BBTS Specialist Certificate in Transfusion Science Practice
Enrolled Student Guide

This handbook should be read in conjunction with the programme terms and conditions. This is available to view/ download from the BBTS website.

Introduction

The BBTS Specialist Certificate in Transfusion Science Practice is designed for UK Health and Care Professions Council (HCPC) registered Biomedical Scientists (BMS) working in transfusion science either in a blood establishment (blood centre) or a hospital transfusion laboratory.
This qualification will provide you with evidence of specialist knowledge* in transfusion science, following HCPC registration at practitioner level, required to demonstrate your specialist and independent practice capabilities. It is accredited by the University of Manchester (45 level 7 credits).
**The BBTS Specialist Certificate is not a certificate of competence to practice; the assessment of competence remains the responsibility of your employer.*

This programme of study will build and consolidate your core knowledge and understanding of transfusion science, while developing your analytical and practical skills required for data interpretation, critical thinking and provision of solutions to differing laboratory situations, commensurate with the level of Specialist Practitioner in Transfusion Science (NHS career framework grade 6 and above).

Units and Descriptors

See Appendix for full unit descriptions. Briefly, the course comprises 2 units studied over a 12 month programme;

- Unit 1; compulsory core transfusion knowledge
- Plus your chosen specialist unit; unit 2 or unit 3
- To successfully exit the programme with 45 level 7 credits you need to complete unit 1 plus unit 2 or unit 3

Unit 1: Transfusion Science Practice (Core: 30 credits)
This unit will provide you with knowledge and understanding of a broad range of topics within transfusion science. You will become familiar with methods and strategies to investigate, and gain experience of the interpretation of routine patient and blood donation related results. You will be expected to relate this knowledge to the workplace as you learn to perform relevant laboratory methods.

Unit 2: Immunohaematology (Optional specialism: 15 credits)
This unit will provide you with knowledge and understanding of patient-related transfusion science practice, management of patients requiring blood transfusions and appropriate investigations. You will become familiar with methods and strategies to investigate and gain experience of the interpretation of complex patient related results. You will be expected to relate this knowledge to the workplace as you learn to perform relevant laboratory methods.

Unit 3: Donation Testing and Component Processing (Optional specialism: 15 credits)
This unit will provide you with knowledge and understanding of blood donation-related transfusion science practice. You will understand the processing and testing requirements for blood donations. You will become familiar with methods and strategies to investigate and gain experience of the interpretation of complex blood donation related results. You will be expected to relate this knowledge to the workplace as you learn to perform relevant laboratory methods.

Programme of Study

The course is delivered via a 12 month structured online curriculum of learning through the BBTS Academy. The timetable is as follows:

Start: May 2018

Induction Day

A face-to-face Induction Day in Manchester marks the start of the programme.
If you are unable to attend, all relevant information will be made available online shortly after the event.

End: May 2019

Examination

The final examination marks the end of the programme.
The examination takes place over a full day at a centralised venue in Manchester; exact date and time will be issued to students in August 2018.

- the first paper begins at 10 am (with entry no later than 9.45 am)
- the expected finish time is 3 pm.

Programme running order:

Learning materials are normally released on the second or third Wednesday of each month; release dates are given in the student calendar.
It is recommended that you view the material and complete your learning objectives before the next month begins.
All materials will remain available to review, once published, until the examination date.

Timetable

May:	Immunology (back to basics)/ Antigen-antibody reactions
June:	Reagents, techniques and controls
July:	Antibody mediated red cell destruction/ Basic genetics and transfusion terminology
August:	The ABO blood group system
September:	The Rh blood group System
October:	Other blood group systems/ Antibody screening
November:	Antibody identification/ Pre-transfusion testing
December:	Pre-transfusion testing (continued)/ Hazards of transfusion
January:	Blood components/ Blood donation testing (immunohaematology)
February:	Blood donation testing (microbiology)/ Antenatal serology
March:	Quality/ Revision
April:	Revision/ Exam practice questions

Student Calendar

Download a copy of your student calendar from the BBTS Academy and save locally. It is pre-loaded with key dates (including the examination). It is fully editable and we recommend that you use this to help plan your studies by adding your personal details/ goals e.g.

- Your planned study time each week
- Your planned participation in discussion activities
- Your shifts/ on-call/ days off
- Your holidays/ birthdays/ celebrations etc.

Compulsory and Recommended Learning Activities

A downloadable activity record sheet will be posted each month. These activity logs form your guided learning schedule outlining the minimum amount of study required for this programme. It is recommended that you support your learning by maintaining an up-to-date CPD portfolio of evidence via the BBTS CPD Manager (this is a BBTS member resource)

To gain 45 level 7 credits students are expected to participate in 10 hours of scheduled learning activities per credit (i.e. 450 hours in total). This figure is calculated based on the average time a learner takes to achieve the specified learning outcomes. Examples of learning activities include taught sessions, independent and self-directed study, and work-based events. You should not expect to simply read the text book and be able to pass the examination.
To be successful, **active** participation in the programme is required. This is monitored during the 12 month programme through the **compulsory discussion activities** (CDA) posted on the online forum. Contributions from all students are actively observed and recorded by the BBTS Education Officer on a weekly basis.

It is recommended that you use a variety of resources to assist in your studies:

- Online presentations
    - Including self-check quizzes
- Online compulsory discussion activities (CDAs)
    - You must complete 75% of the CDAs to be eligible to sit the exam (see programme terms and conditions)
    - You can also use the forum to ask, discuss and answer any questions with your fellow students
- Essential, directed and recommended reading
    - The course text book is your main reference
    - Complete the action/ reflection points and end of chapter questions/ assignments
- Multiple choice quizzes/ Mini-assessments to reflect exam layout
- Work colleagues/ workplace activities
    - Local CPD events/ training/ shadowing/ visiting other departments
    - See below for more advice

Some blood establishments also offer short courses in practical transfusion that you may find useful, however it is not a requirement of this course that you attend such training.

Learning at work while undertaking this programme

One aim of this programme is to link your underpinning and specialist knowledge with your everyday transfusion practice. In addition, it will expand and deepen your understanding of those aspects of transfusion science with which you may be less accustomed. It is expected that you will use your experiences of routine working in either a hospital transfusion laboratory or blood services laboratory (or both) during this programme to help you consolidate your learning.
As each person's experience in blood transfusion practice is different, your particular capabilities and learning requirements will vary. BBTS therefore encourages you to plan your learning over the coming year with your work-place training officer and/ or mentor. During the programme you will be directed to complete some specific action points at your workplace.

It is highly recommended that you arrange the following:

- An initial meeting with your training officer/ mentor before you begin your studies
    - To highlight any work-based development needs

    - To arrange any additional training or laboratory experience that may help with the programme
- Following this, regular update and progress report meetings are highly recommended
    - e.g. once per month
    - to help keep you on target with your studying

Please note: BBTS is not responsible for provision of a work-place training officer or mentor.

All types of workplace activities can be used as a source of material to supplement your learning. This may include (this list is not exhaustive):

- Regular 'on-the-bench' duties and investigations
- Following procedures and guidelines
- Referring to procedures and guidelines
- Writing, reviewing and validating standard operating procedures
- Unusual or complex patient and/ or donor investigations
- Internal and external quality assessment scheme participation
- Liaising with other departments and services (e.g. patient blood management team, blood issuing department, patient reference laboratory, etc.)
- Shadowing a colleague (e.g. to learn a new task)
- Validation/ evaluation of equipment and reagents
- Involvement in quality incident reporting
- Involvement with departmental audits

In addition, you will find it beneficial to engage with your own local experts, colleagues and peers in your workplace during your studies. Your attendance at local and national CPD events is encouraged where possible (e.g. NEQAS meetings, Regional Transfusion Committee education days, user groups, journal clubs, conferences, special interest groups etc.).

Essential and Recommended Reading

The supplied course text book forms the main essential reading for this programme.

Essential additional reading takes the form of current UK transfusion guidelines and best practice advice (including amendments and updates occurring over the programme).
Late changes to guidelines occurring towards the end of the programme will be taken into consideration with respect to exam questions.

BSH guidelines (formerly BCSH guidelines)
JPAC website (for the 'Red Book' but also includes the handbook of transfusion medicine, donor selection guidelines and wealth of patient blood management resources)

Recommended additional reading that you may find useful depending on your level of interest is listed below. Note that the books are not required or necessary for you to successfully complete the programme.
We do believe that it is worth approaching your employer to see if they are able to purchase any of them for your transfusion laboratory. Please be aware that the cost of these books can be prohibitively expensive! As a BBTS member you have access to a 25% discount at Wiley's.

Free Internet Resources

Links to the following are also provided in the student area

- SHOT (annual reports and recommendations plus a wealth of educational resources)
- SaBTO (Publications from the UK advisory committee on the safety of blood, tissues and organs)
- ISBT blood group terminology definitions
- **Introduction to Blood Transfusion Technology**. *ISBT Science Series (affiliated to Vox Sanguinis)*. Volume 3 (Number 2). Armstrong, B. Hardwick, J. Raman, L. and Wilkinson, R.
- EudraLex - Volume 4 Good manufacturing practice (GMP) Guidelines

Text Books

- **Mollison's Blood Transfusion in Clinical Medicine**; 11th edition (or later). Klein, H. G. and Anstee, D. J.
- **Practical Transfusion Medicine**; 4th edition. Murphy, M.F., Pamphilon, D. H., and Heddle, N. M.
- Note: A 5th Edition is expected in 2017.
- **Essential Guide to Blood Groups;** 3rd edition. Daniels, G. and Bromilow, I.
- **AABB Technical Manual**; 16th Edition or later. Roback, J. D., Combs, M. R., Grossman, B. J., Hillyer, C. D.
- **The Blood Group Antigens Facts Book**; 3rd edition. Reid, M., Lomas-Francis, C., Olsson, M.
- **Human Blood Groups**; 2nd or 3rd edition. Daniels, G.

If you come across any relevant articles/journals/materials that you feel could be of interest to your fellow students, please let us know and we will add references to this page.

Athens Account Access

Please note that if you work for the NHS you may be able to register for an OpenAthens account for NHS employees (this does depend on your trust being signed up to the service).

Use the following links to find out more.

- England - https://openathens.nice.org.uk/
- Scotland - https://www.athensregistration.scot.nhs.uk/
- Wales - https://register.athensams.net/cym/
- Northern Ireland - http://www.honni.qub.ac.uk/

Assessment

All assessments are constructed to evaluate your knowledge and understanding while at the same time refining and expanding your intellectual and transferable skills.

In-programme (not graded):

- Compulsory discussion activities
- Self-assessment and review activities

End of programme final assessment (graded): Written Examination

The examination takes place on one day and comprises 3 papers:

Paper 1 Multiple Choice Questions

- Duration 1 hour
- Covers unit 1

Paper 2 Short Answer Questions

- Duration 1 hour
- Covers unit 1

Paper 3 Data and Case studies

Paper 3 takes place over 2 hours. It comprises; part A (compulsory) plus part B or C (your chosen specialism)

Please note your specialism paper is selected as indicated on your enrolment application form. You cannot choose to switch options at the examination stage.

Marking and Grading

Exam papers are weighted:

- Paper 1, multiple choice questions, 25%
- Paper 2, short answer questions, 25%
- Paper 3 part A, data interpretation, 20%
- Paper 3 part B or C, data interpretation and case scenarios, 30%

Exam papers are double-blind marked and collated to a PAEC approved marking scheme

- Students receive a final overall percentage score and average scores for each paper.
- The pass mark is 60%
- Grades awarded:

Final overall percentage score	Grade awarded	Additional information
≥75 %	Distinction	AND must achieve ≥60% in papers 1, 2, 3A and 3B or 3C
60-74.4 %	Pass	AND must achieve ≥40% in papers 1, 2, 3A and 3B or 3C
57.5 – 59.4 %	Borderline	A third independent review is triggered; AND must achieve ≥40% in papers 1, 2, 3A and 3B or 3C
<57.5%	Fail	N/A
	Automatic Fail	<40% in *any* one paper. All papers will be marked

Borderline exam papers are reviewed by a third independent marker; their decision is final

Results are moderated and ratified by the BBTS exam board and Manchester University

- Results are emailed within 8-10 weeks following the examination date
- Successful students receive a hardcopy BBTS certificate and Manchester University transcripts (by post)
- Successful student names and grades (not percentages) are published in Bloodlines

Appeals and Re-sits

Please see the current programme terms and conditions for details available on the BBTS website.

Student Representative

As part of the Specialist Certificate in Transfusion Science Practice programme we encourage one individual to act as student representative for the cohort.

This is a voluntary role and great opportunity to get involved with BBTS, help your fellow students and shape the future delivery of the programme. It's also good for your CPD!

Expectations

The main role is to be an additional* contact for any student feedback and/ or concerns. You will be required to

- attend the Programme Committee meetings
    - 1-2 face to face and 1-2 teleconferences over the programme year
    - Make students' views/ feedback known
    - Reasonable travel expenses are paid
- feedback responses from the BBTS Programme Committee to the student cohort

*we encourage and welcome direct feedback and contact from all our students at any time but recognise that sometimes students would rather give this via a third independent party.

Application/ Nomination Process

Each representative is democratically elected by enrolled students of the cohort year they will represent. All students are offered the opportunity to 'self-nominate' for this position in early June. We ask that you complete a short form outlining how you are suited to fulfil this role.

Once all nominations are received your information is posted on the student homepage for all students to consider and then cast a vote for their preferred candidate

- The student with the most votes will be elected
- Should only one student put themselves forward BBTS will elect them unopposed and forgo the student voting process
- If no student nominations are received BBTS will leave the position open throughout the programme
    - This will be noted in the Programme Committee minutes
    - Volunteers are welcome at any point should this be the case

NUS membership

UK-based students enrolled on this programme are eligible to apply for the NUS Extra Discount Card.
Apply here: https://cards.nusextra.co.uk
BBTS details required:

- Place of Study: British Blood Transfusion Society
- Candidate ID/ TSP number* e.g. TSP001

**see your confirmation of enrolment email*

Feedback

We will seek your formal feedback at different points over the programme via anonymous questionnaires. The purpose of this is to check how you're getting on and for you to comment on the programme and your experience so far. Additionally, you may feedback individually to us at any time you wish; directly at bbts@bbts.org.uk or via your student representative.
We will formally ask for your anonymous feedback via questionnaire at the following intervals

- Post Induction
- Mid programme (usually in August and February)
- Post-examination/ pre-results

All results and responses will be published in the student area for you to view. We will also add comments from previous cohorts that you may find useful.

Fees and Finance

Programme fees: £891

- This includes the course text book, student guide/ handbook, online resources, examination, certificate and university transcripts

Additional costs not included in the programme fees:

- BBTS membership
- Travel/ accommodation plus associated expenses e.g. for induction and exam days

Finance options:

	Self-funded					**Employer-funded**		
Payment	20% Deposit	Instalment 1	Instalment 2	Instalment 3	Total payment	20% Deposit	Balance	Total payment
Option 1	£178.20	£249.48	£249.48	£249.48	£926.64*	£178.20	£712.80	£891
Option 2	£178.20	£712.80			£891			
Due Date	31.12.17	17.05.18	31.07.18	31.10.18		31.12.17	31.03.18	

* *Option 1 is subject to an administration charge*

Late payment of programme or membership fees incurs suspension of online access and exam eligibility
BBTS reserves the right to withdraw students from the course where:

- Programme or membership fees remain unpaid
- There is no response to repeated correspondence from BBTS

Help and Support

We endeavour to pre-empt the most common problems encountered by our students through the provision of the information in the student area. *If you are experiencing any difficulties please ensure you have read the various guides available to you before getting in touch directly*; you may find your query already has a solution.

If you need any further support, or cannot find the help you require, please do get in touch. Alternatively you can raise any issues via your student rep.

Points of Contact

Role	**Named Contact**	**Email Contact**	**Postal Address/Tel:**
Education Officer/Admin Support	Michaela Cheetham	michaela.cheetham@bbts.org.uk	BBTS Enterprise House Manchester Science Park Lloyd Street North Manchester M15 6SE 0161 232 7999
Chief Examiner	Robina Qureshi	bbts@bbts.org.uk	
External Examiner*	Jenny White	bbts@bbts.org.uk	
Programme Director (current)	Johnathan Wallis (BBTS President)	bbts@bbts.org.uk	
Programme Director (from September 2018)	Bill Chaffe (Current BBTS President Elect)	bbts@bbts.org.uk	
Academic Advisor (University of Manchester)	Phil MacDonald	bbts@bbts.org.uk Any relevant queries will be forwarded on	

*Please note that it is inappropriate for students to make direct contact with the External Examiner regarding this programme under any circumstances. All appeals must go through the appeals process detailed in the Student Guide and Terms and Conditions document.

Programme or Examination Deferral/ Withdrawal

Dependent upon extenuating circumstances you may be able to defer your first examination or your programme of study. Please see the current programme terms and conditions for details; available on the BBTS website.

Appendix

Unit descriptors

Unit 1: Transfusion Science Practice (Core: 30 credits)

This unit will provide you with knowledge and understanding of a broad range of topics within transfusion science. You will become familiar with methods and strategies to investigate, and gain experience of the interpretation of, routine patient and blood donation related results. You will be expected to relate this knowledge to the workplace as you learn to perform relevant laboratory methods.

Indicative Content

In this unit, you will learn about:

- Human Immune Response with regard to blood groups and transfusion
- Major blood group systems
- Clinical Significance of blood group antibodies
- Basic overview of haemolytic disease of the fetus/ newborn with respect to red cell antibodies
- Processing, testing and issuing of blood components (including the selection of blood donors)
- Pre-transfusion testing undertaken in UK transfusion laboratories
- Hazards associated with transfusion of blood components and investigative/ preventative measures (including haemovigilance)
- Quality Management Systems (including Quality Assurance and Quality Control in the transfusion laboratory setting)
- British Committee for Standards in Haematology (BCSH) guidelines for pre-transfusion compatibility procedures in blood transfusion laboratories
- Guidelines for the Blood Transfusion Services in the UK, European Blood Safety Directives, Blood Safety and Quality Regulations

Learning Outcomes

You will be expected to:

1. Determine, explain and classify antibody production with respect to blood group systems. Compare and contrast the major blood group antibodies.
2. Describe, explain and classify antibody– antigen reactions, the classical complement cascade and antibody-mediated red cell destruction. Examine and categorise causes of intravascular and extravascular red cell destruction.
3. Describe, explain and categorise the key features of the ABO, Rh and other major blood group systems (Kell, Duffy, Kidd, MNS, Lewis, Lutheran and P1PK)
4. Describe, explain, demonstrate, interpret and classify automated and manual serological laboratory tests performed in blood transfusion (to include patients and donors).
5. Examine and solve anomalous serological results for a range of laboratory tests
6. Describe, explain, justify and contrast the similarities and differences between patient-related and blood donor-related serological testing
7. Explain, determine and prioritise the principles and practice of Quality Management Systems including quality assurance and quality control in blood transfusion laboratories.
8. Determine, explain and predict the hazards associated with various aspects of blood transfusion. Examine the operation of the haemovigilance scheme in the UK
9. Describe, categorise and explain donor selection criteria in the UK

10. Describe, categorise and explain processing, testing, storage and specification criteria and issuing of routine blood components supplied by the UK blood services
11. Describe, explain, categorise and investigate the mechanism of haemolytic disease of the fetus/ newborn. Justify routine antenatal testing requirements

Unit 2: Immunohaematology (Optional specialism: 15 credits)

This unit will provide you with knowledge and understanding of patient-related transfusion science practice, management of patients requiring blood transfusions and appropriate investigations. You will become familiar with methods and strategies to investigate and gain experience of the interpretation of complex patient related results. You will be expected to relate this knowledge to the workplace as you learn to perform relevant laboratory methods.

Indicative Content

In this unit you will learn

- Antibody screening, identification, crossmatching and red blood cell selection (including special requirements) in pre-transfusion testing
- Red cell antibody monitoring and blood provision in haemolytic disease of the fetus/ newborn; BCSH guidelines for blood grouping in pregnancy and antibody testing in pregnancy
- Blood group serological reactions in Autoimmune haemolytic anaemia
- Blood group serological reactions in a suspected transfusion reaction
- BCSH guidelines on the administration of blood components
- BCSH guidelines for the estimation of Fetomaternal Haemorrhage
- BCSH guidelines for the use of fresh-frozen plasma, cryoprecipitate and cryosupernatant
- BCSH guidelines for the use of irradiated blood components
- BCSH guidelines for neonates and older children
- BCSH guidelines for the specification and use of information technology (IT) systems in blood transfusion practice

Learning Outcomes

You will be expected to:

1. Outline and analyse variants associated with the ABO and Rh blood group systems. Determine and describe the implications for patients
2. Determine, explain, formulate and interpret the investigation of complex serological reactions, including recommendations for resolving unexpected anomalies, in patient testing.
3. Determine, describe and explain the design, operation and performance of serological techniques used in the investigation and management of haemolytic disease of the fetus/ newborn. Categorise and recommend management strategies for a range of blood group antibodies.
4. Determine and explain the serological problems associated with autoantibodies with respect to blood transfusion
5. Determine and describe the design, operation and performance of serological techniques used in the investigation and management of autoimmune haemolytic anaemia. Categorise and recommend management strategies for blood provision for patients with cold and warm autoantibodies.
6. Determine, explain and interpret the investigation of a suspected transfusion reaction. Discuss the possible causes.
7. Explain and categorise the principles and practice of, and determine between, serological and electronic issue of blood components

8. Discuss and categorise the principles and mechanisms of, and recommend, blood component selection for a range of patients (including fetus/ neonate, haematological, BMT, HSCT, rare blood groups, pregnant women, immunocompromised, children, transfusion-dependent)

Unit 3: Donation Testing and Component Processing (Optional specialism: 15 credits)

This unit will provide you with knowledge and understanding of blood donation-related transfusion science practice. You will understand the processing and testing requirements for blood donations. You will become familiar with methods and strategies to investigate and gain experience of the interpretation of complex blood donation related results. You will be expected to relate this knowledge to the workplace as you learn to perform relevant laboratory methods.

Indicative Content

In this unit you will learn about:

- Preparation and quality monitoring of blood components
- Preparation and specifications of blood components with special requirements
- Testing requirements for blood donations in the UK
- Transfusion transmitted infections with respect to blood donation
- European Blood Safety Directives and Blood Safety and Quality Regulations
- Guidelines for the Blood Transfusion Services in the UK
- BCSH guidelines for the use of irradiated blood components
- BCSH guidelines for neonates and older children

Learning Outcomes

You will be expected to:

1. Determine, explain and discuss the design, operation and performance of processing techniques for blood components
2. Determine, explain and categorise additional processing and testing requirements for non-routine blood components
3. Identify, explain and categorise quality monitoring procedures applied to blood components
4. Determine, describe and categorise the design, operation and performance of automated and semi-automated testing technology used in blood donor testing.
5. Determine, explain, formulate and interpret the investigation of complex serological reactions, including recommendations for resolving unexpected anomalies, in donor testing
6. Describe and categorise the aetiology of transfusion transmitted infections. Discuss and recommend investigations for a range of transfusion transmitted infections.
7. Determine, describe and explain component validation, specification and labelling criteria

Generic Learning Outcomes (applicable to all units)

Intellectual skills

You will be expected to:

1. Critically analyse scientific data
2. Evaluate results commonly encountered in blood transfusion laboratories
3. Apply knowledge of transfusion science to address specific laboratory problems

Practical skills

You will be expected to:

1. Present information clearly in the form of verbal and written reports.
2. Communicate complex ideas and arguments in a clear and concise and effective manner.

Transferable skills and personal qualities

You will be expected to:

1. Present complex ideas in simple terms in written format.
2. Consistently operate within sphere of personal competence and level of authority.
3. Select and apply appropriate analysis or assessment techniques and tools.
4. Actively seek accurate and validated information from all available sources.
5. Evaluate a wide range of data to assist with judgements and decision making.
6. Interpret data and convert into knowledge for use in the clinical context of individual and groups of patients and donors.
7. Work in partnership with colleagues, other professionals, patients and their carers to maximise patient care.