

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

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List of documents submitted in support of the Qualifications File

1. Annexure – I: Affiliation Norms
2. Annexure – II: IBSC Concept Note
3. Annexure – III: Model Curriculum
4. Annexure – IV: Letter from Industry to support the proposal
5. Annexure – V: Occupational Mapping & Skill Gap Study
6. Annexure – VI: Occupational Mapping Report
7. Annexure – VII: List of IBSC Partner Institutions

SUMMARY

1	Qualification Title:	Certificate in Biomedical Engineering
2	Qualification Code, if any	IBSC / BME / 01
3	NCO code and occupation	Bio-Medical Engineer – 2143.0200
4	Nature and purpose of the qualification (Please specify the duration of the certificate validity)	<p>Nature: It is a Certificate course in Biomedical Engineering</p> <p>Purpose: Learners who attain this qualification are competent in Anatomy & Physiology, Fundamentals of Electricity and Electronics, Medical Terminology, Biomedical Equipment Maintenance & Troubleshooting and Hospital Engineering & Management.</p> <p>Qualified learners can able to perform maintenance of various medical equipments like Patient monitor, ECG Machine, EEG Machines, TMT, 2D Echo, Defibrillator, Ventilators and other Radiology equipments. Also learn the documentation process and records maintenance.</p> <p>IBSC Skill Certification would certify freshers and experienced bio-medical engineers & technicians, this course is a short-term training and valid for life time.</p>
5	Body/bodies which will award the qualification	Indian Biomedical Skill Consortium (IBSC)
6	Body which will accredit providers to offer courses leading to the qualification	Quality Council of India (QCI)
7	Whether accreditation/affiliation norms are already in place or not, if applicable (if yes, attach a copy)	Norms are in place for regulating the training centres and the assessment process. Affiliation norms are attached. Annexure - I
8	Occupation(s) to which the qualification gives access	Junior Biomedical Engineer / Junior Biomedical Technician

		*Title will be decided as per qualification of candidates. With engineering qualification “Engineer” & with diploma qualification “Technician”
9	Job description of the occupation	<p>The objective of the training program is to develop a pool of workforce which can be employed by focuses on the acquisition of skills necessary to use equipment designed to diagnose, and fix malfunctioning medical equipment.</p> <p>As per the training modules at the end of the training, the candidate would be certified to perform following activities -</p> <ol style="list-style-type: none"> a) Maintain, repair or provide technical support for biomedical Equipment. b) Train clinicians & other healthcare professionals on basic medical equipments like BP apparatus, ECG Machines, Patient Monitors etc. c) Evaluate the safety, efficiency and effectiveness of biomedical equipment. d) Liaising with medical, engineering & scientific staff. e) Writing reports and documentation <p>The detail progression is given in the item no 30 of this document.</p>
10	Licensing requirements	NOT applicable
11	Statutory and Regulatory requirement of the relevant sector (documentary evidence to be provided)	NOT applicable
12	Level of the qualification in the NSQF	Level – 5
13	Anticipated volume of training/learning required to complete the qualification	500 Hours
14	Indicative list of training tools required to deliver this	Syllabus, e-study materials, Sample question banks, Hands-on-workshops

	<p>qualification</p> <p>etc.</p> <p>List of tools and laboratories used to deliver this training program:</p> <p>Electronics Laboratory:</p> <ul style="list-style-type: none">i) Digital Storage Oscilloscopeii) Function generatoriii) Multiple Output DC Power Supplyiv) Programmable DC Electronic Loadv) Digital Touch Screen Multimetervi) Mixed Signal Oscilloscopevii) Data Acquisition Systemviii) Real Time Signal Analyzerix) Vector Network Analyzerx) Arbitrary Function generatorxi) Wide band RF signal Vector Generator.xii) Digital Storage Oscilloscope <p>Calibration Laboratory:</p> <ul style="list-style-type: none">i) Incubator Analyzer with Accessories & Automation softwareii) Gas Flow Analyzer with Vapor with Accessories & Automation softwareiii) Infusion Device Analyzer with Accessories & Automation softwareiv) Vital Signs Simulator with Accessories & Automation softwarev) Electrical Safety Analyzer with Accessories & Automation softwarevi) Electrosurgical Analyzer with Accessories & Automation softwarevii) Defibrillator Analyzer with Accessories & Automation software <p>List of other Tools</p> <ul style="list-style-type: none">1. Connecting screwdriver2. Neon tester3. Screw driver set4. Long nose pliers5. Soldering iron6. Tweezers7. Digital Multimeter
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		<ol style="list-style-type: none"> 8. Electric drill 9. DC / AC Ammeter 10. Thermo-coupler meter 11. Watt meter 12. Insulation tester 13. Service oscillator 14. Signal tracer 15. Audio Frequency Oscillator 16. Micro Wave diathermy 17. Ultrasonic diathermy 18. ECG recorder 19. Bed Side monitor 20. Defibrillator 21. 60 mA mobile X-ray equipment 22. Surgical diathermy 23. Infusion pump 24. Syringe pump 25. Ultrasound doppler 26. CPAP 27. BIPAP 28. Nebulizer 29. Flow meter 30. Photo therapy 31. Radiant warmer 32. OT Table 33. ICU bed 34. Phono cardiogram 35. Short wave diathermy 36. EMG 37. Tread mill Test 38. Analytical balance 39. Centrifuge 40. Water bath 41. Incubator 42. Hot air oven
15	<p>Entry requirements and/or recommendations and minimum age</p>	<p>Minimum criteria:</p> <p>i) For Technician: Diploma in biomedical / medical electronics / electrical / any other related filed.</p> <p>ii) For Engineers: B. E / B. Tech in Biomedical Engineering, Biomedical Instrumentation</p>

		<p>Engineering / Medical Electronics / any other related field.</p> <p>Candidates who qualified related IBSC modules and approved by IBSC are exempted to take the training on modules. Upon the registration to the training program the certificate will be issued to such candidates.</p>
16	Progression from the qualification (Please show Professional and academic progression)	<p>Professional Progression</p> <p>After the due certification on qualifying all the desired skills, it is expected that the candidate will attain employment as Junior Biomedical Engineer / Junior Biomedical Technician in health care industry.</p> <p>The candidate may further attain supervisory role as he / she progresses in their careers professionally after gaining adequate experience.</p> <p>After gaining certain experiences the candidate will be promoted to higher levels such as Biomedical Engineer, Senior Biomedical Engineer, Biomedical Manger, Biomedical Head and so on.</p> <p>The candidates can also work in Administration and contribute in Healthcare Industry.</p> <p>Academic Progression</p> <p>For diploma candidates they can entry directly to second year of engineering program in Bio-medical.</p> <p>For engineering candidates, they can pursue M. Tech Biomedical or MBA in Hospital Administration.</p>
17	Arrangements for the Recognition of Prior learning (RPL)	<p>When the individual has relevant experience, he is assessed through a Recognition of Prior Learning (RPL)</p>

	<p>programme.</p> <p>The candidate is assessed through a combination of theory test, practical knowledge and verbal questioning or VIVA.</p> <p>The test is designed by SME or Subject Matter Expert who prepares the test material with total integrity and objectivity.</p> <p>The candidate is administered a written test of 45 minutes and a practical test of 1.5 to 2 hours duration.</p> <p>Upon successful completion of the test the candidate is declared competent for yet to be competent, depending upon which the training is advised.</p> <p>The assessment is conducted by trained and qualified assessors appointed by IBSC. The tests are administered under strict confidentiality and absolute lack of bias or prejudice.</p>
<p>18</p>	<p>International comparability (research evidence to be provided)</p> <p>Association for the Advancement of Medical Instrumentation, USA (AAMI) & American College of Clinical Engineering (ACCE), USA.</p> <p>ACCE is a global leader in Medical Technology Certification (applicable world-wide). IBSC has signed MoU with ACCE for bilateral acceptance of practice.</p> <p>International documentation reviewed for the same included that following –</p> <p>IBSC forges global partnership with AAMI to certify biomedical engineering professionals</p>

		http://www.pharmabiz.com/NewsDetails.aspx?aid=110870&sid=1 IBSC inks pact with AAMI https://www.biospectrumindia.com/news/74/11546/ibsc-inks-pact-with-aami.html		
19	Date of planned review of the qualification.	It is proposed that the qualification to be reviewed every three years. *from the date of clearance of the Qualification Pack		
20	Formal structure of the qualification Mandatory components Certificate in Biomedical Engineering 70 % of the teaching hours will be practical / videos & presentation, demonstrations and 30% will be theory.			
	Title of component and identification code/NOSs/Learning outcomes	Estimated size (learning hours)	Level	
(i)	Course Code	NOSs		
	BM01	Anatomy and Physiology	50	5
	BM02	Fundamentals of Electricity and Electronics	100	5
	BM03	Healthcare Technology Function and Operation	200	5
	BM04	Hospital Engineering & Management	100	5
	BM05	Medical Terminology for Engineers	50	5
	Sub Total		500	5
	Total duration of the program (including internship/training)		500	5

SECTION 1
ASSESSMENT

21	Body/Bodies which will carry out assessment: M/s MeritTrac Testing Services, Bangalore has been selected through bidding and shall conduct the online assessment test across India. Indian Bio-Medical Skill Consortium shall develop the content of assessment.
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22	<p>How will RPL assessment be managed and who will carry it out?</p> <p>IBSC conducts QP-NOS based direct three-way assessment for each and every candidate applied for recognition of prior learning (vis. Certifying the un-certified but skilled workforce who acquired skills through years of experience). Here, the candidates may undergo short-term training of gaps identified.</p> <p>1) Registration: The candidates need to submit registration form online along with uploading of scanned copies of some mandatory documents (work experiences if any). The applications will be screened on the basis of the eligibility criteria and approved candidates will be dully informed.</p> <p>2) Pre-Assessment: The candidates who has relevant experience, he is assessed through a Recognition of Prior Learning (RPL) programme. The candidate is assessed through a combination of theory test, practical knowledge and verbal questioning or VIVA. The test is designed by SME or Subject Matter Expert who prepares the test material with total integrity and objectivity. The candidate is administered a written test of 45 minutes and a practical test of 1.5 to 2 hours duration. Upon successful completion of the test the candidate is declared competent for yet to be competent, depending upon which the training is advised. The assessment is conducted by trained and qualified assessors appointed by IBSC. The tests are administered under strict confidentiality and absolute lack of bias or prejudice. Those who score more than 80% they can directly appear for final assessment. Those who score less than 80% they should undergo skill training program.</p> <p>3) Final Assessment: The shortlisted candidates from pre-assessment are finally selected for final assessment. The assessment is conducted by Indian Biomedical Skill Consortium (IBSC).</p>
23	<p>Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, reliable and fair and show that these are in line with the requirements of the NSQF.</p> <p>The process of assessment followed ensures that the assessment is strictly in accordance to the qualification pack, the NOS and PCs mentioned. Validity depends upon how well the assessment actually measures the learning outcome. The test is prepared against the assessment criteria set by the IBSC, which has in turn identified the core skills and the supplementary skills in terms of NOS and PC. That the test is designed according to the assessment criteria and is prepared by subject matter experts who are</p>

established in their fields ensures the validity of the test.

Consistency of the test is dependent on the fact that the assessment generates consistent results inspite of change in evaluators, location etc. The MCQ pattern followed for the theory rules out any element of prejudice or subjectivity on the part of the evaluator. The practical is designed in such a manner that the core skills and supplementary skills are tested and evaluated. The trained assessors who are experts in the field ensure that the test is consistent. Fairness is ensured as the students are given equal opportunity irrespective of their religion, social back ground or gender. The roll numbers assigned to the candidates conceal their identity and making the evaluation impartial.

Assessment Guidelines:

1. The criteria for assessment is based on module/s for which the candidate has enrolled out of the total course modules.
2. The individual modules are mapped with specialized skill in the area of Healthcare Technology.
3. Individual module carries equal weightage and marks.
4. The outcome of the learning process is based on best practices adopted in Healthcare Technology.

The Assessment Parameters adopted during assessment:

- 1) Knowledge of equipment, limitation of use of tools and equipment, and methods & procedure.
- 2) Understanding of functioning of equipment & tool, criteria to be used in selecting tools for given
- 3) job, and the process of measurement.
- 4) Skill in finishing to required measurement, handling measurement & calculations, handling tools
- 5) and equipment with ease, finishing neatly.
- 6) Abilities to take corrective steps, use correct work habits, take measurements, complete the job
- 7) within stipulated time, and adopt safe practices.
- 8) Attitude towards the work, accurate & precise work and co-workers and supervisor.

Theory Test / Internal Assessment:

- 1) The questions shall be normally of objective type involving selection of correct response rather than writing sentences.
- 2) The question paper shall contain sketches/ diagrams/ photographs/ drawing to overcome the problems of reading comprehension.
- 3) The test shall be of short duration.

Practical Test / Viva-voice:

It shall be able to test:

- 1) Manipulative skills to handle tools and equipment.
- 2) Speed in doing work.
- 3) Accuracy maintained
- 4) Quality in workmanship.
- 5) Sequence of performance.
- 6) Economical use of material.
- 7) All the competencies prescribed in the course curriculum.

Testing & Certification Process:

Application Process:

1. The candidate enrolls for the modules for assessment.
2. IBSC would declare a specific period for registration for assessment.
3. Applicant will fill the details along with supporting documents.
4. The uploaded documents will be verified & approved by IBSC.
5. Applicant can book the online examination centre as per the requirement.
6. After the online examination, IBSC will prepare the certification based on online test marks.
7. The verification & approval section will be recommended for the final certification.
8. The applicant will be communicated by Email & SMS about award of certificate.

Assessment Process:

1. Candidate should reach the venue 45 minutes before the start of the test.
2. Candidates should carry valid training ID card or else an ID card approved by the Government of India (PAN Card, Aadhar Card, DL, etc).
3. Candidates without any identification are not allowed to take the test.

Candidates should follow these guidelines:

- a) No usage of electronic devices (mobiles and calculators) during the test
- b) No malpractice during the test hours
- c) Talking is not allowed during the test
- d) There are 30 (Varies for different QPs) multiple choice questions
- e) Each question has only one correct answer
- f) There is no negative marking
- g) Candidates need to attempt all questions to complete the test.
- h) Pencil, eraser, and white paper will be provided to all the candidates.

	<p>Examination Procedure:</p> <ol style="list-style-type: none"> 1) Mode of Application: Online 2) Examination Pattern: Objective 3) Total number of Modules: 5 4) Number of questions in each module: 30 5) Time duration for examination of one module: 90 minutes <p>Qualifying Criteria:</p> <ol style="list-style-type: none"> 1) Minimum 60% in each module is required to qualify the exam. 2) If any candidate has not qualified any module/s s/he can take re-exam in that module/s. <p>Post-assessment activities</p> <ol style="list-style-type: none"> 1) The testing partner shall share the consolidated report (attendance sheet, results sheet) to the IBSC immediately after the completion of assessment. 2) IBSC will verify each application and approve the test scores. 3) Uploading outcome of the assessment and photos in portal by IBSC. 4) IBSC upload the results within one week of the assessment date. 5) IBSC shall maintain assessment records. 6) Publishing of results and Certificate issue 7) Certificates which will be issued carry QR code, qualified modules, technology competency score. 8) The certificate is issues under the aegis of NSDC and partner affiliations. <p>Direct Assessment:</p> <ol style="list-style-type: none"> 1) Candidates desire to get the skills certified have to apply online. 2) IBSC would declare a specific period for registration for assessment. 3) Applicant will fill the details along with supporting documents. 4) The uploaded documents will be verified & approved by IBSC. 5) Applicant can book the online examination centre as per the requirement. 6) After the online examination, IBSC will prepare the certification based on online test marks. 7) The verification & approval section will be recommended for the final certification. 8) The applicant will be communicated by Email & SMS about award of certificate.
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24. Assessment evidences

Title of Component: Certificate in Biomedical Engineering

	Compulsory NOS		Marks Allocated
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Outcomes to be assessed/NOSs to be assessed	Assessment criteria for the outcome	Total	Out of	Viva-voice	Practical
IBSC / BME / BM01 Anatomy and Physiology	PC1. Understand the General Anatomy: Various Anatomical terms, axis, plane	25	5	2	3
	PC2. Able to demonstrate of Human Skeleton: Anatomical Position, Axis, Plane, Identification of various bones & joints, Demonstration of movement possible at various joints		5	2	3
	PC3. Have knowledge of bones: composition & function, classifications, various terms & marking on the bones.		5	2	3
	PC4. Have knowledge of blood: composition & function, blood groups.		5	2	3
	PC5. Acquire detailed knowledge of function of the following systems: Digestive, Renal, Respiratory, Cardiovascular, Reproductive.		5	2	3
	Total	25	10	15	
IBSC / BME / BM01 Fundamentals of Electricity and Electronics	PC1. Ability to differentiate between different types of electronic components and connect various components to build circuits.	25	5	2	3
	PC2. Able to perform multiple tasks such as applications of DC / AC machines, measurement of various components of instruments using tools, checking wiring and earthing etc.		5	2	3
	PC3. Ability to test the components using multimeter		5	2	3
	PC4. Demonstrate designing rules for fabrication of PCB and identify types of PCB.		5	2	3

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	PC5. Ability to test and calibrate parts and election devices or equipments.		5	2	3
		Total	25	10	15
IBSC / BME / BM03/ Healthcare Technology Function and Operation	PC1. Describe the major responsibilities of the job of a biomedical engineer	25	5	2	3
	PC2. Interpret circuit diagrams and specifications of electronic systems in technical/service manuals for installation, testing and commissioning		5	2	3
	PC3. Describe deliver process or medical equipments; ensure all equipment and item(s) that are necessary to operate the equipment; perform further adjustments as applicable		5	2	3
	PC4. Describe and demonstrate principles, installation, operation and repair of Intensive Care Equipments		5	2	3
	PC5. Describe and demonstrate principles, installation, operation and repair of Operation Theatre Equipments.		5	2	3
		Total	25	10	15
IBSC / BME / BM04 Hospital Engineering & Management	PC1. Describe the various types of managed care organizations and compare governance, executive roles, marketing procedures, and value.	30	5	2	3
	PC2. Promote patient centred care with a continuous quality improvement orientation ensure smooth functioning of core process by forecasting, streamlining patient flow, staff scheduling, planning space/facilities. Supplies/maintenance, etc.		5	2	3
	PC3. Ability to understand the		5	2	3

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	importance of cost-effective sustainable healthcare through demand generation and enhanced quality care.					
	PC4. Demonstrate the skills on the use of information technology in the hospital		5	2	3	
	PC5. Demonstrate knowledge of strategic planning and decision making in the healthcare organizations		5	2	3	
	PC6. Understand the role of organizational and human resource management in the healthcare field		5	2	3	
		Total	30	12	18	
IBSC / BME / BM05 Medical Terminology for Engineers	PC1. Understand the basic principles of term usage when referring to concepts in the medical field		5	2	3	
	PC2. Distinguish, pronounce, spell, and give meanings for suffixes, prefixes, and roots of medical terms.		5	2	3	
	PC3. Ability to use software technology to comprehend application of medical terminology as also identify terms and their parts of words as they relate to the human body and medical environment.	30		5	2	3
	PC4. Identify the body cavities and recognize the organs contained within those cavities		5	2	3	
	PC5. Define medical terms that apply to the structure and function of the human body		5	2	3	
	PC6. Demonstrate skills on understanding medical documentation and medical records.		5	2	3	
			Total	30	12	18
		Grand Total	135	54	81	

Practical & Skill Test (pre-assessment)

After the completion of sufficient training hours, the candidates should maintain 75% of attendance. The candidates should qualify the pre-assessment test consists of both theory & skill test. Those who qualified in pre-assessment test with 75% they will be shortlisted for final assessment. Those who not qualified in pre-assessment they should reappear in the pre-assessment test.

Theory Assessment (final)

In the final assessment it consists of 30 questions in each module to evaluate the competency of the candidate.

Pass/Fail:

The minimum criteria for passing in final assessment is 60% in each module.

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SECTION 2

25. EVIDENCE OF LEVEL

OPTION A

Title/Name of qualification/component: Certificate in Biomedical Engineering			Level: 5
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
Process	Individuals at this job level need to perform routine tasks including Installation, adjustment, maintenance, repairing or providing technical support for biomedical Equipment under the guidance and supervision of senior biomedical engineers or HOD's. This is an activity which requires limited range of activities routing and predictable.	The performance of the biomedical engineer would be enhanced in doing routine tasks in the healthcare institutions, including rectifying minor malfunctioning of medical equipment, identify / collate break down calls and report to senior personnel. Hence mapped as level - 5.	5
Professional knowledge	This job requires individuals to work in a team and in close collaboration with Medical and healthcare professionals. They must develop aptitude to be polite and remain calm in volatile conditions, as also placate upset individuals. Develop temperament to complete tasks spending long hours as also stay back in departments (ICU / OT) for long duration. The individual should be able to demonstrate clinical skills, knowledge on electrical and electronics, communication skills and ethical	The Applicants should be able to apply their professional knowledge in association with multi-disciplinary teams, communication skills and ability to execute the given task. Hence mapped as level - 5.	5

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Title/Name of qualification/component: Certificate in Biomedical Engineering			Level: 5
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
	behaviour.		
Professional skill	<p>The candidates should have sound knowledge on working of medical equipments and standard operating procedures. Should understand about the terms and definition of laboratory equipments (like pH meter, pH value etc.). Skill proficiency in calibration of medical equipments such as ventilators, patient monitors and etc. The candidates should be able to use tools and software's to resolve problems.</p> <p>The candidates should able to support the BME department under the guidance / supervision by seniors as and when needed. These include preparation and maintenance of log book for service breakdowns, communication with the service companies to sort out the breakdown issues and etc.,</p>	The Applicants are able to apply their skills in delivering their duties including basic trouble shooting of the medical equipments, understanding the medical terminology and laboratory procedures. Hence mapped as level – 5.	5
Core skill	Be update with general and specialized medical terms, sound medical knowledge and specialized operation and maintenance procedures. In day to day operations, it	Applicants are certified based on core skills technical support & adopting best practices in health care sector. The candidates should act as a resource person in the department and act as	5

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Title/Name of qualification/component: Certificate in Biomedical Engineering			Level: 5
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
	includes providing technical support to the doctors, nurses and technicians for the proper use of basic medical equipments, such as patient monitor, ECG, and etc. The biomedical professionals are expected to possess excellent communication skills (written & oral) with good knowledge on usage of computer and programs.	a connecting link to the other departments. Hence mapped at level - 5	
Responsibility	The biomedical professionals are responsible for the maintenance of medical equipments in the hospital. They need to perform daily visit to all departments such as wards, OPD, Emergency, ICU, OT etc. Should have skill set to create and manage medical information system and healthcare delivery systems effectively. Assist in administrative duties including maintenance of the equipment log book, preparing documents for purchase of spares, essential items and etc. Be up to date with the latest developments in the field of Biomedical Engineering nationally and globally.	Applicants are rated on the basis of their ability, approach, aptitude towards the task. It is mapped at Level – 5	5

SECTION 3
EVIDENCE OF NEED

26 Is this certification made mandatory by any statutory body?		
Basis	Description	Evidence
Need of the qualification	The IBSC would undertake market study and would enclose demand forecast for the proposed job role both on short-term and long-term basis to substantiate the requirement of the job role.	<p>The Global medical device industry is poised to reach USD 543.9 Billion by 2020 driven by the increase in the lifespan of aging individuals as well as the increasing costs of healthcare globally. The Indian medical device market is currently established at USD 5.5 Billion and is growing yearly at a steady rate of 15% CARG. A rise in the number of hospitals and the increased requirement for healthcare facilities creates a need for sophisticated devices and equipment, which can provide accurate treatment to individuals. It is expected that the Medical Equipment industry will need at least 1.0 lakh trained professionals every year and this number is likely to increase in the near future.</p> <p>Skill Gap Analysis reports for industry demand and secondary research data, though these do not lend to accurate demand projection.</p> <p>Occupation map is attached ANNEXURE – V & VI</p>
Industry Relevance	The IBSC would undertake validation of the job roles with actual end-user	As per the detailed survey done by Ministry of Health &

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		<p>industry where such employment are going to be generated and absorbed instead of generic validation of industry. The IBSC would submit the endorsements from users/ intended users of the qualification clearly supporting or otherwise the need for trained people against specific job role. The industry validation report is attached. ANNEXURE - IV</p>	<p>Family welfare, it is found that in India there are only 3.32 biomedical engineers per 1,00,000 population. Ministry has already urged the industry bodies and government to share the road map for biomedical engineering to take control of healthcare industry.</p> <p>The report also indicates that 60% of the medical equipments in government institutions are in an unserviceable condition due to lack of maintenance. Hence rigorous training along with strong knowledge has to be imparted to these professionals.</p> <p>Hence this certification paves the way for having a system in place for recognising the skills of biomedical engineers & apply their skills in their profession backed by a certificate.</p> <p>Feedback from industry for demand though sample size may not lend to accurate figures. Training duration, and current and potential training capacity envisaged. The Qualification Pack has been validated by the industry along with endorsements and also received validation from Association of Indian Medical Device Industry (AiMeD)</p>
Usage of the qualification		The IBSC would submit details of the employment generated (wherever	The Medical Equipment industry is the fastest growing sector of the Indian economy and the need for trained

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	<p>applicable) and realised by virtue of training in the Qualifications of the sector earlier submitted for NSQF alignment.</p>	<p>manpower is growing. The trained candidates will be employed in hospitals, medical equipment service company, medical device manufacturing industry and etc.</p>
<p>Estimated uptake</p>	<p>The IBSC would submit the estimated uptake of the qualification and What steps were carried out to test the likely uptake of the qualification. The basis of this estimate should include data about the number of jobs or places in courses of learning which will be available to the candidates.</p>	<p>As per the Healthcare sector report, workforce requirements for the Healthcare sector is expected to grow to 74 lakhs in 2022 which is more than double its existing workforce to meet the market demand. Additionally, the major percentage of the requirement is of allied and healthcare professionals (A&HP) apart from nursing and medical doctors. It is essential to also realign the existing workforce with the required course, so that their skills can be tested and adequate knowledge and skills can be rendered for them to be called as a qualified Biomedical Engineer.</p> <p>Report: Human resource and skill requirement in Health sector is available at https://www.ugc.ac.in/skill/SectorReport/Healthcare.pdf</p>

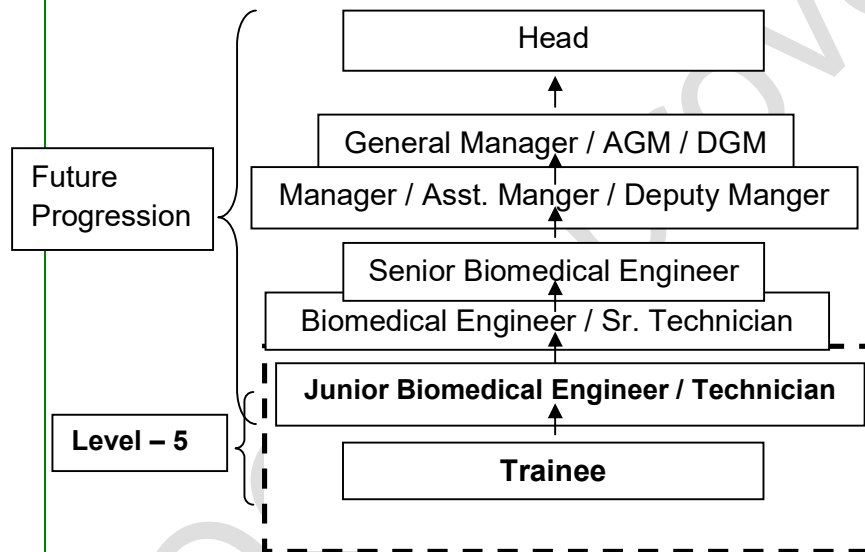
27	<p>Recommendation from the concerned Line Ministry of the Government/Regulatory Body. To be supported by documentary evidences</p> <p>Department of Health & Family Welfare</p>
28	<p>What steps were taken to ensure that the qualification(s) does (do) not duplicate already existing or planned qualifications in the NSQF? Give justification for presenting a duplicate qualification</p> <p>Sufficient research has been done to establish that the certificate course is not available for the skill development of the candidates in Biomedical Sector under the existing Sector Skill Council.</p> <p>The Certification has been mapped with the National Qualification Register, maintained by NSDA to ensure that the qualification does not duplicate.</p> <p>The Certification program is originally designed by core groups including Technical committee, certification committee & strategic committee. These committees comprise of senior biomedical engineers, industrial experts and experienced academicians.</p>
29	<p>What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated? Specify the review process here</p> <ul style="list-style-type: none"> i. IBSC office monitors the screened candidates periodically as per the module & qualifying marks. ii. The review report generated on the basis of previous response by the candidates & benefits candidate on the professional front. iii. The technical committee will be informed to revise the syllabus & question bank for continuous improvements. iv. Qualification is reviewed after every three years for updating according to latest technologies & practices.

SECTION 4
EVIDENCE OF PROGRESSION

30	<p>What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?</p> <p><i>Show the career map here to reflect the clear progression</i></p>
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The Certification program designed for “Certificate in Biomedical Engineering” in each level, is shown below. This certification programme screens potential candidates based on basic knowledge, skill and ability in handling of Medical Equipments and providing technical support, Train clinicians and healthcare professionals on the proper use of medical equipments. To understand the operation, maintenance & service of medical equipment and wide range of activities such as adapt computer hardware or software, advice hospital administrators on the planning, acquisition and use of medical equipment, disseminate knowledge about field through writing or consulting.

Certificate in Biomedical Engineering - Career Graph



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