and paper (3” wide) for the printer of the autoclave . It is envisaged that 3 printer cartridges and 6 rolls or paper shall be required in year.	6 rolls
9.	Grease for lubricating the machine parts for smooth functioning. About 1 kg. grease shall be required per month.	
10.	Heavy duty gloves , apron , mask , gumboot for safety of the operators.	2 each
11.	Register for keeping records	16 nos.

- ii. Syringe & Needle Cutter , Sieved Bucket , Blue Bin and Card-board Box
The basis of requirements of syringe & needle cutters, blue bin and sieved bucket depends on the number of wards/units where disposable syringes are in use. These shall be installed in the nursing stations within the wards and other units such as a T , laobur rom, Emergency Pathological Laboratory (where blood is collected to carry out tests), Vaccination units, etc. and wherever injections are being administered. The installations of these have to be optimized wherever possible. The requirement of card-board boxes, shall be similar to the requirement of blue bags. Based on this principle, the consolidated annual/half yearly / quarterly requirements of all these above items may be prepared inclusive of 10% buffer stock.

- iii. Trolleys for Internal Segregated Transportation
Internal transportation of waste from the wards and other units to the temporary storage area/on-site disposal area is to be carried in dedicated trolleys. The general waste shall be transported in black coloured trolleys and the bio-medical waste in red coloured covered trolleys marked with bio-hazard symbol. While procuring the trolleys , it should be kept in mind that the trolleys should have the following features.
- Easy to load and unload
 - Easy to clean/disinfect
 - No sharp edges for preventing damage/tearing of waste bags.

While estimating number of trolleys that would be required for segregated internal transport, the following features should be taken into consideration:

- Layout of the Hospital Building
- Ease of operating the trolleys
- Time required for internal transport
- Expected number of bags to be generated daily

iv. **Personal Protective Equipment**

Personal protective equipment (PPE) such as, gloves, masks, gum bots and aprons are to be provided to the sweepers of the hospital. The following table gives an indicative estimate of annual requirements of PPEs for the sweepers of hospital with buffer stock:

Estimates of PPE for the Waste Handlers in the Hospital:

Gloves	-	6 nos.
Masks	-	6 nos.
Gum Boots	-	6 pairs
Aprons	-	6 nos.
Bleaching Powder	-	6 kgs.

The quantity of bleaching powder that would be required annually for chemical treatment of sharp waste, and laboratory wastes in the hospital can be estimated as follows:

Total Amount of Bleaching Powder (in Kg.)=20 gms* × number of wards/units using needle cutter+200 gm** × number of laboratories)