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**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.**

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| **Name of lead school** | Cheadle Hulme High School |
| **Lead contact** | Paul Cass |
| **Date submitted** | 10/9/18 |

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| **Course summary** | **Notes** |
| The Cheadle Hulme High School TSST builds on our existing best practice in the area of Physics 11-16. All of our programmes are delivered by a highly experienced and trained Institute of Physics School Based Coach. Through a blended learning approach, we aim to develop participants not only to be conversant with the relevant subject knowledge but also the most effective pedagogic approaches associated with learning in these areas. Participants are given an experienced professional learning tutor who supports them throughout the programme.For those wishing to pursue a Masters degree our programme has the additional opportunity to be accredited with a local university through a module of Reflection on Action. This is supported by a series of Criticality focused sessions.Through our experience with multiple cohorts of TSST we are well aware that every participant is different and have their own needs. We aim to offer a supportive environment where learning physics and developing pedagogical approaches is fun and interactive. Participants can expect to be challenged whilst simultaneously supported. They will develop a clear understanding of pedagogic structures which will support teaching and enable students to counter their misconceptions. | Short description of the course (e.g. objectives and expected outcomes) |

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|   | **Subject area (indicate number of hours)** |
| **Mode of delivery** | Energy | Motion & Forces | Waves | Electricity & electromagnetism | Matter & Space | Other, if any, specified below: |
| Face to Face (Presentations, lectures, guided group tutorial work with tutor present) | 5 | 5 | 5 | 6 | 7 |  |
| Practical (Hands on use of apparatus working individually or small groups. Observation of demonstrations is not deemed to be practical work) | 1 | 1 | 1 | 1 |  |  |
| Coaching/ Mentoring (One to one or small group sessions involving coaching, mentoring or allied techniques led by an experienced practitioner.) |  |  |  |  |  | 142 Structured school experience days (observation days) |
| Monitored independent learning (e.g. online tutorial work) | 2IoP Online Learning | 2IoP Online Learning | 2IoP Online Learning | 2IoP Online Learning | 2IoP Online Learning |  |
| Other modes (please specify below) |  |  |  |  |  |  |
| **Total hours** | 8 | 8 | 8 | 9 | 9 | 14 |

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| **Please provide further *brief* detail on the following aspects of the course** | **Notes** |
| **Practical Work** | Specify what nature is – e.g. embedded in related session/standalone/skills focussed, work in pairs/groups. Also include Health and Safety measures in place.  |
| The TSST is designed around using practical work to enhance conceptual learning rather than as a driver for content. The pedagogical approaches that are employed utilise practicals for exemplification. Practical work is embedded where appropriate. With regard to grouping this is determined through assessment of suitability, where paired work is appropriate this is the mode which is employed. Individual practical work is utilised as an ongoing assessment method to ensure that TSST participants are able to work safely. Familiarity with exemplar safety policies is key.Day 1 Main focus is use of circuits equipment, addressing misconceptions, proving theory and helping students to build correct circuits.Day 2 Focus is on bouncing a ball investigation and consideration of energy stores and graph drawing.Day 4 Focusses on wave demonstrations.Based on the need of the group and misconceptions which present, sessions will employ bespoke practical activities. |
| **Subject knowledge** | Please give more details on methodology of subject knowledge (e.g. lecture, practice questions, peer tutorial, diagnostic testing) |
| The contact days represent an opportunity to explore big ideas in physics both in terms of subject but also pedagogic knowledge. These involve not just the delivery of GCSE content but moving beyond to the early aspects of A-level study. This is to ensure that teachers are able to excite and interest students to continue their studies beyond GCSE. After each big idea there are assessed gap tasks to ensure further engagement with the topic but also determine whether additional work is necessary. Through this a bespoke and differentiated approach can be created. Access to internet based subject tutorials and MOOCs are also signposted as required.The Masters aspects will involve exploring academic texts with regard to misconceptions, assessment and methodology. These sessions are interleaved within the contact days. Assessment for Masters accreditation takes the form of a series of post-session critical reflections and a final evaluative piece focusing on impact in practice. |
| **Pedagogical Content Knowledge** | Give further details on methodology used (e.g. pupils, misconceptions/naïve conceptions) |
| A detailed, structured curriculum is mapped out across all phases, ensuring continuity and supporting transition. Effective mastery curricula are designed in relatively small carefully sequenced steps, which must each be mastered before pupils move to the next stage. Fundamental skills and knowledge are secured first. This often entails focusing on curriculum content in considerable depth at early stages.Theoretical concepts have origins in specialist knowledge with associated misconceptions. These concepts have specific purposes in that they enable us to make reliable generalisations from particular cases and test our generalisations. Theoretical concepts are systematically related to each other (in subjects and disciplines) and are acquired consciously and voluntarily through pedagogy in school.Knowledge, like anything worthwhile, is not only shared but has to be struggled for – wrought from the world by work no less dedicated than the work it took to create it. Pedagogy is the hard work of making a relationship with ideas that are new to the learner. The curriculum and the pedagogy of the teacher can offer a student ways of relating to knowledge that is new to them and new in how this knowledge relates to their experience. Teachers need to have strong subject knowledge and be able to convey this confidently and unapologetically – this is the nub of effective PCK.Teaching content does not preclude the idea that multiple answers are possible. Teachers should question students in a way that provides intellectual stimulus to explore the subject more deeply. Academic subject specific language should be the norm in the classroom. Whether pupils acquire this new relationship between knowledge and their experience is largely the responsibility of the teacher and the confidence they have in their subject and pedagogy. Another way to grasp the meaning of the term pedagogy refers to the relationship between teachers and students that are involved in development of their knowledge. Teachers are involved in pedagogy as specialists; schools are the specialist institutions that bring teachers and students together. |
| **Research Informed Practice** | How do you propose to embed the results of research informed best practice (e.g. access to research articles)  |
| The TSST programme is informed by current educational research and delivered by our Director of Physics who is actively engaged in masters level education. The programme is designed around the findings of the EEF toolkit. It takes advantage of some of the larger drivers within this meta-analysis. For instance, the place of feedback and effective methodologies of this are explored. Metacognitive skills to move from session based performance to long term learning is a key focus. This is greatly informed by the work of Bjork and Bjork. Moreover, Willingham’s sequencing of learning and cognitive load is used to design sessions and inform content.  |
| **Handling of Mathematical Requirements** | e.g. handling of graphical techniques, proportionality, errors |
| We acknowledge that mathematical skills underpin much work in physics. Clearly one of the main cognitive barriers to learning physics is the application of mathematics with fluency. In our experience of working with multiple cohort of Physics TSST participants the fear many non-specialists experience before starting the TSST is tangible. We have developed a clear understand of the limitations in the application of mathematical skills these include rearranging formula, getting significant figures right and using their calculator correctly. To counter this, much of the work is developing fluency in these area. Here we focus on the areas as highlighted by ACME 2016:* conceptual understanding;
* procedural and factual knowledge;
* the ability to reason;
* the ability to solve and pose problems.
* the connections between different areas;
* how mathematical ideas build upon and lead to others;
* ways of modelling and representing mathematical ideas;
* specific and consistent use of mathematical language and notation.
* the way mathematics is used within other subjects
* and different terminology that might be used;
* the way mathematics is used beyond the classroom,
* for example in work
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| **Participant Assessment Arrangements** | Use of various modes e.g. lesson observation, portfolio, diagnostic testing, etc.  |
| Initial diagnostic testing is carried out using the IoP diagnostic tests. These are used to inform and direct subsequent work. On-going diagnostic questioning is further used to meet participant need. Over the course of the taught element of the programme participants develop a portfolio of work. All participants have the opportunity to attend at least one school based experience day. Those who carry out two days will be observed and supported delivering co-constructed content.The Masters level assessment is carried out in partnership with Manchester Metropolitan University. This assessment is carried out by the HEI board but is informed by the work in TSST. This assessment acts as a mechanism to get participants to further engage with the subject and pedagogical knowledges around Physics – as part of the assessment participants are then enrolled on the MSc (STEM) which further supports their development. |
| **Quality Assurance Mechanisms** | Mention use of any form of quality assurance – use of validated material, external validation or accreditation. Please include qualifications of staff.  |
| As a Teaching School we have significant experience of designing and delivering effective professional development. All of our trainers are SLEs, one is an is an IoP School based Physics Coach for the Stimulating Physics Network and working towards CPhys accreditation. Moreover, all of our TSST evaluations to date have rated our provision as outstanding. We seek to continue this and make incremental improvements to ensure the very best quality.With regard to the depth of knowledge both subject and pedagogic we are in an incredibly fortunate situation with our physics departments. We have high qualified physics departments whose subject knowledge is exemplary as demonstrated, in part, through our impressive numbers for sixth form take up in these areas and our outstanding sixth form results. All of our trainers are either completing or have already completed their Masters degrees in Education. Furthermore, we also have a Doctoral Associate Tutor from MMU on staff who delivers our Masters in Education degree across the alliance. The programme is quality assured throughout Teaching School with scrutiny applied through the governance structure within this. This is aligned to the NCTL quality assurance and evaluation methods. |
| **Individualisation for Participants** | Mention any separate routes possible, and how those routes are decided. |
| All course attendees are encouraged to come for at least one observation day (two are available) shadowing various physics teachers in the school. Deconstructing the activities within the observed lessons is a key element of this and is carried out on a one to one basis. The Return to Teaching participants take great advantage of these opportunities. Those participants who take advantage of more than one observation day get the opportunity to team plan/teach tasks.Further to this additional time is dedicated to address areas of difficulty that have been encountered. Much of this happens on the day but with follow up support either provided online or directed online through IoP units. |
| **Course Evaluation Mechanism** | Mention evaluation by participants, or external body, if you intend to publish survey results etc.  |
| Initial baselining using the IoP diagnostic assessments are carried out to determine the actual subject knowledge. Subject delivery confidence is established through a series initial topic based discussions/tasks at the commencement of the programme. These are used as a diagnostic tool to establish cohort and individual need. These assessments are then repeated at the end of the programme prior to completion to quantitatively evaluate progress.For serving teachers an aspect of their commitment to participate in the programme involves the agreement to provide longitudinal tracking of their pupil outcomes both before participating but also up to 2 years after. In addition, long term evaluative data is collected from participants, line managers and headteachers to determine qualitative impact of the programme.All of the planned evaluative aspects of the programme are informed by impact assessment practice and shared with the governing board of the Teaching School. |
| **Lifelong Learning of Participants** | The TSST courses are inevitably of limited duration. Explain how participants are enabled to acquire the skills for autonomous learning beyond the course itself.  |
| The TSST course aims to show that key physics concepts can be understood and explained by any teacher of science. To build on this we want participants to use this as a foundation to build their physics knowledge & pedagogy and be open to the idea of doing some research or asking for help.Participants are asked to reflect on their learning and practice while the course is taking place. Further access to ongoing professional learning is encouraged and signposted. For instance as part of the TSST programme participants are supported in a unit of the MSc(STEM) programme at MMU. They are also provided with exemplars of practice through the IoP Stimulating Physics Network with the opportunity of hosting a SPN event at their workplace to further embed into the departmental work. This is not a one off but offered over a period of time. |