IOP Institute of Physics

TSST COURSE AUDIT FORM

This form is designed to allow community based panels of teachers to evaluate each other's course, facilitated by the Institute of Physics.

Courses which meet the required standard will be deemed to have received IOP-enabled community approval.

Evaluators will be primarily looking at consistency between course objectives/outcomes and mode of delivery. The audit form is designed to test the coherence of the course as described. Individual courses may vary in length and it is for individual participants to decide which advertised length suits their needs best.

However, based on community feedback, it was felt that it would be helpful to provide some guidance as to specific aspects. Most specific recommendations are given in the Notes columns. In addition it was felt that a TSST course securing IOP approval would normally be expected to take 30-50 hours to complete, excluding unmonitored independent learning time. Please note that a course submitted for auditing will not be penalised if it does not meet a stated guideline. However, the approval panel will expect to see some justification.

Institute of Physics will publish details of all community approved courses on the IOP website.

Name of lead school	George Abbot Teaching School
Lead contact	Jackie Blackwood
Date submitted	26/09/18

Course summary	**Notes**
The course is run on 3 whole days (2 days in the science labs at George Abbot School and 1 day in the physics department at Surrey University) and 6x 2 hour twilights (in the science labs at George Abbot School) as follows: Course Dates: Day 1 – 18 October 2018 Forces & Motion (DI), Day 2 – 24th January 2019 Electricity & Electromagnetism (2), Day 3 – 7 March 2019 Forces and Motion (3), Twi 1 – 8th November 2018 Energy, Twi 2 - 21st November 2018 Matter, Twi 3 – 5th February 2019 Electricity, Twi 4 – 13th February Waves, Twi 5 – 20th March 2019 Forces, Twi 6 – 27th March 2018 Space. This course involves the participants in a number of learning approaches: Lectures, presentations and group tutorial work; Hands-on use of apparatus and demonstrations; Group sessions; Online tutorial work; Private study including pre-session work and post-session gap tasks to support consolidation of learning. Aims of the course: By the end of the course teachers will: • Gain a better understanding of how to teach physics concepts and strengthen subject pedagogy • Explore opportunities for practical work in physics • Enhance the learning experience for students by maintaining their interest in the subject • Ensure students success by addressing common errors and misunderstandings At the start of each course day, the teachers begin by sharing their experiences of how they have applied their previous course day learning, and provide evidence of how they have assessed the impact on student learning outcomes related to the topics e.g. addressing misconceptions	The content of this year's TSST Physics course is the same as last year. The only change to the course is the delivery model. In response to feedback from participants we have changed the format from six full days to 3 full days and six twilight sessions to enable the course to fit around the teaching requirements of our participants. Additionally we have employed Dr Mike Lewis, a physics teacher from an outstanding institution to deliver some of the practical work in light of new specifications in the curriculum. This ensures the course is up-to-date and fit for purpose whilst retaining its original integrity.

	Subject area (indicate number of hours)					
Mode of delivery	Energy	Motion & Forces	Waves	Electricity & electromagnetism	Matter & Space	Other, if any, specified below: Radioactivity with particular focus on safety
Face to Face (Presentations, lectures, guided group tutorial work with tutor present)	5	5	2	5	2	2

Practical (Hands on use of apparatus working individually or small groups. Observation of demonstrations is not deemed to be practical work)	1	2	2	2	1.5	0.5
Coaching/ Mentoring (One to one or small group sessions involving coaching, mentoring or allied techniques led by an experienced practitioner.)	1	1	1	1	1	
Monitored independent learning (e.g. online tutorial work)	1	2	1	1	1	
Other modes (please specify below)						
Total hours	8	10	6	9	5.5	2.5

Please provide further *brief* detail on the following aspects of the course	**Notes**
Practical Work	
Practical work is focused on equipment and techniques less familiar to non-specialist physics teachers e.g. measuring specific heat capacity, using radioactive sources, getting the most out of air-track experiments, setting up and using a CRT to demonstrate the bending of electrons in a magnetic field. Consequently a key emphasis on the practical work is safety related to using such apparatus with students in the classroom. The teachers are encouraged to work independently and imagine themselves as their students in terms of what excites and where the challenges lie with a specific practical. They work in pairs to think through the work and share their skills to gain confidence.	
Subject knowledge	
The teachers are set pre course day tasks e.g. discussing with students their experiences with the topic and to gain insight into challenges students have with the math. The lectures are interactive and teachers are encouraged to share their challenges with the subject including interactive workshop	

activities such as card sorts, solving practice math questions using equations taught in the topic and preparing practical work. Teachers are given post course day gap tasks to test out their subject knowledge and reflect on their learning. This includes classroom work with students and completing questions using the physics diagnostic tool. Teachers are also enrolled into a George Abbot group on the TalkPhysics forum so they can ask for further support from each other and the course leader.	
Pedagogical Content Knowledge	
The pedagogic methodology used throughout this course draws upon the leader's experience as a STEM Learning consultant, AQA consultant and A level physics teacher, to support the teachers identify and address pupil misconceptions related to the topics. This ensures that teachers through interactive workshop experiences gain confidence in learning how to apply the subject knowledge and understanding where this knowledge fits into the overall school science curriculum, e.g. the teachers have been encouraged to review the Primary National Curriculum to recognise the prior learning of students entering KS3.	
Research Informed Practice	
Specific websites and YouTube videos related to informed best practices are embedded into the learning materials and act as part of the workshop resources. All teachers have been strongly encouraged to make use of STEM ambassadors in their teaching to give student learning better contextual links.	
Handling of Mathematical Requirements	
The Forces and motion (I) topic included a session on the process of linking parameters through proportionality and identifying the dependency relationship of parameters in practical work e.g. the teachers did a simple density measurement to link mass and volume proportionality to a constant for each material. During practical work the teachers are expected to identify and evaluate sources of error. Graphical representation techniques have included capturing data through the use of the Vernier Video Physics Apple app - and sharing their experiences of using this with pupils in the classroom to make data capture more interactive and motivating.	
Participant Assessment Arrangements	
All teachers participating on the course are expected to complete post course day diagnostic testing questions and keep a portfolio of their learning experiences in a TSST course reflective diary provided to them on Day-1. These are assessed by the course leader before the next session and feedback provided to the teachers at the beginning of each session, e.g. a focus on any common theme incorrectly answered question. Teachers also keep a record of lesson observations by their school in their portfolio and discuss their learning progress with their head of department in their regular school mentoring meeting. The students have been provided with a memory stick to keep all the materials used on the course.	

Quality Assurance	
The course material uses the IOP TSST recommended powerpoint material and also incorporates pedagogic techniques and best practices from validated research at the National Science STEM Centre at the University of York. The TSST course leader is a member of the Institute of Physics, a Chartered Engineer, an AQA Hub Leader and STEM Learning accredited presenter and consultant. George Abbot School is the lead school in the Guildford Education Partnership.	
Individualisation for Participants	
The participants include a SEN teacher, non-physics specialist NQTs, teachers returning to teaching after a career break and a current Head of Science (biochemist) who is expected to teach A level physics. The different background experiences of the participants is considered when the teachers work together on practical work and the diagnostic questions are differentiated to allow all participants to gain confidence accessing the materials.	
Course Evaluation Mechanism	
Both presenters and course presenter are asked to evaluate and feedback after every session as well as post course. The presenter evaluates each participant and produces progress reports based on the intersessional gap tasks to test out their subject knowledge and reflect on their learning. Additional reassurance has been provided due to having IOP approval in 2017-18 (which we are applying for via the fast track process in 2018-19.) Lastly, we have been selected as Regional TSST lead for the South-East and will be putting a Physics TSST strategic board in place where best practise will be shared and implemented by all TSST providers in the region.	
Lifelong Learning of Participants	
All participants are strongly encouraged to register as associate members of the IOP. This will be mandatory before completion of the course. Participants have also been encouraged to register at www.stem.org.uk to gain access to many free materials to support student learning. Since registering on the TalkPhysics forum, the participants have provided feedback that they already find the different age range physics forums very useful for accessing physics concepts and teaching ideas to support successful student learning outcomes.	